

Texas Tech University Catalog

2003 – 2004

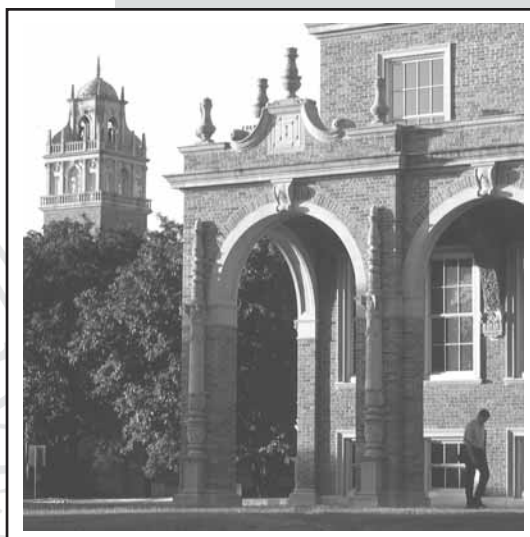
Undergraduate
and Graduate

Volume LXXX
June 2003

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 2003-2004 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.



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 following initial enrollment. The university reserves the right to make changes at any time to reflect board policies, administrative regulations and procedures, state law amendments, 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 class schedules that can be found on the web site of the Office of Official Publications (www.depts.ttu.edu/officialpublications). The *Undergraduate and Graduate Catalog*, as well as other official university documents, is available online.

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, 214 West Hall, (806) 742-3674, or the Center for Campus Life, 250 West Hall, (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, with the assistance of an advisory committee of disabled and nondisabled students, faculty, staff, and community members in related professions.

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, 214 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 the TCB counselor, 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 Law Schools
- American Association of Museums
- American Association of Petroleum Land Management
- American Bar Association
- American Chemical Society
- American Nurses Credentialing Center
- American Psychological Association
- American Society of Landscape Architects
- American Society of Mammalogists
- American Speech-Language-Hearing Association
- Association for Access Merit and Accreditation of Laboratory Animal Care, Intl.
- Association of American Law Schools
- Board of Nurse Examiners for the State of Texas
- The Certified Financial Planner Board of Standards, Inc.
- Commission on Accreditation for Marriage and Family Therapy Education
- Commission on Accreditation in Physical Therapy Education
- Commission on Accreditation of 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
- State Board for Educator Certification
- Supreme Court of Texas
- Texas Educational Theatre Association

Welcome

Dr. Donald R. Haragan
Interim 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.

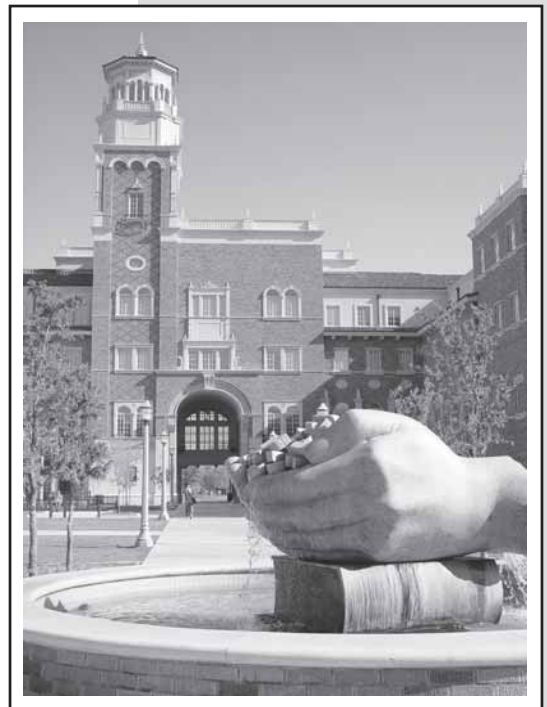


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Administration

Board of Regents

Officers

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

Members

Term Expired January 31, 2003

John W. Jones Brady
Dr. Nancy E. Jones Abilene
J. Michael Weiss Lubbock

Term Expires January 31, 2005

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

Term Expires January 31, 2007

C. Robert Black Horseshoe Bay
J. Robert Brown El Paso
David R. Lopez Austin

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

Executive Secretary, Board of Regents, Lucy Lanotte, 2000. B.A., Mills College, 1966

Senior Vice Chancellor Richard Butler, 1996. B.A., Humboldt, 1971

Senior Vice Chancellor and Chief Information 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

Special Assistant to the Chancellor Richard A. Baker, 2002. B.A., Texas, 1999; M.P.A., Texas Tech, 2002; J.D., 2002

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 Counsel Pat Campbell, 1981. B.S., Texas Tech, 1968; J.D., 1971

Vice Chancellor for Facilities Planning and Construction Michael A. Ellicott, 1999. B.S., Lafayette, 1968; M.S., Missouri, 1976; Reg. Prof. 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 News and Information Cynthia R. Rugeley, 1998. B.A., Texas Christian, 1978; M.A., Midwestern State, 1984

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

Office of the President

Interim President Donald R. Haragan, Professor of Geosciences, 1969. B.S., Texas, 1959; M.S., Texas A&M, 1960; Ph.D., Texas, 1969

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

Vice President for Fiscal Affairs Lynda Gilbert, 2001. B.S., Texas A&M, 1975; M.S., 1983; Ph.D., 1998

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 Psychology and Leadership, 1990. B.S., Western Illinois, 1979; M.S., 1981; Ed.S., Pittsburgh State, 1987; Ph.D., Kansas, 1991

Vice President for Research, Graduate Studies, and Technology Transfer Robert M. Sweazy, Professor of Civil Engineering, 1970. B.A., Wichita State, 1962; M.S., 1966; Ph.D., Oklahoma, 1970; Reg. Prof. Engr. (Texas)

Official University Academic Calendar

Summer 2003

Intersession at Junction

May 15-27

Classes held at Junction Center campus for Intersession.

First Summer Term

May 23, Friday

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

May 27, Tuesday

Noon, residence halls open for occupancy.

May 28, Wednesday

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

May 29, Thursday

Classes begin.

May 29-30, Thursday-Friday

Student-initiated drop-add on the Web.

June 3, Tuesday

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

June 5, Thursday

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

June 13, Friday

Last day to declare pass-fail intentions.
Last day to drop a course and receive an automatic W.
Last day for degree candidates and faculty to order invitations and academic regalia at the bookstore.

June 18, Wednesday

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

June 27, Friday

Last day of classes.

June 30-July 1, Monday-Tuesday

Final examinations.

July 1, Tuesday

First summer term ends.

July 2, Wednesday

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

Last day for graduate degree candidates to defend theses/dissertations

July 3, Thursday

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

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.

Second Summer Term

July 3, Thursday

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

July 7, Monday

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

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

July 8, Tuesday

Classes begin.

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

July 8-9, Tuesday-Wednesday

Student-initiated drop-add on the Web.

July 11, Friday

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

July 23, Wednesday

Last day to declare pass-fail intentions.

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

July 28, Monday

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

August 6, 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 7-8, Thursday-Friday

Final examinations for the second term.

Last meal served in residence halls Thursday evening.

Second summer term ends Friday.

August 9, Saturday

Commencement.

10 a.m., residence halls close.

August 11, Monday

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

Fall 2003

August 24, Sunday

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

August 25, Monday

Faculty on duty.

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

August 27-29, Wednesday-Friday

Registration for new students.

August 28, Thursday

First meal (breakfast) served in residence halls.

August 29, Friday

Last day to register without penalty.

September 1, Monday

Labor Day. University holiday.

September 2, Tuesday

Classes begin.

September 2-5, Tuesday-Friday

Student-initiated drop-add on the Web.

September 12, Friday

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

September 17, Wednesday

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

September 29, Monday

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

October 8, Wednesday

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

October 13, Monday

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

October 27, 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 4, Tuesday

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

November 5, Wednesday

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

November 10, 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 10-25

Spring semester advance registration for currently enrolled students.

November 26-30, Wednesday-Sunday

Thanksgiving holiday.

December 1, Monday

Classes resume. Open registration begins.

December 4-10, Thursday-Wednesday

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

December 5, 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 10, Wednesday

Last day of classes.

December 11, Thursday

Individual study day.

December 12-17, Friday-Saturday and Monday-Wednesday

Final examinations.

December 17, 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 18, Thursday

Last meal (breakfast) served in residence halls. 10 a.m., residence halls close. Noon, grade rolls for graduating students due in the Registrar's Office.

December 20, Saturday

Commencement. Degree candidates may occupy rooms until noon.

December 22, Monday

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

Spring 2004**January 9, Friday**

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

January 11, Sunday

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

January 12, Monday

Faculty on duty.

January 13, Tuesday

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

January 14, Wednesday

Classes begin.

January 14-20, Wednesday-Tuesday

Student-initiated drop-add on the Web.

January 19, Monday

Martin Luther King Jr. Day. Holiday.

January 23, 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 11, Wednesday

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

February 23, Monday

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

February 25, Wednesday

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

March 10, 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 13, Saturday

Noon, classes dismissed for spring vacation.

March 22, Monday

Classes resume.

April 1, Thursday

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

April 1-19

Summer and fall semester advance registration for currently enrolled students.

April 2, Friday

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

April 7, 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 12, Monday

No classes.

April 20, Tuesday

Open registration begins.

April 27-May 3, Tuesday-Monday

Period of no examinations except for make-up exams or scheduled lab exams.

April 30, 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, Monday

Last day of classes.

May 4, Tuesday

Individual study day.

May 5-11, Wednesday-Friday and Monday-Tuesday

Final examinations.

Spring semester ends.

May 12, Wednesday

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

Last meal (breakfast) served in residence halls.

10 a.m., residence halls close. Degree candidates may occupy rooms until Saturday, May 15.

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

May 15, Saturday

Commencement.

May 17, Monday

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

Summer 2004**Intersession at Junction****May 12 - 27**

Classes held at Junction Center campus for Intersession.

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) served 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) served 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) served 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) served in residence halls.

10 a.m., Residence halls close.

August 9, Monday

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

Majors and Degrees

Undergraduate Majors

The diverse programs at Texas Tech allow students to explore many academic options. Students who are undecided about a major may enroll as an undeclared student in the College of Arts and Sciences. Students with a general interest in a particular area may enroll as an undeclared major in one of the other colleges. It is not critical for freshmen to choose a major immediately.

- **Agricultural Sciences and Natural Resources**
 - Agribusiness
 - Agricultural and Applied Economics
 - Agricultural and Applied Economics/General Business
 - Agricultural Communications
 - Agronomy
 - Animal Science
 - Environmental Conservation of Natural Resources
 - Food Technology
 - Horticulture
 - Interdisciplinary Agriculture (Agricultural Education)
 - Integrated Pest Management
 - Landscape Architecture
 - Range Management
 - Wildlife and Fisheries Management
 - Agriculture Undecided
- **Architecture**
 - Architecture/Business (dual)
 - Architecture (Bachelor of Science)
 - Architecture/Civil Engineering (dual)
- **Arts and Sciences**
 - Advertising
 - Anthropology
 - Applied Physics
 - Biochemistry
 - Biology
 - Cell and Molecular Biology
 - Chemistry
 - Classics (Classical Languages)
 - Communication Studies
 - Economics
 - English
 - Exercise and Sports Sciences
 - French
 - General Studies
 - Geography
 - Geosciences with specializations in geology, geophysics, or geochemistry
 - German
 - Health
 - History
 - International Economics
 - Journalism with specializations in either news editorial or broadcast
 - Latin American/Iberian Studies
 - Mathematics/Computer Science (dual)
 - Mathematics
 - Microbiology
 - Philosophy
 - Photocommunications
 - Physics
 - Political Science
 - Psychology
 - Public Relations
 - Russian Language and Area Studies
 - Social Work
 - Sociology
 - Spanish
 - Telecommunications
 - Zoology
 - Arts and Sciences Undeclared
- **Business Administration**
 - Accounting
 - Agricultural and Applied Economics/General Business (dual)
 - Architecture/Business (dual)
 - Business Economics
 - Finance
 - Finance/Real Estate
 - General Business
 - General Business International
 - International Business
 - Management
 - Management Information Systems
 - Marketing
 - Petroleum Land Management
 - Business Administration Undecided
- **Education**
 - Multidisciplinary Studies
 - Multidisciplinary Science
 - Majors using the term "Education" are not offered (e.g., Secondary Education, Art Education). Individuals are certified to teach in elementary or secondary schools 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
 - Engineering Undecided
- **Health Sciences**
 - Clinical Laboratory Science
 - Communication Disorders
 - Emergency Medical Services Management
 - Nursing
- **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. Additional options within the Honors College include the following:
 - Natural History and Humanities (Bachelor of Arts)
 - Honors Program in Management (leads to Bachelor of Business Administration)
- **Human Sciences**
 - Apparel Design and Manufacturing
 - Family and Consumer Sciences
 - Food and Nutrition
 - Human Development and Family Studies
 - Interior Design
 - Personal Financial Planning
 - Restaurant, Hotel, and Institutional Management
 - Retailing
- **Visual and Performing Arts**
 - Design Communication (Art)
 - Art History
 - Dance
 - Music (Bachelor of Arts)
 - Music (Teacher Certification)
 - Music Composition
 - Music Performance
 - Music Theory
 - Studio Art
 - Theatre Arts with specializations in either Acting/Directing or Design/Technology
 - Visual Studies (Art)

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.Agr.
 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.

• 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.
 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.
 Mass Communications, M.A.
 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, M.A., Ph.D.
 Psychology, Clinical, Ph.D.
 Psychology, Counseling, M.A., Ph.D.
 Psychology, General Experimental, M.A., Ph.D.
 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. Acct.
 Business Administration, M.S., Ph.D.
 General Business, M.B.A.
 International Business, I.M.B.A.

• Education

Bilingual Education, M.Ed.
 Counselor Education, M.Ed.
 Curriculum and Instruction, M.Ed., Ed.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.
 Supervision, M.Ed.

• 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.
 Communication Disorders, M.S.C.D.
 Health Services Research, M.S.H.S.R.
 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.
 Physician Assistant, M.P.A.S.
 Physiology, M.S., Ph.D.
 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.

• 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 Education, M.M.Ed.
 Music History and Literature, M.M.
 Music Theory, M.M.
 Performance (Music), M.M.
 Theatre Arts, M.A., M.F.A.
 Theatre & Dance–Fine Arts, Ph.D.

• Interdisciplinary Programs

Biological Informatics, M.S.
 Biotechnology, M.S.
 Heritage Management, M.S.
 Interdisciplinary Studies, M.A., M.S.
 Land-Use Planning, Management, and Design, Ph.D.
 Multidisciplinary Science, M.S.
 Museum Science, M.A.
 Public Administration, M.P.A.

• Joint Programs

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

Reader's Guide to the Catalog

Organization

This catalog has many sections but is basically divided into four broad categories:

- **GENERAL INFORMATION** about the university and its administration, academic calendar, degrees and majors, facilities and services, admission requirements, registration procedures, tuition and fees, housing, student affairs, and academic requirements.
- **ACADEMIC UNITS** divided into colleges and professional schools. Each consists of smaller units called departments, programs, or areas of study. Beginning with the section on Graduate Studies, the catalog provides a broad overview of each academic unit and its faculty, course offerings, and academic requirements.
- **COURSE DESCRIPTIONS** of nearly 4,500 courses arranged by subject areas. These provide such detailed information as the required prerequisites, hours of earned credit, hours spent in class per week, and hours of required laboratory work (see "Explanation of Course Offerings" on this page).
- **SUBJECT INDEX** for help in locating a topic or department quickly.

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.

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 page 13.

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

Explanation of Course Offerings

Texas Tech offers nearly 4,500 courses as part of its curriculum. In the "Course Descriptions" section of this catalog, these courses are listed alphabetically by subject prefix (see next page). Within each subject the courses appear in numerical order, moving from beginning freshman or remedial 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, such as the following mathematics course:

1350. Analytical Geometry (3:3:0).

Prerequisite: Score on the mathematics placement examination of 6 or higher and knowledge of basic trigonometry or MATH 1320 and 1321. Fundamental concepts of analytical geometry. [MATH 1348, 2312]

The **first digit in the course number** indicates the academic level of the course. First digits of 1, 2, 3, or 4 indicate that the course is primarily designed for the freshman, sophomore, junior, or senior year, respectively. A number of 5 or above designates a graduate course. The **second digit** indicates the semester-hour credit of the course. The **remaining digits** are the distinguishing numbers of the course. Thus, MATH 1350 is a freshman course carrying 3 semester hours of credit. Remedial courses begin with "0" (e.g., MATH 0301). The **course numbers in brackets** at the end of the course description identify this course as part of the Texas Common Course Numbering System (TCCNS) that facilitates transfer between Texas colleges and universities (see further explanation in "Admission to the University").

Indication of Credit. The number of semester hours of credit for each course is shown immediately following its title, usually in this form: (3:3:0). The first digit in parenthesis indicates the credit in semester hours for the course; the second, the number of lecture hours per week; and the third, the number of laboratory hours per week. If the third digit is zero, the course requires no laboratory 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, this indicates variable credit courses (e.g., V1-12). 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.

Designation of Semester Courses Offered.

To assist students in planning their sequence of courses, some course descriptions indicate when they are normally taught. The designations used are F—fall, S—spring, SSI—first summer term, and SSII—second summer term.

Prerequisites for Courses. Certain general prerequisites apply to all courses listed in this catalog. 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).

Graduate Credit. 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).

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

About the University

Campuses

Nearly 28,000 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 Campus 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.

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), and David J. Schmidly (2000–2002). Haragan currently serves as Interim President.

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, Graduate Studies, and Technology Transfer who directs the research efforts and graduate education of the university; a Vice President for Enrollment Management who is in charge of recruiting students and overseeing financial aid; a Vice President for Operations who manages the physical plant of the university; a Vice President for Institutional Advancement who is responsible for developing private giving to the university; and a Vice President for Information Technology who is responsible for electronic communications and computer systems for the university.

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

Facilities and 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 Pavillion.

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.

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. As home to the Texas Tech Association of Parents, the office serves 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 55 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 such valuable programs and services as a toll-free hotline and e-mail for parent questions and concerns, the Parents' Page web site, transition programs for parents at new student orientation and publication of *The Parent's Guide*, move-in program week 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.

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.

Office of Community and Multicultural Affairs

The mission of the Office of Community and Multicultural Affairs, a division of the Texas Tech University System Chancellor's Office, 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 (OIA) is composed of the following:

- A division of immigration services and student advisement
- Overseas Resource Center for study abroad, internationally sponsored student recruitment, and alumni development
- International Center for Arid and Semiarid Land Studies (ICASALS)
- Division of Public Education for K–12 students
- A division of international student recruitment and international alumni relations
- International Cultural Center
- Several support units

OIA facilitates programs that bring an international dimension to the university's roles in teaching, research, and public service. OIA works with and assists the various units of the university, coordinating international activities.

The immigration division provides information, counseling, and advisement to international students and scholars on all noncurricular

issues, including immigration regulations, financial issues, personal concerns, and general American academic questions. The office also coordinates cross-cultural programming and other extracurricular activities with campus- and community-based organizations to facilitate development of cross-cultural understanding. OIA offers customized services to sponsoring agencies and students. Services to sponsoring agencies include placement monitoring, customized billing procedures, timely reports, special program design, and communications maintenance. Special counseling, orientation, and administrative services are provided to sponsored students. An administrative fee of at least \$250 per semester and \$125 per summer term enrolled is charged for sponsored international students. See the Overseas Resource Center in this section of the catalog for study abroad opportunities.

The public education division, funded through the university with support of an external organization, provides an outreach program of an international dimension for K–12 students.

ICASALS provides special research and sustainable development projects for faculty, staff, and students. See the ICASALS entry for additional information.

The International Cultural Center houses all units of the Office of International Affairs; a library featuring specialized publications, videotapes, and CD-ROMs; and the CNN World Report Television Archive. In addition to offering attractive facilities for all types of meetings, conferences, and special events, the center hosts changing art exhibitions and a large number of lectures annually. The center represents Texas Tech's commitment to internationalization.

Overseas Resource Center

Students in almost any field will be more competitive in the globalized job market if they have studied abroad. An overseas education offers a type of education that cannot be obtained in any other way than experiencing life in another culture and viewing one's own culture through the eyes of others.

Many of the foreign language areas and other departments offer their own programs in the summer. Additionally, the Overseas Resources Center, a unit of the Office of International Affairs, coordinates reciprocal student exchanges with institutions in Eastern and Western Europe, Scandinavia, Turkey, and Central and South America. This type of exchange allows qualified Texas Tech students to trade places with students from other countries for a year or semester and to receive credit and grades for their academic work. The cost of these exchanges is usually much less than that of many other education abroad programs, and participants remain eligible for financial aid and scholarships through Texas Tech.

Affiliated study abroad programs also allow Texas Tech students to pay tuition to another institution or program having an affiliation agreement with Texas Tech. Through the Overseas Research Center, participants in these programs remain registered in a nontuition-bearing registration while they are away so

that they are not required to reapply for admission upon return to the United States. They also remain eligible for financial aid and scholarships through Texas Tech. Transfer credit is earned for academic work completed on these programs. Students can travel almost anywhere in the world on these programs—Eastern and Western Europe, Asia, Africa, South America, and Australia.

In addition to coordinating programs, the center maintains a reference library of catalogs and announcements of overseas educational, work abroad, internships, and volunteer programs. These programs include those offered by Texas Tech departments as well as those sponsored by other institutions. The staff of the center helps students clarify their objectives for overseas opportunities and assists them in identifying educationally sound programs. The staff assists students throughout the application process, including providing an all-day orientation program to prepare students for their international experience, and, upon their return, awarding credit for academic work completed while abroad. Students wishing to study abroad are advised to begin planning at least one year in advance of their departure.

International Center for Arid and Semiarid Land Studies

ICASALS, a division of the Office of International Affairs, 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.

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 82-seat auditorium with a Spitz A4 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 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.

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.

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 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.

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.

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 six 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 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 2 p.m. on Saturday.

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 (www.lib.ttu.edu) 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 2.1 million volumes in the collection provide rich and timely support for the humanities, social sciences, and science-technology programs of the university. Nearly 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 20,000 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 interlibrary loan service can obtain books and articles from periodicals not owned by the Texas Tech libraries, with the exception of rare books, reference materials, textbooks, and some dissertations from other libraries. Service counters 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 library research 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.

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.

Southwest Collection

The Southwest Collection/Special Collections Library research collections include Rare Books, the University Archive, the Archive of Turkish Oral Narratives, 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. It also houses one of the nation's most important collections on the Literature of Place—the James Sowell 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 new 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.

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 <http://aton.ttu.edu>.



Books, articles, papers, and recorded programs produced from archive materials flow from scholars in this country and abroad.

Located on the third floor of the Texas Tech University Library, the archive makes available a conference room, audio-visual equipment, and comfortable work space for the use of students, faculty, and the general public.

The archive is open Monday through Friday from 8 a.m. to 3 p.m. and at other times by special arrangement. Queries for information and requests for materials may be written or telephoned to the curator at (806) 742-1922.

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

Clifford B. and Audrey Jones Stadium, named for Texas Tech's late President Emeritus and his wife who provided the initial funds to permit its construction, was built in 1947. Renovations have expanded seating to the present capacity of 50,500 seats. Athletic Department offices in the south end of the stadium underwent refurbishing in 1988. The stadium is currently undergoing a \$90 million renovation process.

Baseball is played at Dan Law Field where a modern lighting system permits nighttime use for the added enjoyment of both athletes and fans. Additional permanent seating recently brought the capacity to 5,614 and the infield was resurfaced with AstroTurf.

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.

A state-of-the-art Academic Services Building located within the athletic complex near Jones Stadium is scheduled to be open soon. The facility will feature 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 full-sized wooden basketball court, four tennis or volleyball courts, nets for pitching and hitting baseballs and golf balls, a 250-yard long circular track with six lanes, and 10,000 square feet of weight training facilities.

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 tae kwon do—all of which receive some funding from the Department of Recreational Sports.

Texas Tech's indoor/outdoor aquatic facility, which adjoins the Student Recreation Center, offers a wide range of water sports and activities to students. This facility is one of the most unusual in the nation, with a removable bubble top that allows participants to enjoy an out-



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

The outdoor pursuits center provides 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.

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.

Computing Services

The Information Technology 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, aliases, dial-up (RAS) access, Help Desk, desktop support, teleconference room, server hosting, administration, and consulting.

The most recent addition to these services is www.raiderlink.ttu.edu, a student portal "RaiderLink." 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 University 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 (<http://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. The Help Desk is structured to escalate questions, problems, and concerns from the user community to the proper IT staff member staff member and track the incident until it is resolved. Their 742-HELP phone number is easy to remember.

Telecommunications (www.net.ttu.edu) provides Texas Tech 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.

Technology Operations and Systems Management (www.tosm.ttu.edu) staff are available to answer questions about server administration, management, or support; properly backing up data on the server; and distributed mainframe print. In addition to hosting the IBM 9672-R26 mainframe system supporting administrative, instructional, and research activities, this division also 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 IA32 architecture is currently being installed. Faculty and researchers are welcome to take advantage of these services.

Communication Services (www.itcs.ttu.edu) assists in providing new office or cellular phones, additional phone lines, voice mail, telephone repair, and individual campus phone numbers.

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

Information Systems (www.itis.ttu.edu/ismain.htm) develops and supports legacy, intranet, and online systems for student information, human resources, payroll, accounting, budget, housing, and communication services.

Radio and TV Stations

KTXT-FM and KOHM-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. Another university-owned radio station, KOHM-FM, is a division of the Office of the Provost and operates with a professional staff on a frequency of 89.1 Mhz with a power of 50,000 watts (ERP). An affiliate of National Public Radio (NPR) and Public Radio International (PRI), the station also provides classical music, jazz, and other fine arts programming to the South Plains.

KTXT-TV. A noncommercial educational television station, KTXT-TV (Channel 5 Digital 39) is licensed by the Federal Communications Commission to the university's Board of Regents and operates as a division within the Office of the Provost. The broadcast operation includes a cable system capable of feeding a signal to various rooms on the campus and a multiterminal telecommunications receive-only earth station.

Channel 5's office, studio, production, master-control, transmitter 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 about 115 hours of diverse programming each week. The signal coverage zone encompasses the geographical area within a 60-mile radius of Lubbock and serves 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 bonus service to the university and Channel 5's viewers.

Upon celebrating its 40th broadcasting year in 2002, KTXT-TV began its FCC-required transition to a digital broadcasting signal. When completed, digital technology will enable the station to consider a 24-hour seven days a week broadcast schedule and many new educational options. These options include high definition broadcast picture with state-of-the-art sound; multicasting of several dedicated-content channels; broadcasting of instructional interactive programming; and datacasting of media-rich educational materials for university and community entities.

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 main stage 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.

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 neighborhood. 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.

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.

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. The 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.

Learning Center

Under direction of the Programs for Academic Support Services, the Learning Center provides students with learning assistance in the form of teaching study skills and other special topic presentations as well as providing individual academic skills counseling, in-house and online peer tutoring, and a self-help learning lab.

Video and audio tapes, printed materials, and computer software are available in mathematics, English, study skills, history, and other specific subject areas. Test preparation guides are available for the GRE, GMAT, TOEFL, LSAT, and MCAT. Supplemental instruction is also offered in a limited number of subjects, historically targeting difficult courses and providing regularly scheduled modified forms of discussion sessions.

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, 8 a.m. to 5 p.m. Friday, and 2 to 6 p.m. Sunday. Summer hours are 8 a.m. to 5 p.m. Monday through Friday.

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.

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.

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.

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.

Motor Vehicle Regulations

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 5:30 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.

Lubbock Municipal Auditorium/Coliseum

The Municipal Auditorium–Coliseum, located on the north edge of the campus near Jones Stadium, is operated by the City of Lubbock. Its facilities are frequently rented by the university for convocations, registration, graduation exercises, cultural events, rodeos, and other special events. Seating capacity is about 3,200 persons in the auditorium and 10,000 in the coliseum. Rental arrangements are made through the City of Lubbock.

Admission to the University

Undergraduate Admission

Admissions and School Relations
Texas Tech University
Box 45005
Lubbock, TX 79409-5005
(806) 742-1480
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.ttu.edu/gradschool
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 are recommended.

Applicants may be considered for admission to the undergraduate divisions of the university by graduation from 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. Since experience indicates that prospective students with poor academic records have little chance of successfully completing degrees at Texas Tech, class rank in high school, SAT-1/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 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-1 or the ACT, sent from the testing agency at the time the test is taken.

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

Because success in college depends on solid preparation in high school, the following courses must be completed before you attend Texas Tech:

| High School Subjects | Units Required |
|----------------------|----------------|
| English | 4 |
| Mathematics* | 3 |
| Laboratory Science** | 2 |
| Foreign Language† | 2 |

* The Colleges of Architecture and Engineering recommend geometry, Algebra II, and trigonometry; the College of Business Administration recommends Algebra II.

** The College of Architecture recommends chemistry *or* physics; the College of Engineering recommends chemistry *and* physics.

† Unless two units of credit in a single foreign language have been received in high school, at least two semesters of a single foreign language are required at the college level.

Assured Admission

Students who graduate from 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 | |
|---------------------------------------|---|-------|
| | ACT | SAT-1 |
| 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 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 will be considered to evaluate a student's potential for success at Texas Tech, including:

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

A response to Topic C on the State of Texas Common Application may be helpful in the review process.

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 Studies and Research" section of this catalog, and any additional departmental requirements will be listed in the Graduate Program section of each college and department.

Alternate Admission Program

Freshman applicants who do not meet the university's admissions requirements are eligible to participate in an Alternative Admissions Program. For information about available programs, go to www.admissions.ttu.edu.

Summer Gateway Program. Students participating in this program are required to enroll in the summer following high school graduation. Students must pass a prescribed number of hours in specific transferable courses. These courses will be offered at the South Plains College Reese Center. Summer Gateway students will live in Texas Tech residence halls and have access to most student activities, facilities, programs, and services. Students may satisfy their Summer Gateway requirements in one of two ways:

- Attend either the first or second summer session and pass 7 hours of transferable course work with a cumulative GPA of at least 2.5 on a 4.0 scale. The required course work must include a one-hour college orientation course.
- Attend both the first and second summer sessions and pass 13 hours of transferable course work with a cumulative GPA of at least 2.25. The required course work must include a one-hour college orientation course.

Summer Gateway students who complete either of these requirements will be admitted as transfer students for the fall semester.

Fall/Spring Gateway Program. The partnership between Texas Tech University and South Plains College provides students with the opportunity to complete their student course work through South Plains College. Students in this program will be able to participate in many Texas Tech student activities and organizations, have access to student health and advisement services, and attend all university functions. At the same time they will be enrolled as full-time students at South Plains College, where, if qualified, they will be able to receive state or federal financial aid. Courses for these students will be offered at the nearby Reese Center. Students who complete 12 hours (one semester) of transferable college credit with a 2.50 GPA or 24 hours (two semesters) with a 2.25 GPA can be admitted to Texas Tech as transfer students.

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 Admissions Office recommends that applications be on file by March 1 for summer or fall admission and November 1 for spring admission. Applications must be on file by August 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 to Texas Tech University 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. (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 high school transcript for use in advisement and placement.

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

1. Complete 12 to 23 semester hours of transferable college work at another institution with a cumulative 2.5 GPA.
2. Complete 24 or more semester hours of transferable college work at another institution with 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 2.5 GPA; College of Architecture, cumulative 3.0 GPA; and Interior Design, cumulative 3.0 GPA. These requirements are subject to change.

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 are 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 and School Relations. 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 necessarily be accepted by Texas Tech.
- Nonvocational, college-level courses completed with a grade of D or above at another accredited institution (including courses taken on a pass-fail basis and passed) will normally be accepted for transfer. No transferred course completed with a grade below C- may be applied to fulfill course requirements in majors, minors, or specializations.
- Courses completed with codes indicating no grade or credit will not be transferred. This includes courses from which a student has withdrawn or received a grade of incomplete.
- Vocational and technical courses normally not acceptable 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 at the end of 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 1131 | AGSC 1111 |
| 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 |
| ANTH 2301 | ANTH 2300 |
| ANTH 2302 | ANTH 2301 |
| ANTH 2351 | ANTH 2302 |
| ARTS 1301 | ART 1309 |
| ARTS 1303 | ART 1310 |
| ARTS 1304 | ART 1311 |
| ARTS 1311 | ART 1320 |
| ARTS 1312 | ART 1331 |
| ARTS 1316 | ART 1324 |
| ARTS 1317 | ART 1325 |
| ARTS 2316 | ART 2322 |
| ARTS 2317 | ART 2322 |
| ARTS 2323 | ART 2320 |
| ARTS 2326 | ART 2338 |
| ARTS 2327 | ART 2339 |
| ARTS 2333 | ART 2328 |
| ARTS 2341 | ART 2334 |
| ARTS 2346 | ART 2330 |
| ARTS 2347 | ART 2331 |
| ARTS 2356 | ART 2326 |
| ARTS 2366 | ART 2322 |
| BCIS 1301 | C S 1300 |
| BCIS 1320 | C S 1462 |
| BCIS 1405 | ISQS 2440 |
| BCIS 1420 | C S 1462 |
| 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 1313 |
| BIOL 2401 | ZOOL 2403 |
| BIOL 2402 | ZOOL 2404 |
| BIOL 2406 | BIOL 1313 + 1113 |
| BUSI 1301 | I S 1300 |
| BUSI 1307 | FIN 1307 |
| CHEM 1105 | CHEM 1105 |
| CHEM 1106 | CHEM 1301 |
| CHEM 1107 | CHEM 1106 |
| CHEM 1111 | CHEM 1107 |
| CHEM 1112 | CHEM 1108 |
| CHEM 1207 | CHEM 1301 |
| CHEM 1305 | CHEM 1305 |
| CHEM 1307 | CHEM 1306 |
| CHEM 1311 | CHEM 1307 |
| CHEM 1312 | CHEM 1308 |
| CHEM 1405 | CHEM 1305 + 1105 |
| CHEM 1407 | CHEM 1306 + 1106 |
| CHEM 1411 | CHEM 1307 + 1107 |
| CHEM 1412 | CHEM 1308 + 1108 |
| CHEM 1419 | CHEM 2303 + 2103 |
| CHIN 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 1305 | C S 1405 |
| COSC 1315 | C S 1405 |
| COSC 1319 | C S 2350 |

| TCCNS | TTU Equivalent |
|-----------------|----------------|
| COSC 1320 | C S 1462 |
| COSC 1334 | C S 2350 |
| COSC 1401 | ISQS 2440 |
| 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 1131 | DAN 2100 |
| 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 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 1301 |
| DRAM 1341 | TH A 2101 |
| DRAM 1351 | TH A 2301 |
| DRAM 2120 | TH A 1103 |
| DRAM 2336 | TH A 1301 |
| DRAM 2337 | 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 1313 | PHIL 1310 |
| ENGL 2307 | ENGL 2351 |
| ENGL 2308 | ENGL 2351 |
| ENGL 2311 | ENGL 2311 |
| ENGR 1305 | E GR 1306 |
| ENGR 1307 | C TEC 2301 |
| ENGR 1407 | C TEC 2301 |
| ENGR 2301 | C E 2301 |
| ENGR 2405 | GTEC 1312 |
| FREN 1411 | FREN 1501 |
| 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 |

TCCNS TTU Equivalent

| | |
|-----------|-----------|
| 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 | FADS 2311 |
| HECO 1322 | F&N 1325 |
| HECO 1323 | F&N 1325 |
| HECO 1325 | I D 1380 |
| HECO 1326 | I D 1380 |
| HECO 1328 | FADS 1303 |
| HECO 1329 | FADS 1304 |
| HIST 1301 | HIST 2300 |
| HIST 1302 | HIST 2301 |
| HIST 2311 | HIST 1300 |
| HIST 2312 | HIST 1301 |
| HIST 2321 | HIST 2321 |
| HIST 2380 | HIST 1325 |
| HORT 1401 | PSS 1411 |
| HUMA 1301 | HUM 2301 |
| HUMA 1302 | HUM 2302 |
| ITAL 1411 | ITAL 1301 |
| ITAL 1412 | ITAL 1302 |
| ITAL 2311 | ITAL 2301 |
| ITAL 2312 | ITAL 2302 |
| JAPN 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 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 |
| 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 |

TCCNS TTU Equivalent

| | |
|-----------|------------------|
| MUSI 1216 | MUTH 1103 |
| MUSI 1217 | MUTH 1104 |
| MUSI 1286 | MUCP 1201 |
| MUSI 1287 | MUCP 1202 |
| MUSI 1300 | MUTH 1300 |
| MUSI 1301 | MUTH 1301 |
| MUSI 1303 | MUTH 1300 |
| MUSI 1304 | MUSI 2301 |
| MUSI 1306 | MUHL 1308 |
| MUSI 1307 | MUHL 1308 |
| MUSI 1308 | MUHL 1301 |
| MUSI 1309 | MUHL 1302 |
| 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 2183 | MUAP 2113 |
| 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 1105 |
| PHED 1153 | PF&W 1140 |
| PHED 1164 | ESS 1201 |
| PHED 1238 | ESS 1201 |
| PHED 1251 | PF&W 1141 |
| PHED 1252 | PF&W 1141 |
| PHED 1301 | ESS 1201 |
| PHED 1304 | HLTH 1300 |
| PHED 2155 | PF&W 2142 |
| PHIL 1301 | PHIL 2300 |
| PHIL 1304 | PHIL 2350 |
| PHIL 2303 | PHIL 2310 |
| PHIL 2306 | PHIL 2320 |
| PHYS 1101 | PHYS 1103 |
| PHYS 1102 | PHYS 1104 |
| PHYS 1105 | PHYS 1101 |
| PHYS 1111 | ASTR 1100 |
| PHYS 1112 | ASTR 1101 |
| PHYS 1301 | PHYS 1306 |
| PHYS 1302 | PHYS 1307 |
| PHYS 1305 | PHYS 1303 |
| PHYS 1310 | PHYS 1304 |
| PHYS 1311 | ASTR 1300 |
| PHYS 1312 | ASTR 1301 |
| PHYS 1401 | PHYS 1306 + 1103 |
| PHYS 1402 | PHYS 1307 + 1104 |
| PHYS 1405 | PHYS 1303 + 1101 |
| PHYS 1410 | PHYS 1304 |
| PHYS 1411 | ASTR 1300 + 1100 |
| PHYS 1412 | ASTR 1301 + 1101 |
| PHYS 2125 | PHYS 1105 |
| PHYS 2126 | PHYS 1106 |
| PHYS 2325 | PHYS 1308 |
| PHYS 2326 | PHYS 2301 |
| PHYS 2425 | PHYS 1308 + 1105 |
| PHYS 2426 | PHYS 2301 + 1106 |
| PHYS 2427 | PHYS 2402 |
| PORT 1411 | PORT 1301 |
| PORT 1412 | PORT 1302 |
| PORT 2311 | PORT 2301 |
| PORT 2312 | PORT 2302 |
| PSYC 2301 | PSY 1300 |
| PSYC 2306 | HLTH 1305 |
| PSYC 2307 | PSY 2305 |

TCCNS TTU Equivalent

| | |
|-----------|-----------|
| 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 |
| 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 |
| SPCH 2341 | TH A 2305 |
| TECA 1311 | HDFS 2311 |

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.

Resolving 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 acceptable level of quality, it should first contact the sending institution and attempt to resolve the problem. In the event that the two institutions are unable to come to a satisfactory resolution, the receiving institution may notify the Commissioner of Higher Education, who may investigate the course. If its quality is found to be unacceptable, the Coordinating Board may discontinue funding for the course.

Concurrent Attendance at Texas Tech and Other Institutions

A student registered at Texas Tech who wishes to register concurrently at another institution must obtain written approval from 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.

International Student Admission

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

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. Students who have completed secondary school in the United States must also take and submit scores from the SAT-1 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 Educational Testing Service, P.O. Box 899, Princeton, New Jersey 08540, U.S.A. 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 verify their ability to support themselves financially (a required minimum of \$18,867 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 \$306 per semester credit hour during summer 2003 and \$328 per semester credit hour beginning fall 2003. 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.

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.

Texas Academic Skills Program (TASP)

The Texas Academic Skills Program (TASP) was implemented to ensure that students enrolled in Texas public colleges and universities possess the necessary academic skills to succeed. The TASP test, which is a diagnostic assessment of reading, mathematics, and writing skills, must be taken by entering part-time and full-time undergraduate students.

The following students may be exempt from TASP requirements:

- Students who have previously earned a baccalaureate degree.
- Students who earned 3 or more college-level credit hours from an accredited college or university *prior to September 1, 1989*.
- Students who have achieved high test scores on one of the following:
 - The high school exit-level Texas Assessment of Academic Skills (TAAS) test—1770 or better on writing, TLI (Texas Learning Index) X-86 on math, *and* TLI X-89 on reading within 3 years.
 - The ACT-23 or better composite with at least a 19 verbal *and* 19 math within 5 years.
 - The SAT-1-1070 or better composite with at least a 500 verbal *and* 500 math within 5 years.
 - Active duty military.
 - Students who graduated from high school in 1999 with a GPA of 3.5 or higher on a 4.0 scale and completed the recommended or advanced high school curriculum (the exemption is effective only for a student who enrolls in an institution of higher education on or before the second anniversary of the date the student graduated from high school).

- Students seeking entry into teacher certification programs may be exempted only on the basis of high test scores.

TASP test scores are not used to determine admission status. However, entering students must test before enrolling in college-level courses in Texas public institutions of higher education. Students transferring hours from private or out-of-state institutions who have earned a B or better in courses equivalent to those specified as B or better courses in reading, math, and writing may be waived from taking some or all of the TASP test. (Contact the Transfer Evaluation Office at 742-1510 for course equivalents.)

Students are strongly encouraged to take the TASP test before registering for class at Texas Tech so that the scores may be used to help determine initial placement in college courses. TASP test registration usually must be done a month prior to the scheduled testing date. Six or more test dates are available each year at 110 Texas locations. TASP test registration booklets are available at most Texas public colleges and universities or by writing to the testing company, National Evaluation Systems, Inc., P.O. Box 140347, Austin, TX 78714-0347.

The TASP test fee is paid by the student (fee vouchers may be available in the Financial Aid Office for some students with exceptional need). Test scores should be released to Texas Tech University by indicating Code 323 on the TASP test registration form.

Students who have tested but not attained the established minimum scores on all three sections of the test are required by Texas law to obtain TASP advising and to enroll in a formal program of skills development each semester until they have passed all sections of the test. Assigned skills development must be completed as a condition of enrollment. Students whose term enrollment would result in 60 or more semester credit hours upon completion will be blocked from registration in any 3000 or 4000 level (upper division) courses until they have satisfied all TASP requirements.

For further information on testing, contact the TASP Office of the Registrar, 116 West Hall, or telephone (806) 742-1183. Questions about TASP skills development should be directed to the TASP Skills Development Office in 72 Holden Hall, telephone (806) 742-3242.

New Student Orientation

New Student Orientation, held in June, July, and August, serves as an introduction to Texas Tech University for incoming freshmen and transfer students. Research indicates that students who attend a college orientation are more successful once they arrive on campus. New freshmen have the opportunity to attend nine new student orientation conferences, and transfer students can select a new student orientation from three dates. 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. By the end of orientation, students will be true Red Raiders and ready for the fall semester. For information, call (806) 742-0048 or visit www.admissions.ttu.edu/nso.

Admission of Former Texas Tech Students

Former Texas Tech students applying for readmission to the university must have their application on file 60 days prior to open registration for the semester the student plans to attend. Supporting materials, the committee letter, and transcript(s) must be on file 30 days prior to the semester the student plans to attend. Former students who paid an application fee for a previous application are not required to submit another application fee. For admission criteria refer to the "Scholastic Probation and Suspension" policy listed in the Academic Regulations section.

Former Texas Tech students (except those who left on second or subsequent suspension) who have not attended or earned credit at another institution following Texas Tech enrollment can be reinstated through the Office of the Registrar by completing the Returning Student Form available at www.reg.ttu.edu or call the Office of the Registrar at (806) 742-3661.

All other former students can apply for readmission by utilizing the State of Texas Common Application for Transfer/Transient/Readmission available electronically at www.applytexas.org or the Office of Admissions and School Relations at (806) 742-1480. Official transcripts from all institutions attended subsequent to Texas Tech enrollment must be submitted.

Former students returning from first suspension may apply for readmission to the college from which they were suspended or to another college if they have decided upon a different major or career goal. Conditions of the readmission will be established by the academic dean of the new college, and all such conditions must be met.

Former students who return after first suspension will be required to successfully complete XL 0201, "Strategies for Learning," during the first semester of their readmission. A nonrefundable fee of \$150 will be collected for this course. Attendance in XL 0201 is mandatory from the first day of classes. Three absences will result in a student being withdrawn from the university.

Former students who left on first scholastic suspension and have undertaken no college-level work are not eligible to return to Texas Tech until after a period of one semester. Former students who have been scholastically suspended for a second or subsequent time are not eligible to return to Texas Tech until after a period of two semesters.

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).

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-1 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-1 or 25 ACT or a high school junior in the top 10 percent of their class with at least an 1180 SAT-1 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.

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-1 or ACT scores will be required for nondegree-seeking students. For more information or for a special application, contact the Office of Admissions or access the application at www.admissions.ttu.edu/sa.

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:

- As of July 1, 2001, all CLEP exams were converted to a computer-based version. Appointments to use the computers and schedule the exams must be made through the Testing Center at 213 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.
- 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 the Testing, Evaluation, Assessment, and Measurement Center, 213 West Hall. The student is responsible for completing tests for lower level courses in sufficient time to qualify for registering for higher level courses.
- 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.
- 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.
- College Level Examination Program (CLEP) tests **cannot** be repeated before six months have passed.
- 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 the Testing Center 213 West Hall (806) 742-3671.

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

- Specified CEEB Achievement Tests.
- CEEB Advanced Placement Examinations that are a part of the Advanced Placement Programs (AP) available in a limited number of secondary schools.
- Specified subject examinations of the CEEB College Level Examination Program (CLEP).
- Departmental examinations prepared, administered, and scored by faculty members who teach the related course.
- 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 the Testing, Evaluation, Assessment, and Measurement Center at Texas Tech. It is the student's responsibility to request that his or her CEEB test scores be sent to the university. Information concerning each of the testing programs follows.

1. Credit for CEEB Achievement Tests. The CEEB Achievement Tests are part of the CEEB Admissions Testing Program. Each year there are several national administrations of the CEEB Achievement Tests. 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. In addition to the national administrations, there are administrations of the Achievement Tests recognized for credit by Texas Tech during the Early Registration Conferences held on the campus each summer.

Further information concerning the CEEB Achievement Tests may be obtained from your high school counselor or principal, the College Entrance Examination Board, Box 592, Princeton, New Jersey 08540, or the Testing, Evaluation, Assessment, and Measurement Center of Texas Tech University, Box 45002, Lubbock, Texas 79409-5002.

2. Credit for CEEB Advanced Placement Program Examinations (AP). 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 is offered once a year during May at participating high schools.

3. Credit for CEEB 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 CEEB 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 campus during the Early Registration Conferences held each summer, several times each month to students currently enrolled, and monthly at national CLEP test centers.

NOTE: Scores accepted for credit vary from other 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; the College Level Examination Program, Box 1821, Princeton, New Jersey 08540; or the Testing, Evaluation, Assessment, and Measurement Center of Texas Tech University, Box 45002, Lubbock, TX 79409-5002.

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 applications from students in the IB program and will grant 6 to 8 semester hours of credit for scores of 5, 6, or 7 on the IB higher level examinations. An IB examination transcript must be sent to Texas Tech.

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 | | | | | | | |
| ART 1310 | AP: Art History | 4 | 3 | FREN 2301, 2302, 3304 | IB: French B Standard or Higher Level | 5 | 9 |
| ART 1311 | AP: Art History | 4 | 3 | FREN 2301, 2302, 3302, 3304 | IB: French B Standard or Higher Level | 6, 7 | 12 |
| ART 1320 | AP: Art General | 4 | 3 | *FREN 3302, 3304 | IB: French A1 or A2 Standard or Higher Level | 6, 7 | 6 |
| ART 1324 | AP: Art Drawing | 4 | 3 | *FREN 3304 | IB: French A1 or A2 Standard or Higher Level | 4, 5 | 3 |
| Biology | | | | Geography | | | |
| Gen. Biol. Credit | IB: Biology Standard Level | 4, 5, 6, 7 | 4 | GEOG 2351 | IB: Geography Standard or Higher Level | 5, 6, 7 | 3 |
| BIOL 1401, 1402 | AP: Biology | 3 | 8 | | | | |
| BIOL 1403, 1404 | AP: Biology | 5 | 8 | | | | |
| BIOL 1403, 1404 | IB: Biology Higher Level | 5, 6, 7 | 8 | | | | |
| BIOL 1401, 1402 | CLEP-S: General Biology | 52 | 8 | | | | |
| Business Administration | | | | German | | | |
| ACCT 2300, 2301 | CLEP-S: Principles of Accounting | 50 | 6 | GERM 1501 | CLEP-S: College Level German Language | 44 | 5 |
| MGT 3370 | CLEP-S: Principles of Mgmt. | 52 | 3 | GERM 1501, 1502 | CLEP-S: College Level German Language | 50 | 10 |
| MKT 3350 | CLEP-S: Principles of Marketing | 55 | 3 | GERM 1501, 1502, 2301 | CLEP-S: College Level German Language | 56 | 13 |
| BLAW 3391 | CLEP-S: Intro. Business Law | 51 | 3 | GERM 1501, 1502, 2301, 2302 | CLEP-S: College Level German Language | 63 | 16 |
| Chemistry | | | | | | | |
| CHEM 1301 | IB: Chemistry Standard Level | 4, 5, 6, 7 | 3 | GERM 1501, 1502, 2301 | AP: German | 2 | 10 |
| CHEM 1305, 1306 & 1105, 1106 | AP: Chemistry | 3 | 8 | GERM 1501, 1502, 2301 | AP: German | 3 | 13 |
| CHEM 1305, 1306 & 1105, 1106 | CLEP-S: General Chemistry | 52 | 8 | GERM 1501, 1502, 2301, 2302 | AP: German | 4 | 16 |
| CHEM 1307, 1308 & 1107, 1108 | AP: Chemistry | 4 | 8 | GERM 1507 | IB: German B Standard or Higher Level | 3 | 5 |
| CHEM 1307, 1308 & 1107, 1108 | CLEP-S: General Chemistry | 65 | 8 | GERM 2301, 2302 | IB: German B Standard or Higher Level | 4 | 6 |
| CHEM 1307, 1308 & 1107, 1108 | IB: Chemistry Higher Level | 5, 6, 7 | 8 | GERM 2301, 2302, 3303, 3304 | IB: German B Standard or Higher Level | 5 | 9 |
| Computer Science | | | | | | | |
| C S 1300 | CLEP-S: Info. Systems and Computer Applications | 55 | 3 | *GERM 3303 | IB: German A1 or A2 Standard or Higher Level | 4, 5 | 3 |
| C S 1303 | AP: Computer Science A | 4 | 4 | *GERM 3303, 3304 | IB: German A1 or A2 Standard or Higher Level | 6, 7 | 6 |
| C S 1303 | AP: Computer Science AB | 3 | 4 | History | | | |
| Economics | | | | | | | |
| ECO 2301 | CLEP-S: Principles of Microeconomics | 50 | 3 | Gen. History Credit | IB: History Higher Level: History of the Americas | 5 | 3 |
| ECO 2301 | IB: Economics Higher Level | 5, 6, 7 | 3 | Gen. History Credit | IB: History Higher Level: History of the Americas | 6, 7 | 6 |
| ECO 2302 | CLEP-S: Principles of Macroeconomics | 50 | 3 | HIST 1300 | IB: History Higher Level: European | 5 | 3 |
| ECO 2301 | AP: Microeconomics | 4 | 3 | HIST 1301 | IB: History Higher Level: European | 5 | 3 |
| ECO 2302 | AP: Macroeconomics | 4 | 3 | HIST 1300, 1301 | IB: History Higher Level: European | 6, 7 | 6 |
| English | | | | | | | |
| ENGL 1301 | SAT II: Writing | 610 | 3 | HIST 1300, 1301 | AP: European History | 3 | 6 |
| ENGL 1301, 1302 | SAT II: Writing | 680 | 6 | HIST 1300 | CLEP-S: Western Civilization I: Ancient Near East to 1648 | 51 | 3 |
| ENGL 1301 | CLEP-S: Freshman College Composition | 50 | 3 | HIST 1301 | CLEP-S: Western Civilization II: 1648 to the Present | 51 | 3 |
| ENGL 1301 | AP: English Language and Composition | 3 | 3 | HIST 2300 | SAT II: United States History | 600 | 3 |
| ENGL 1301, 1302 | AP: English Language and Composition | 4 | 6 | HIST 2300, 2301 | AP: US History | 3 | 6 |
| ENGL 1301 | AP: English Literature and Composition | 3 | 3 | HIST 2300, 2301 | SAT II: United States History | 700 | 6 |
| ENGL 1301, 1302 | AP: English Literature and Composition | 4 | 6 | HIST 2300 | CLEP-S: History of the U.S. I: Early Colonizations to 1877 | 52 | 3 |
| ENGL 1301, 1302 | ACT: English Aptitude | 28 | 6 | HIST 2301 | CLEP-S: History of U.S. II: 1865 to the Present | 52 | 3 |
| ENGL 1301, 1302 | ACT: Composite Aptitude | 28 | 6 | HIST 3395 | IB: History Higher Level: African | 5 | 3 |
| ENGL 1301, 1302 | SAT I: Verbal Aptitude | 710 | 6 | HIST 3396 | IB: History Higher Level: African | 5 | 3 |
| ENGL 2302 | IB: English A1 or A2 | 5, 6, 7 | 3 | HIST 3395, 3396 | IB: History Higher Level: African | 6, 7 | 6 |
| ENGL 2305, 2307 | CLEP-S: Analyzing and Interpreting Literature | 52 | 6 | Mathematics | | | |
| French | | | | | | | |
| FREN 1501 | CLEP-S: College Level French Language | 49 | 5 | MATH 1320 | CLEP-S: College Algebra | 52 | 3 |
| FREN 1501, 1502 | CLEP-S: College Level French Language | 50 | 10 | MATH 1320 | IB: Mathematics Studies Standard Level | 5, 6, 7 | 3 |
| FREN 1501, 1502, 2301 | CLEP-S: College Level French Language | 51 | 13 | MATH 1321 | CLEP-S: Trigonometry | 50 | 3 |
| FREN 1501, 1502, 2301, 2302 | CLEP-S: College Level French Language | 52 | 16 | MATH 1350 | SAT II: Mathematics Level IC or IIC | 670 | 3 |
| FREN 1501, 1502 | AP: French | 2 | 10 | MATH 1351 | AP: Calculus AB | 4 | 3 |
| FREN 1501, 1502, 2301 | AP: French | 3 | 13 | MATH 1350, 1351 | CLEP-S: Calculus With Elementary Functions | 50 | 6 |
| FREN 1501, 1502, 2301, 2302 | AP: French | 4 | 16 | MATH 1351, 1352 | AP: Calculus BC | 4 | 6 |
| FREN 1507 | IB: French B Standard or Higher Level | 3 | 5 | MATH 1350, 1351, 1352 | CLEP-S: Calculus With Elementary Functions | 56 | 9 |
| FREN 2301, 2302 | IB: French B Standard or Higher Level | 4 | 6 | MATH 1351 | IB: Mathematics Methods Standard Level | 6, 7 | 3 |

| 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. |
|---|---|------------|-----------|--|---|------------|-----------|
| MATH 1351 | IB: Mathematics Higher Level | 5, 6, 7 | 3 | <i>Theatre Arts</i> TH A 2301 or 2303 | IB: Theater Arts Standard or Higher Level | 5 | 3 |
| MATH 1550 | IB: Mathematics Methods Standard Level | 4, 5 | 5 | | | | |
| MATH 1550 | IB: Mathematics Higher Level | 4 | 5 | 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 |
| MATH 2300 | AP: Statistics | 4 | 3 | | | | |
| Music | | | | | | | |
| **MUHL 1301 | IB: Music Standard or Higher Level | 6, 7 | 4 | 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. | | | |
| **MUTH 1303, 1103 | IB: Music Standard or Higher Level | 6, 7 | 4 | | | | |
| Philosophy | | | | | | | |
| Gen. Philos. Credit | IB: Philosophy Standard Level | 5, 6, 7 | 3 | | | | |
| PHIL 2300 | 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: College Level Spanish Language | 48 | 5 | | | | |
| SPAN 1501, 1502 | CLEP-S: College Level Spanish Language | 50 | 10 | | | | |
| SPAN 1501, 1502, 2301 | CLEP-S: College Level Spanish Language | 52 | 13 | | | | |
| SPAN 1501, 1502, 2301, 2302 | CLEP-S: College Level Spanish Language | 54 | 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 | | | | |

Registration and Finances

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

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

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 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

Graduate Student Notice

Although the financial information in this section applies to both undergraduate and graduate students, additional information specific to graduate student registration appears in the "Graduate Studies and Research" section of this catalog.

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.

Financial Information

Summary of Undergraduate Student Expenses

These figures represent enrollment in **30 semester hours per year (15 hours per semester)**. Fees, books, and supplies may vary depending on the area of study. To add the estimated costs for residence hall room and board, refer to the Student Housing section of this catalog.

| | Fall | Spring |
|---|-------------|-------------|
| Tuition | | |
| Resident Tuition (state, institutional) | \$ 1,380.00 | \$ 1,380.00 |
| Nonresident Tuition | 4,920.00 | 4,920.00 |
| Tuition (Adjacent County of New Mexico, Oklahoma, and Arkansas) | 1,380.00 | 1,380.00 |
| Tuition (Nonadjacent County of New Mexico and Oklahoma) | 1,830.00 | 1,830.00 |
| Fees | | |
| Student Union Fee | 95.00 | 95.00 |
| Information Technology Fee | 210.00 | 210.00 |
| Laboratory Fee | 30.00 | 30.00 |
| Library Fee | 225.00 | 225.00 |
| Medical Services Fee | 62.50 | 62.50 |
| Student Services Fee | 117.00 | 117.00 |
| ID Card Maintenance Fee | 5.50 | 5.50 |
| International Education Fee | 3.00 | 3.00 |
| Course Fee | 45.00 | 45.00 |
| Recreation Center Fee | 59.50 | 59.50 |
| Athletic Fee | 50.00 | 50.00 |
| Cultural Activities Fee | 15.00 | 15.00 |
| Student Business Services Fee | 105.00 | 105.00 |
| Transportation Fee | 45.00 | 45.00 |
| Additional | | |
| Books and Supplies | 900.00 | 900.00 |
| TOTALS | | |
| Total (Texas Resident) | \$3,347.50 | \$3,347.50 |
| Total (Nonresident) | \$6,887.50 | \$6,887.50 |
| Total (Adjacent County of New Mexico, Oklahoma, and Arkansas) | \$3,347.50 | \$3,347.50 |
| Total (Nonadjacent County of New Mexico and Oklahoma) | \$3,737.50 | \$3,737.50 |

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 by action of the Board of Regents of Texas Tech University, Texas State Legislature, 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 2003 | August 25, 2003 |
| Spring 2004 | January 9, 2004 |
| 1st Summer 2004 | May 28, 2004 |
| 2nd Summer 2004 | July 2, 2004 |

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 reregister for classes until open registration.

Students registering after the first due date will have until the 12th class day (4th class day in summer) to make payment arrangements.

Students who are cancelled on 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, credit card, 100% financial aid).
- Option 2:** Emergency enrollment loan.
- Option 3:** Payment option plan (not available for summer terms).

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 Financial Aid in 310 West Hall. EEL forms are also available at www.sbs.ttu.edu. The student may print the form, sign it, and deliver it in person to Student Business Services or Financial Aid for immediate application to their tuition and fee account. A service charge of \$25 will be imposed for this option.

Payment Option Plan (Option 3)

Texas State Law (Texas Education Code, Section 54.007a) allows students to pay tuition and fees 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 or Financial Aid in 310 West Hall. POPA forms are also available online at www.sbs.ttu.edu.

POPA forms must be turned in prior to the first class day. 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 will be imposed for this option. 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. Students registering after preregistration need to check their balances online at www.techsis.ttu.edu/student. Monthly billings for incidental expenses will be mailed the first Friday of each 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.

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, or Discover Card. Checks should be made payable to Texas Tech University. All payments made other than cash are subject to final acceptance for payment.
- **Mail.** Cash should not be sent through the mail, and Texas Tech accepts no responsibility for cash sent by mail. Payments should be sent to the Student Business Services office and mailed far enough in advance to reach the office by the due date.
- **Telephone Credit Card Payments.** Credit card payments may be made by calling (806) 742-3272 or toll free at (866) 774-9477. Please call between the hours of 8 a.m. and 4:30 p.m. Monday through Friday.
- **Fax Credit Card Payments.** Credit card payments may be made by faxing payment to (806) 742-0445. Please fax credit card payments between the hours of 8 a.m. and 4:30 p.m. Monday through Friday. Texas Tech University assumes no responsibility or liability for credit card payments faxed other than these hours.
- **Web Credit Card Payments.** Payment can be made on the Web at this address: <http://techsis.admin.ttu.edu/student>.

Account Information. Tuition and fee information can be obtained online at the following: <http://techsis.admin.ttu.edu/student>. The student's six-digit PIN number 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 \$25 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 a registration or re-registration and re-enrollment after the 12th class day (4th class day in summer). The amount of the reinstatement fee is subject to change by Board action without prior notice.

Refund Policy

Financial aid refunds are disbursed as permitted by federal regulations. All refunds will be disbursed no later than the 35th class day in the fall or the 20th class day in the summer. Students may choose either to have their refund checks mailed to them or to have their funds automatically deposited into their checking or savings account.

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

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 via the Web at the following address: <http://techsis.admin.ttu.edu/student>.

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

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

IT IS THE STUDENT'S RESPONSIBILITY TO MAINTAIN A CURRENT ADDRESS IN THE STUDENT INFORMATION SYSTEM.

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

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

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

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

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

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

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

Any refund due to a student will be after calculation of the amount of tuition and fees due at

the time of withdrawal. If the student has paid less than the amount due at the time of withdrawal, the student will be required to pay the percentage due.

Federal Refund Formula. Effective with the fall 2000 semester the new 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 Residents:** \$92 per semester credit hour
- **Nonresidents:** \$328 per semester credit hour
- **Nonresident Students Who Are Legal Residents of New Mexico, Oklahoma, and Arkansas and Reside in a County Adjacent to Texas:** \$92 per semester credit hour
- **Nonresident Students Who Are Legal Residents of New Mexico and Oklahoma and Reside in Counties Not Adjacent to Texas:** \$122 per semester credit hour
- **School of Law—Texas Residents:** \$286 per semester credit hour
- **School of Law—Nonresidents:** \$468 per semester credit hour
- **Graduate Program Tuition:** Students enrolling in graduate level courses will be charged the current tuition and an additional charge of \$46 per semester credit hour

General Fees

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

- **Application Fee:** \$50, International \$60
- **Honors College Application Fee:** \$25
- **New Student Orientation Fee:** \$50, Intl. \$60
- **Advising, Retention, and Placement Fees:** College of Agriculture and Natural Resources—\$1.75 per semester credit hour
Rawls College of Business—\$3.25 per semester credit hour
- **Intercollegiate Athletic Fee:** \$50 per fall and spring semester if enrolled in 4 or more credit hours
- **Cultural Activities Fee:** \$1 per semester credit hour
- **Student Union Fee:** \$95 per semester if enrolled in 4 or more credit hours and \$47.50 for summer terms or \$95 for summer trimester
- **Information Technology Fee:** \$14 per semester credit hour
- **Laboratory Fee:** Not less than \$2 per semester credit hour with a maximum charge of \$30 for each applicable course
- **Library Fee:** \$15 per semester credit hour
- **Medical Services Fee:** \$62.50 per semester if enrolled in 4 or more credit hours and \$31.25 for summer terms or \$62.50 for summer trimester
- **Student Business Services Fee:** \$7 per semester credit hour
- **Student Services Fee:** \$9.75 per semester credit hour with a maximum of \$117
- **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
- **Identification Card Maintenance Fee:** \$5.50
- **Identification Card Replacement Fee:** \$12
- **Identification Card Revalidation Fee:** \$5
- **International Education Fee:** \$3 per semester or summer term
- **Course Fee:** \$3 minimum per semester credit hour, maximum \$45 per semester credit hour
- **Recreation Center Fee:** \$59.50 per semester if enrolled in 4 or more credit hours and \$29.75 for summer terms or \$59.50 for summer trimester
- **Student Transportation Fee:** \$3 per semester credit hour
- **Field Trip Fee:** Varies
- **Off-Campus Travel Fee:** Varies
- **Special Instruction Fee:** Varies

Other Fees

- **Library Fines:** \$1 to \$225
- **Graduate Fees:** The cost of research items, questionnaires, charts, maps, slides, microfilm, photostats, postage, etc. required by a graduate student for completion of a thesis or research project will be the responsibility of the student.
- **Music Fees for Private Instruction:** An additional fee is charged at the time of registration for individual instruction in voice, piano, strings, and wind instruments for enrollment in the following courses in applied music: MUAP 1001, 1002, 2001, 2002, 3001, 3002, 4001, 4002, 5001 (1 semester credit hour—\$15) (2 or more semester credit hours—\$30).
- **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.)
- **International Student Fee:** \$50 each semester charged to each nonimmigrant international student, \$25 each summer session
- **Sponsored International Student Administrative Fee:** \$250
- **Parking Fee:** A fee is required for all vehicles parked on campus. A schedule of these fees may be obtained from Traffic and Parking.
- **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 is \$5, domestic mailing is \$5, and international mailing is \$8.
- **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.
- **Facilities Fee:** \$8 per student credit hour—applies only to those students enrolled in courses at any of the TTU Hill Country Campuses.
- **Law School Deposit:** \$200
- **Post Suspension Assistance Fee (XL-Strategies):** \$150

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. Student Business Services should be contacted for information regarding outstanding student loans and how the rebate will be applied toward them. If the student has an outstanding student loan, including an emergency loan, owed or guaranteed by this state, including the Texas Guaranteed Student Loan Corporation, the amount of the rebate shall be applied to the student's loan. If a student has more than one outstanding loan, the institution shall apply the amount of the rebate to the loans as directed by the student. If the student fails to provide timely instructions on the application of the amount, the institution shall apply the amount of the rebate to the loans according to priorities established by the coordinating board.

Exemptions and Waivers

All exemptions or waivers have been authorized by statute in the Education Code or through Texas Tech University Board of Regents action. 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.
- **Concurrent Enrollment:** Charges a student minimum tuition charges over and above per credit hour rate. Student must present certification of enrollment at institution of public higher education.
- **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 is required.
- **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.
- **Individual Studies:** Waives payment of Student Services Fee, Student Union Fee, Recreation Center Fee, and Medical Services Fee. Students must be enrolled only for those courses that will not permit them to avail themselves of these services because of the nature of the courses. All courses in which the student is enrolled must meet these criteria and be certified by the Office of the Provost.
- **Junction:** Waives Student Services Fee, Student Union Fee, Recreation Center Fee, Medical Services Fee, and ID Maintenance Fee for main campus. These are billed separately by the Junction Center.
- **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.
- **Off-Campus:** Waives Student Services Fee, Student Union Fee, Recreation Center Fee, Medical Services Fee, and ID Maintenance Fee. Students must be enrolled only for those courses that will not permit them to avail themselves of these services because of the nature of the courses. If the student is enrolled in a course requiring attendance on campus, this waiver does not apply. Certification by the Office of the Provost is required.
- **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.
- **Special Field Trips:** Waives Student Services Fee, Student Union Fee, Medical Services Fee,

Recreation Center Fee, and ID Maintenance Fee. Students must be enrolled only for those courses that will not permit them to avail themselves of these services because of the nature of the courses. Certification by the Office of the Provost is required.

- **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.ttu.edu/gradschool.
- **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.ttu.edu/gradschool.
- **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:

- College 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 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 March 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. According to the standards and practices at Texas Tech, the following guidelines determine satisfactory progress:

1. All undergraduate and law student aid recipients must have a 2.0 cumulative GPA; graduate students must have a 3.0.
2. If the student's cumulative GPA falls below 2.0 (Graduate–3.0), the student will be given one semester probation.
3. If a student earns a 2.0 GPA (Graduate–3.0) during a semester he or she is on probation but fails to raise the cumulative GPA to a 2.0 (Graduate–3.0) or better, he or she will continue on probation as long as the current GPA of 2.0 (Graduate–3.0) is maintained and until such time as his or her cumulative GPA meets the requirements.

4. If at the end of any probationary semester, the student does not have a 2.0 (Graduate–3.0) current or cumulative GPA, the student will not receive future financial aid until a 2.0 (Graduate–3.0) cumulative GPA has been obtained.
5. All students enrolling at Texas Tech for the first time (including transfers) will not be denied aid based on their enrollment status. However, all financial aid recipients must meet the requirements for satisfactory progress to continue on aid.
6. In addition to maintaining the overall GPA, a student must be making reasonable academic progress. For all students, satisfactory academic progress is reviewed at a minimum of once yearly. Students who have not maintained progress and are on appeal are reviewed each semester until minimum satisfactory academic progress has been met. Therefore, after completion of 60 undergraduate hours attempted, a student must have earned at least 70 percent of all hours attempted at Texas Tech (transfer hours included). A graduate student must be earning 70 percent of all hours attempted from the beginning of the graduate program. Grades of "W" or "F" are included in the calculation.
7. Students are expected to complete their program of study within 150 percent of the number of hours required.
8. A special graduate, nondegree graduate, or special undergraduate student is only eligible to receive financial aid for one 12-month period.
9. Summer school is considered as a semester.
10. Financial aid recipients or applicants whose aid has been canceled or denied as a result of failure to meet the required standards may be reinstated as follows:
 - A. A student must regain a 2.0 cumulative GPA (Graduate–3.0).
 - B. A student must, after 60 hours, have completed and earned 70 percent of the hours attempted (undergraduate only).
 - C. Students wishing to appeal their loss of aid may do so in writing to the Financial Aid Appeals Committee. Forms are available in the Financial Aid Office. Appeals may be made under hardship based on (1) the death of a relative of the student, (2) personal injury or illness of the student, or (3) special circumstances as determined by the institution. Documentation is required (e.g., death certificates or notice, medical bills, letter from an instructor or PASS showing effort made to make up work in the course).
11. Incompletes taken in course work must 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 that the "I" will be completed.
12. Students receiving TEXAS Grant funds must meet the institution's standards for satisfactory academic progress during the first two years on the program. Beginning the third year of eligibility, students must meet the state's guidelines of a 2.5 adjusted GPA and complete 75 percent of course work at Texas Tech.

Student Housing

Housing and Residence Life

Texas Tech University
108 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 the first semester of enrollment 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 received 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. A contract will be mailed to new students after the application and required fees have been received. Students and parents are urged to read the Residence Hall Contract carefully.

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 a private telephone line are available for each resident. Other services include basic cable television service, local telephone service, coin-operated laundry and vending machines, and desk services.

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

Meal Plans

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.

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.

Graduate 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 predetermined 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 2003-2004 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 \$5,263

Air-Conditioned Halls:

Chitwood, Clement, Coleman, Gaston,* Gates, Horn, Hulén, Knapp, Murdough, Stangel, Wall, Weymouth \$6,023

Air-Conditioned Suites:

Gordon (2-bedroom) \$6,244

Carpenter/Wells Complex:**

3-Bedroom townhouse \$6,945

4-Bedroom flat \$6,991

* 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 Affairs

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 Affairs Handbook*, student grievances, and the Assessment Response Team that works with students during emergencies and crisis situations. The center is located in 204 Student Union, (806) 742-5433.

Bookstore

The Texas Tech Bookstore is operated by Barnes and Noble and located in the Student Union Building. It is 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. Study guides, exam books, technical books, and bestsellers are all available. In addition to books, 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 accepts personal checks, major credit cards, and TechExpress. Store hours are 7:45 a.m. to 6 p.m. Monday through Thursday; 7:45 a.m. to 5 p.m. Friday; and 11 a.m. to 3 p.m. Saturday (summer hours vary). **Contact information:** (806) 742-3816 or www.bkstore.com/texastech.

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.). Students may also obtain free financial counseling from the Career Center's "Red to Black Program." The Career Center is located in the Wiggins Complex.

Check Cashing Services

For convenience of the student, personal checks printed with magnetic ink characters may be cashed for limited amounts at the Student Union upon presentation of a current student identification card and a valid driver's license. Checks returned by the bank may subject the student to suspension of check cashing privileges and/or disciplinary action.

The Student Union also 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 northeast lobby.

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 Tech (a tiered leadership certificate program), 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 in-

volvement can 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, 204 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 college or department office. Grievance procedures are described in the *Student Affairs Handbook* and questions may be directed to the Center for Campus Life, 204 Student Union, (806) 742-5433.

High Tech Computer Store

The campus computer store is located in the east 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:** www.hightech.uc.ttu.edu. Email hightech.sales@uc.ttu.edu.

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 col-

leges. 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 has been ranked in the top teams nationally for several years. They actively compete in both debate and individual event competitions across the country. Student travel and competition expenses are paid for, and the team is always actively recruiting new members. Contact the Director or Associate Director of Forensics for more information at (806) 742-3911.

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

Staff members in the Ombudsman's Office provide informal, neutral, and confidential dispute resolution services for students. Staff 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:** 203 Student Union, (806) 742-4791, www.ttu.edu/ombudsman.

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 stu-

dents 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.

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 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, choosing a credit card, comparing job offer benefits, or reading a credit report. The program also provides premarital financial counseling and has a large personal finance library with books and articles for student use. The Web site (www.r2b.ttu.edu) offers many useful financial tools. To make an appointment or obtain more information, email RedtoBlack@ttu.edu or call (806) 742-2210.

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. Copies of the *Code of Student Conduct* and *Student Affairs Handbook* may be obtained from the Office of Student Judicial Programs, 247 West Hall, (806) 742-1714, or online at the following address: www.depts.ttu.edu/studentjudicialprograms.

Student Counseling Center

The Student Counseling Center provides professional psychological services to address the wide variety of concerns affecting a college student's personal life and academic performance.

Personal and social adjustment counseling focuses on the developmental issues of early adulthood that many college students experience as well as 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 identity issues, communication skills, or simply help in understanding oneself better. Counseling can be conducted on an individual or group basis.

With the aid of career-interest tests, career literature, and a computer-assisted career exploration program (SIGI-PLUS), the Center guides students in choosing their academic major and career direction. Career exploration groups and workshops are offered regularly to synthesize test results with the students' values, interests, and lifestyle. Other groups are geared toward career adjustment through the job-hunting process. Academic counseling focuses on barriers to success such as test and speech anxiety or learning disabilities.

Several Student Counseling Center programs address specific populations. A peer mentoring program staffed by undergraduate peer mentors is designed to welcome first-year students to the Texas Tech community, especially ethnic minority, transfer, and nontraditional students. The Relationship Enhancement Center (REC) is also part of the Student Counseling Center and provides couples and family counseling for Tech students and their families. Peer mentoring and REC services are available during the evening hours as well as the daytime.

Student Counseling Center services are available 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 7 p.m. Monday through Thursday and 8 a.m. to 5 p.m. Friday. Contact information: 214 West Hall, (806) 742-3674, web site www.depts.ttu.edu/universitycounselingcenter.

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

Students enrolled for 4 or more semester hours 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. Approximately 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. Students may enroll online at www.student-resources.net. The plan is serviced by Student Resources, a division of The MEGA Life and Health Insurance Company.

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 registration. 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. Fail-

ure to comply with this requirement will result in a block being placed on the student's registration.

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 online 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 Mediation Center

The Student Mediation Center is comprised of two offices: Student Legal Services and Student Judicial Programs. Although the center offers numerous programs, the main focus is mediation services.

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 109 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:** 109 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:** 247 West Hall, (806) 742-1714.

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 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 Union is in the middle of an ambitious addition and renovation project. When the renovations are complete in the fall of 2004 the Student Union will be one of the preeminent facilities in the United States.

The first phase, which will be completed early in the summer of 2003, includes the addition of over 90,000 square feet of floor space. The addition will include a Barnes and Noble superstore; a casual dining unit; the High Tech Computer Store; a 100-seat theater; and offices for the Union, Center for Campus Life, the Student Government Organization, and more than 60 student organizations. As the new building comes online, portions of the existing building will be shut down to begin the renovation of those areas.

During the renovations the Raider Express Convenience Store, Post Tech, and the American State Bank branch will be relocated across the street to the building previously occupied by the Texas Tech Bookstore. After new spaces are built for those operations, they will return to the Union. Likewise, the fast food units will relocate to the Red Raider Ballroom so that the fast food area can be renovated. The renovations are expected to take slightly over one year. During that time there will be some disruption in operations, but the completed facility will be well worth the time and minor inconvenience.

The new Student Union will feature numerous spaces for students to relax between classes or spend time with their friends. The most imposing of the new lounge spaces is the Gathering Pavilion on the northwest corner of the building. With mostly glass walls, this two-story space will provide a beautiful panorama of the surrounding campus. The finished facility will also 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 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 service 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.

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, attention deficit disorder, and attention deficit hyperactivity disorder.

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 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.

Testing, Evaluation, Assessment, and Measurement (TEAM) Center

The TEAM Center provides assessment services based on test samples of individual and group performances. Academic testing includes such national and institutional testing programs as the Graduate School admissions tests (GRE and GMAT), the Law School Admissions Test (LSAT), the Medical School Aptitude Test (MCAT), PCAT, TOEFL, SAT-I, ACT, and others. Academic institutional testing includes Credit-by-Examination, the College Level Examination Program (CLEP), and other tests such as the CEEB. Programs include special testing for persons with certified handicaps; differential diagnostic testing; and consulting for academic strengths, vocational interests, career aptitudes, and learning plans. Additional group and individual services are available as staffing and time allow. **Contact information:** 213 West Hall, (806) 742-3671.

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 nine 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 student must complete the last 30 hours at Texas Tech. These hours may include a maximum of 6 semester hours in correspondence course work, provided the minimum residence and course work requirements stated above have been met.

Course work taken through the Division of Outreach and Extended Studies at Texas Tech University or at any other institution will not be counted as residence credit. A Texas Tech resident student may apply course work completed at a distance through Texas Tech University's Office of Extended Studies 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 as 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 objective. For the student who changes a degree objective after beginning a college career, the degree requirements in effect when the student is officially admitted to the college from which the degree is to be received will be applicable. Only with the specific approval of the academic dean may a different catalog be selected. In no case may a student complete the requirements set forth in a catalog more than seven years old. When necessary, a catalog issued later than the student's first registration may be selected by the academic dean in conference with the student.

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

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

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

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

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

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

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. For students in the College of Business Administration (except 150-hour accounting majors), completing the B.B.A. degree requirements satisfies the university's multicultural requirement. All students should check with an advisor for appropriate courses.

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 | | TCCNS [†] |
|------------|--------------------------------|--------------------|
| ENGL 1301 | Essentials of College Rhetoric | ENGL 1301 |
| ENGL 1302 | Advanced College Rhetoric | ENGL 1302 |

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

2. Oral: Speech: 3 hours

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

| TTU Course | | TCCNS |
|------------|---|-----------|
| CH E 2306 | Exposition of Technical Information | |
| COMS 1300 | Introduction to Communication Studies | SPCH 1311 |
| COMS 2300 | Public Speaking | SPCH 1315 |
| COMS 3358 | Business and Professional Communication | |
| HDFS 2320 | Basic Interpersonal Skills | SPCH 1318 |
| MGT 3373 | Managerial Communication | |
| PETR 3308 | Engineering Communications | |

B. Mathematics: Logic, college-level algebra or equivalent, finite math, statistics, calculus or above: 6 hours, at least 3 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 | | TCCNS |
|--|---|-----------|
| AAEC 3401 | Agricultural Statistics | |
| I E 3341 | Engineering Statistics | |
| MATH 1320 | College Algebra or MATH 1300 or MATH 1420 (only 1 of the 3) | MATH 1314 |
| MATH—All mathematics courses above 1320, except 3430 | | |
| MUTH 3303 | Form, Analysis, and Synthesis | |
| PHIL 2310 | Logic | PHIL 2303 |
| PHIL 4310 | Advanced Logic | |
| PSY 3400 | Statistical Methods | |
| SOC 3391 | Introduction to Social Research I | |

C. Natural Science: 8 hours (3-hour lecture courses must be accompanied by the related 1-hour laboratory course)

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

| TTU Course | | TCCNS |
|------------|---|---------------------|
| ANSC 3404 | Consumer Selection and Utilization of Meat Products | |
| ANTH 2300 | Physical Anthropology | ANTH 2301* |
| ANTH 2100 | Physical Anthropology Laboratory | |
| ASTR 1300 | Solar System Astronomy | PHYS 1311 |
| ASTR 1100 | General Astronomy Laboratory I | PHYS 1111 |
| ASTR 1301 | Stellar Astronomy | PHYS 1312 |
| ASTR 1101 | General Astronomy Laboratory II | PHYS 1112 |
| ATMO 1300 | Introduction to Atmospheric Science | GEOL 1347* |
| ATMO 1100 | Atmospheric Science Laboratory | |
| BIOL 1305 | Ecology and Environmental Problems | |
| BIOL 1113 | Environmental Problems Laboratory | |
| BIOL 1401 | Biology of Plants | BIOL 1411 |
| BIOL 1402 | Biology of Animals | BIOL 1413 |
| BIOL 1403 | Biology I | BIOL 1406 |
| BIOL 1404 | Biology II | BIOL 1407 |
| CHEM 1305 | Chemistry and Society I | CHEM 1305 |
| CHEM 1105 | Experimental General Chemistry I (Laboratory) | CHEM 1105 |
| CHEM 1306 | Chemistry and Society II | CHEM 1307 |
| CHEM 1106 | Experimental General Chemistry II (Laboratory) | CHEM 1107 |
| CHEM 1307 | Principles of Chemistry I | CHEM 1311 (or 1411) |
| CHEM 1107 | Principles of Chemistry I (Laboratory) | CHEM 1111 |
| CHEM 1308 | Principles of Chemistry II | CHEM 1312 (or 1412) |
| CHEM 1108 | Principles of Chemistry II (Laboratory) | CHEM 1112 |
| F&N 1410 | Science of Nutrition | |
| GEOG 1401 | Physical Geography | GEOG 1301* |
| GEOL 1303 | Physical Geology | GEOL 1403 |
| GEOL 1101 | Physical Geology Laboratory | |
| GEOL 1304 | Historical Geology | GEOL 1404 |
| 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 1303 | Physics for Nonscience Majors | PHYS 1305 |
| PHYS 1101 | Experimental Elementary Physics (Lab) | PHYS 1105 |
| PHYS 1306 | General Physics | PHYS 1301 |
| PHYS 1103 | Experimental General Physics I (Lab) | PHYS 1101 |
| PHYS 1307 | General Physics | PHYS 1302 |
| PHYS 1104 | Experimental General Physics II (Lab) | PHYS 1102 |
| PHYS 1308 | Principles of Physics I | PHYS 2325 |
| PHYS 1105 | Principles of Physics I (Lab) | PHYS 2125 |
| PHYS 1406 | Physics of Sound and Music | |
| PHYS 2301 | Principles of Physics II | PHYS 2326 |
| PHYS 1106 | Principles of Physics II (Laboratory) | PHYS 2126 |
| PSS 1411 | Principles of Horticulture | HORT 1401 |
| PSS 2330 | Urban Soils | |
| PSS 2130 | Urban Soils Laboratory | |
| PSS 2401 | Introductory Entomology | AGRI 1413 |
| ZOOL 2403 | Human Anatomy and Physiology I | BIOL 2401 |

*Does not include lab course

TCCNS[†] — See Page 23 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 | | 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 | CHEM 2323 |
| C S 1300 | Computers and Modern Society | COSC 1301 |
| C S 1412 | Programming Principles II | COSC 1420 |
| 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 | Telecommunications Technologies and Society | |
| EM&C 3310 | Introduction to Telecommunications | |
| 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 Mgmt. | |
| GEOL 3323 | Environmental Geology | |
| GEOL 3428 | GIS in Natural Science and Engineering | |
| GTEC 1312 | Alternating and Direct Current Technology | |
| HONS 3302 | Honors Seminar in Sciences | |
| I D 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 2440 | 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 | Introduction to Mechanical Engineering | |
| M E 2322 | Engineering Thermodynamics I | |
| MTEC 1312 | Mechanical Technology | |

| | | |
|-----------|--|-----------|
| MUCP 3001 | Projects in Electronic and Experimental Music | |
| 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 | |
| PSS 1321 | Agronomic Plant Science | AGRI 1307 |
| 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 2330 |
| 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 | | 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 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. | | |
| | Excluded are courses in technical writing. | |
| HIST—Any history courses not used to fulfill Core Curriculum American history requirement. | | |
| HONS 3301 | Honors Seminar in Humanities | |
| HUM 2301 | Introduction to Humanities | HUMA 1301 |
| HUM 2302 | Introduction to Humanities | HUMA 1302 |
| JOUR 3350 | History of American Journalism | |
| LAIS 2300 | Latin America and Iberia: An Interdisciplinary Introduction | |
| LAIS 4300 | Seminar in Latin American and Iberian Studies | |
| LARC 3302 | Development of Landscape Architecture | |
| NHH 1301 | Natural History and Humanities Seminar | |
| PHIL 2300 | Beginning Philosophy | PHIL 1301 |
| PHIL 2320 | Introduction to Ethics | PHIL 2306 |
| PHIL 2350 | World Religions and Philosophy | |

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| 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)* |

*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 | | TCCNS |
|--|---|-----------|
| 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 | ARTS 1301 |
| ART—All studio courses | | |
| DAN 3313 | History of the Dance | |
| 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 | MUSI 1181 |
| MUAP 1124 | Group Keyboard Instruction II | MUSI 1182 |
| MUAP 2123 | Group Keyboard Instruction III | MUSI 2181 |
| MUAP 2124 | Group Keyboard Instruction IV | MUSI 2182 |
| MUAP 2133 | Class Guitar | MUSI 1192 |
| MUAP 2134 | Class Guitar | MUSI 1193 |
| 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 | |

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| MUHL 2309 | Heritage of Music | |
| MUHL 3304 | History of Jazz | |
| MUHL 3308 | Masterpieces in Music | |
| MUSI 2301 | Essential Elements of Music | |
| MUTH 1300 | Songwriting | |
| MUTH 1301 | Introduction to Music Theory | |
| MUTH 1101 | Developmental Aural Skills | |
| MUTH 1303 | Elementary Music Theory I | MUSI 1311 |
| MUTH 1103 | Elementary Aural Skills I | |
| MUTH 1304 | Elementary Music Theory II | MUSI 1312 |
| MUTH 1104 | Elementary Aural Skills II | |
| TH A 2301 | Introduction to Acting | |
| TH A 2303 | Introduction to Theatre | DRAM 1310 |
| TH A 2304 | Introduction to Cinema | |
| TH A 2305 | Fundamentals of Oral Interpretation | SPCH 2341 |
| TH A 3308 | History of Theatre I | |
| TH A 3309 | History of Theatre II | |
| TH A 4303 | Theory and Practice of Playwriting | |

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 | | TCCNS |
|------------|--|-----------|
| HIST 2300 | History of the U.S. to 1877 | HIST 1301 |
| HIST 2301 | History of the U.S. Since 1877 | HIST 1302 |
| HIST 3310 | History of Texas | |
| W S 3323 | History of Women in America (HIST 3323)* | |

*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 | | TCCNS |
|------------|-----------------------------------|-----------|
| POLS 1301 | American Government, Organization | GOVT 2301 |
| POLS 2302 | American Public Policy | GOVT 2302 |

3. Individual or Group Behavior: 3 hours

| TTU Course | | TCCNS |
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| 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 | |

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| ANTH 3331 | Indians of North America | |
| ANTH 3332 | Peoples of Latin America | |
| ANTH 3345 | North American Archeology | |
| ANTH 3371 | Peoples of the Southwest | |
| ANTH 4372 | Society and Culture of Mexico | |
| ARCH 1311 | Design, Environment, and Society | |
| ART 3311 | Native American Arts | |
| ART 4315 | Arts of Pre-Columbian America | |
| COMS 1301 | Interpersonal Communication | |
| COMS 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 | |
| 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 | PSYC 2306 |
| HLTH 2302 | Environmental Health and Awareness | |
| HLTH 3325 | Health Concerns in Chemical Dependencies | |
| 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 2308 |
| PSY 3398 | Ethnic Minority Psychology | |
| PSY 4300 | Psychology 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)* | |

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| 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 | Women in the Modern World (SOC 3325)* |
| W S 3326 | Women in Politics (POLS 3326)* |
| W S 3331 | Sociology of the Family (SOC 3331)* |
| W S 3337 | Inequality in America (SOC 3337)* |
| W S 4302 | Psychology of Human Sexual Behavior (PSY 4300)* |
| W S 4399 | Women's Studies Seminar |

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

Academic Regulations

Classification of Students. An undergraduate student is classified according to the following: freshman, 0–29 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 grade point average of 2.00 or higher in each semester, and maintains an overall grade point average of 2.00 or higher.

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

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

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

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

Enrollment in One of the Colleges or Schools. Each student accepted for admission will enroll in one of the colleges or schools of the university: Agricultural Sciences and Natural Resources, Architecture, Arts and Sciences, Business Administration, Education, Engineering, Honors, Human Sciences, 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.

Advising Center at Texas Tech (ACTT).

Academic advisors at ACTT assist the following student populations: Arts and Sciences undeclared (ASUD) majors with up to 60 earned hours, prelaw students with up to 30 earned hours; provisionally admitted 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, (806) 742-2189, fax (806) 742-2200, advising@ttu.edu, www.actt.ttu.edu

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 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 performance 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, the *Schedule of Classes*, and other official documents.
- Keep a record of all contacts with the university.

Dropping a Course. Students 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.

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 Dining Services.

Administrative Holds. By failing to meet certain obligations to the university, a student may be denied registration and/or a transcript until the administrative hold is cleared.

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 by using the following Web address: <http://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 Affairs 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.

- Cheating:** Dishonesty on examinations and quizzes or on written assignments; illegal possession of examinations; use of unauthorized notes during an examination or quiz; obtaining information during an examination from the examination paper, the Internet, or another student; assisting others to cheat; alteration of grade records; and illegal entry to or unauthorized presence in an office are instances of cheating. Complete honesty is required of students in the presentation of any and all phases of course work as their own. This applies to quizzes of whatever length as well as to final examinations, daily reports, lab work, and term papers.
- Plagiarism:** Offering the work of another as one's own, without proper acknowledgment, is plagiarism; therefore, any student who fails to give credit for quotations or an essentially identical expression of material taken from books, encyclopedias, magazines, documents from the Internet, and other reference works, or from the themes, reports, or other writings of a fellow student, is guilty of plagiarism.

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. More information on this subject is available on-line at www.ttu.edu/vpsa/publications/civility.htm.

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.

The grade of W is 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. The grade of WF is 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.

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.

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. 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. A student wanting to replace a grade received before fall 1983 should contact the student's academic dean's office.

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 (I S 100) 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.

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.

The names of students taking a course pass–fail will not be made known to the instructor.

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.

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 section entitled “Undergraduate Credit by Examination”).

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 ac-

knowledgments, 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 100 West Hall, no later than five class

days before the first day of the final examination period. Students under 18 years of age 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 correspondence and provided the instructor who taught the residence course is assigned as the correspondence instructor. Credit received through the process just described is recorded as correspondence credit.

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) 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 following 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) 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.

Applications for readmission should be received in the Office of Admissions and School Relations at least 60 days before the beginning of the anticipated term of enrollment. Students who do not qualify for admission and then attend another college will be considered transfer students and must meet transfer admission policies to be readmitted to the university.

Conditions of Return From a First Scholastic Suspension. A student who wishes to return to Texas Tech after a first suspension will be treated as a former student for re-admission purposes but must provide copies of transcripts for all academic work completed at institutions other than Texas Tech.

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. Conditions of the readmission will be established by university policy regarding readmission.

Subsequent Suspensions and Conditions of Return. A student's academic dean must approve a student's re-admission following suspension for a second or subsequent time. Re-admission 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. Students seeking re-admission following a second or subsequent suspension must seek re-admission through the college from which they were suspended. 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 re-admitted 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.

A student who wishes to return to Texas Tech after a second or subsequent suspension will be treated as a former student for re-admission purposes but must provide copies of transcripts for all academic work completed at institutions other than Texas Tech.

Teacher Education

The preparation of teachers and the provision of knowledge and skills for teachers are important functions of the university at both the undergraduate and graduate levels. The coordination of the teacher education program is a responsibility of the Dean of the College of Education.

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. Selection of courses in the student's teaching field is determined by an advisor in the academic department involved.

Due to changes in state laws, teacher education at Texas Tech has undergone many revisions. Majors using the term "education" (e.g., secondary education, art education) are no longer offered. Individuals will be certified to teach in elementary, middle, and secondary schools, but they must complete an academic major.

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 2000-2001 was 82 percent. The cumulative passing rate on all tests for students taking licensing exams from 2000 to 2002 was 91.47 percent.

Students preparing to teach in secondary schools 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 8-12) may complete a Multidisciplinary Science major through the College of Education or an academic major in one of the teaching fields. Students preparing to teach grades 4-8 will complete a Multidisciplinary Studies major in the College of Education. 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 4, should enroll in the early childhood program.

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. The College of Education seeks to maintain rigorous academic programs to prepare outstanding educators for Texas and the nation. Admission to College of Education certification programs is open to all individuals on the basis of academic preparation, achievement, and availability of space in the program selected. When there are more qualified applicants than can be instructed adequately by the available faculty or accommodated in available facilities, the college will control enrollment in specific programs by limiting the admission of new students. The number of students accepted into the undergraduate Early Childhood, Middle-Level Education, and All-Level, Secondary, 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 through a twice-per-year admission process. Application forms from the College of Education should be completed during the second semester of the sophomore year. Application deadlines are generally early 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. Individuals must have a minimum acceptable scholastic grade point average. Students seeking early childhood certification (through a degree in the College of Human Sciences) must have a 2.7 or higher overall GPA. Students seeking other certificates (middle level, secondary, career and technology, and all-level), must have a 2.5 or higher overall GPA.
2. A satisfactory level of performance on the Texas Academic Skills Program (TASP).
3. Good character and high ethical standards. All applicants for Texas certification are screened for a record of felony or misdemeanor convictions through the Texas Department of Public Safety. All potential certificate applicants with criminal felony or misdemeanor convictions should immediately contact the Texas Tech Certification Office to seek clarification of their certification status.
4. Possess the ability to speak and understand the English language sufficiently to use it easily and readily in conversation and teaching.
5. Possess college level skills in critical thinking.
6. Possess such personal and social qualities and physical and mental health to indicate a fitness for the education profession.

Admission to upper division teacher education programs is 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 or have not passed the TASP examination 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 or, for transfer students, during the first semester of attendance at Texas Tech. Students seeking certification in agricultural science, art, family and consumer science, or music must consult their department advisor regarding the proper time to file this certification plan. The student's advisors will assist in completing the certification plan. Any graduate student (either a degree or nondegree student) working toward a certificate should file a certification plan in the College of Education following admission to the Graduate School. 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 any corequisite 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 with permission from a College of Education advisor.
2. Each student, unless enrolled in agricultural science, family and consumer science, or music, must file an application for student teaching in the Certification Office. To apply for fall student teaching, applications must be received between October 15 and December 15 in the year before. To apply for spring student teaching, applications must be received between April 15 and July 15 in the year before. 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.

Recommendation for Teacher Certification.

An individual who has maintained the levels of performance stated as prerequisites for admission to student teaching, who has demonstrated knowledge and understanding related to the nature of our multicultural society, and who has demonstrated knowledge and understanding regarding the education of pupils with exceptionalities is eligible to apply during the last semester of certification work to the College of Education for a recommendation to the State Board for Educator Certification for the appropriate teaching certificate. A \$75 fee is required by the state. Upon completing all requirements, including the appropriate TExES examinations, the student is recommended for certification. The Texas Oral Proficiency Test (TOPT) is also required of individuals seeking language related certificates.

While completing the requirements, a student must maintain a 2.5 GPA in the professional education courses and a 2.5 GPA in the teaching field(s). Grades of D are not acceptable in the professional education courses or in the

teaching field(s). An acceptable overall GPA is required (2.7 for early childhood; 2.5 for middle level, secondary, all-level, and career and technology).

All persons completing teacher training programs who 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 and endorsement. All candidates for initial teacher certification must pass a professional development test 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 (\$72 per test).

Contact the College of Education for information about the proficiency tests.

Certificate Programs. Certificate programs have been approved for Texas Tech University at the early childhood, middle, and secondary levels. In addition, all-level programs have been approved in certain fields (art, music, and physical education) which qualify the individual for certification at both the elementary and secondary levels.

The certificate programs for early childhood, middle, secondary, career and technology, and all-level education have similar Core Curriculum requirements consistent with those of the university. However, Core Curriculum requirements may vary slightly. Consult an advisor.

The State Board for Educator Certification has recently approved a set of new teaching certificates. These certificates will go into effect after September 1, 2002. Preparation for the following certificates is currently offered at Texas Tech:

Early Childhood Certificates: Early Childhood—Grade Four Generalist; Bilingual Generalist

Middle Level Certificates: Grades 4–8 Bilingual Generalist; English Language Arts; Social Studies; Math; Science; English Language Arts—Social Studies

Secondary Certificates: Grades 8–12 English Language Arts; Speech; Journalism; Social Studies; History; Science; Life Science; Physical Science; Mathematics; Technology Applications; Computer Science

All Level Certificates: All Level Physical Education; Art; Music

Please consult an advisor in the College of Education to match your academic background and career goals with certificates available at Texas Tech University.

Off-Campus Educational Sites and Distance Learning

Off-Campus Sites

• Texas Tech University–Amarillo

Texas Tech University has established an off-campus educational site in Amarillo for the purpose of delivering master's level engineering education. This program is known as the Engineering Graduate Studies Program (EGSP). The primary objective of the EGSP is to provide quality teaching, research, and service to Amarillo. The EGSP is in a unique position to provide graduate education in engineering and engineering management to students in Amarillo and the surrounding regions. Partnerships are being developed to provide faculty and graduate students with research and financial support opportunities that would otherwise not be available. The program will also facilitate workforce education and development for employers in this region.

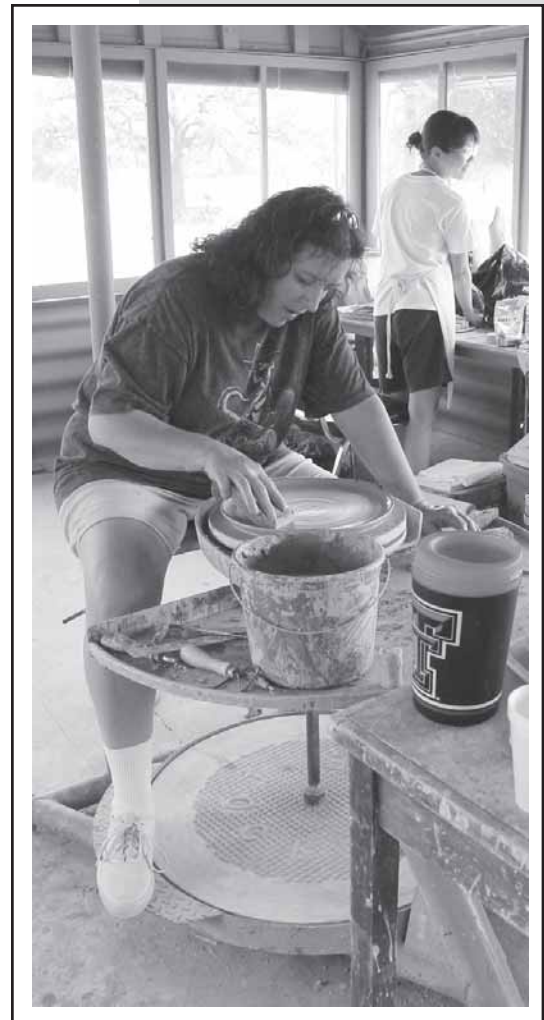
The programs being offered in Amarillo are master's level engineering degree programs. All students entering the programs at this educational site will be held to the same entrance requirements as students at the main campus. The courses and curriculum will meet the same standards as those on campus. Students will meet the same requirements for graduation as the students on the main Texas Tech campus. The following degree programs are being offered in Amarillo:

- Master of Engineering
- Master of Science in Systems and Engineering Management
- Master of Science in Manufacturing Systems and Engineering
- Master of Science in Environmental Technology Management
- Master of Science in Software Engineering

Courses will be delivered in one of three modalities. The first will be courses delivered on-site by faculty located in Amarillo. The second will be courses delivered via interactive video from the main campus or another TTU educational site. The third modality will be to provide courses to these locations via asynchronous delivery. The combination of these delivery methods will allow for the maximum flexibility in delivering programming to this educational site.

The Amarillo educational site 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. A small area has been dedicated as a computer lab for student use. Each faculty member has his or her own computer, and the space is fully networked. The network is connected by two T1 lines to Lubbock. The T1 lines provide both video and Network Services to the Amarillo site.

Contact information: Dr. Milton Smith, chairperson of the Department of Industrial Engineering at Texas Tech, serves as Academic Director of the Amarillo campus. An assistant chairperson located in Amarillo manages the educational site facilities. To reach the Amarillo site, call (806) 356-4701 or visit <http://aln.coe.ttu.edu/amarillo>.



• Texas Tech University–Abilene

Texas Tech University has established an off-campus educational site in Abilene for the purpose of delivering master's level engineering education. This program is known as the Engineering Graduate Studies Program (EGSP). The primary objective of the EGSP is to provide quality teaching, research, and service to Abilene. The EGSP is in a unique position to provide graduate education in Computer Science and engineering to students in Abilene and the surrounding regions. Partnerships are being developed to provide faculty and graduate students with research and financial support opportunities that would otherwise not be available. The program will also facilitate workforce education and development for employers in this region.

The programs being offered in Abilene are master's level computer science and engineering degree programs. All students entering the programs at this educational site will be held to the same entrance requirements as students at the main campus. The courses and curriculum will meet the same standards as those on campus. Students will meet the same requirements for graduation as the students on the main Texas Tech campus. The following degree programs are being offered in Abilene:

- Master of Engineering
- Master of Science in Software Engineering
- Master of Science in Computer Science

Courses will be delivered in one of three modalities. The first will be courses delivered on-site by faculty located in Abilene. The second will be courses delivered via interactive video from the main campus or another TTU educational site. The third modality will be to provide courses to these locations via asynchronous delivery. The combination of these delivery methods will allow for the maximum flexibility in delivering programming to this educational site.

The Abilene educational site building is located at 301 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 will be the primary location of the Abilene educational site. This space contains offices, classrooms, a break room, bathrooms, and research areas, including many office cubicles for adjunct faculty or graduate students. The entire facility has been networked, and the network is connected to a dedicated DS3 line to Lubbock. There are three classrooms, with one classroom equipped as a videoconference classroom. Each faculty member has a desktop computer, and students use a high-tech computer lab.

Contact information: Dr. Daniel Cooke, chairperson of the Department of Computer Science at Texas Tech, serves as the Academic Director of the Abilene campus. Dr. Jack Barnes is the assistant chairperson located on-site to manage the branch campus facilities. To reach the Abilene site, call (915) 677-1112 or visit online at <http://aln.coe.ttu.edu/abilene>.

• Texas Tech University–Hill Country

The mission of Texas Tech University-Hill Country is to support academic, research, and special programs while expanding educational, economic, and cultural opportunities throughout the Hill Country region. TTU-HC offers a variety of undergraduate and graduate degree programs as well as continuing education programs at three off-campus educational sites: TTU-Junction, TTU-Fredericksburg and TTU-Highland Lakes. Degree-seeking students may enroll in university courses every semester, with instruction delivered by faculty in a traditional face-to-face setting or via interactive video conferencing, the Internet, or correspondence. Each site offers a full range of student services, including academic advising and assistance with registration and financial aid. Detailed information is available at www.hillcountry.ttu.edu. Degree programs offered through the TTU-HC sites include:

- Bachelor of General Studies
- Master of Education in Educational Leadership
- Master of Art Education (Junction only)
- Doctor of Education in Agricultural Education

Additionally, the School of Allied Health and the School of Nursing at the Texas Tech University Health Sciences Center offer the following degree programs through the TTU-HSC sites:

- RN to Bachelor of Science in Nursing
- Bachelor of Science in Clinical Support Services Management (Internet-based)
- Bachelor of Science in Emergency Medical Services Management (Internet-based)
- Master of Vocational Rehabilitation (Internet-based)
- Master of Science in Rehabilitation Sciences (Internet-based)
- Master of Science in Nursing

Other degree programs are available through distance learning. For a listing of degree programs offered at a distance, refer to the Distance Learning section of this catalog. Non-credit professional development and personal enrichment opportunities are also available. Contact the respective educational sites for a detailed listing of offerings.

Hill-Country Locations

1. Texas Tech University–Junction

TTU-Junction encompasses 411 acres on the South Llano River in the Texas Hill Country two miles south of Junction on FM 2169. In addition to the degree programs and continuing education opportunities noted above, 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 TTU-Junction is Howard College.

The following facilities are available: interactive video conferencing and traditional classrooms, a lecture hall, offices, laboratories, a library, a dark room, Mac and PC computer labs with T1 Internet connections, and specialized art facilities.

A wide range of housing accommodations and full meal service are available year round for groups ranging from 20 to 200 people. TTU-Junction is available for workshops, retreats and other special activities to Texas Tech student organizations, faculty groups, researchers and other groups. TTU-Junction is home of Red Raider Camp, a freshman spirit and orientation camp that operates from mid to late summer.

Recreational opportunities include river activities, hiking and nature trails, a sand volleyball court and a large swimming pool.

Contact information: Ashton Thornhill, Academic Director, (806) 742-2184, or Martha Richardson, Director of Programs, (325) 446-2301, (806) 742-6134, or (888) GOTECH2, www.hillcountry.ttu.edu

2. Texas Tech University–Fredericksburg

Texas Tech operates an off-campus educational site in Fredericksburg with administrative offices at 102 E. San Antonio Street and classrooms in dedicated portable buildings behind the Primary School at 1110 S. Adams Street. Two interactive video classrooms, a traditional classroom, and an Internet lab are available. Austin Community College is the partner offering first- and second-year core curriculum courses in Fredericksburg.

Contact information: Phil Youngblood, Interim Academic Director, (830) 990-2717, (806) 742-6440, or (888) GOTECH2, www.hillcountry.ttu.edu

3. Texas Tech University–Highland Lakes

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

Contact information: Dr. Bobbie Walker, Academic Director, (830) 798-9548, (806) 742-6450, or (888) GOTECH2, www.hillcountry.ttu.edu

Distance Learning

For more than 70 years Texas Tech University has offered distance learning courses that allow the teacher and student to interact at a distance. Current distance learning opportunities include K-12 options, college credit courses, degree programs, certifications, and noncredit programs. These options enable students to take both credit and noncredit courses at their convenience, choosing the appropriate time and place to meet their needs. Courses are delivered over the Web, by two-way interactive video, on audiotape and videotape, by CD ROM, and by printed correspondence, depending on the course or program. Email, threaded discussions, chat rooms, and traditional communication methods allow students to correspond with instructors and peers.

Distance learning courses taken either for college credit or continuing education credit are recorded on Texas Tech University transcripts. Distance learning course credits may be transferable to other institutions.

Degree Programs

Texas Tech University offers the following 10 distance learning degree programs:

- Bachelor of General Studies
- Master of Arts in Technical Communication
- Master of Engineering
- Master of Science in Systems and Engineering Management
- Master of Science in Petroleum Engineering
- Master of Science in Software Engineering
- Master of Education in Instructional Technology
- Master of Education in Special Education
- Master of Science in Restaurant/Hotel and Institutional Management
- Doctor of Education in Agricultural Education

Certifications

The College of Education offers the following four college credit distance learning programs leading to state and national certifications in special education: Generic Special Education (Supplemental Certificate), Educational Diagnostician (Professional Standards Certificate), Visually Handicapped (Professional Standards Certificate) and Orientation and Mobility (National Certificate). For more information, visit <http://www.educ.ttu.edu/Distance>.

Contact information: For specific information about degree programs or non-credit distance learning opportunities, visit the distance learning website at <http://www.de.ttu.edu> or call (806) 742-7200, ext. 276.

Extended Studies

Extended Studies administers (1) print and Web-based distance learning college courses, including an external 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, and the TTU Ropes Course. Interested students may request information about any of these programs by contacting Extended Studies at (806) 742-7200 or by visiting the office on the third floor of West Hall or at 6901 Quaker Avenue.

The Bachelor of General Studies distance learning degree program, offered by the College of Arts and Sciences through Extended Studies, is a challenging program for exceptional students. A highly flexible program, the Bachelor of General Studies degree features three core areas of concentration tailored to students' interests or professional goals. Students taking this distance learning program must meet the same academic requirements as students in the resident program. Interested students may obtain an admission application and additional information from Extended Studies. College-level credit courses are offered in an asynchronous print-based format and, when available, online. The self-paced design of the courses allows many students to stay on track with their degree plans when scheduling conflicts with resident classes occur. Academic departments ensure that all Extended Studies college credit courses are equivalent in quality to courses taken in residence.

A Texas Tech resident student may apply up to 18 hours of course work completed through Extended Studies toward a bachelor's degree. Such a 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. No more than 6 hours of the final 30 hours may be completed at a distance through Extended Studies, and none of the 6 hours may be part of the major or minor resident degree requirements. 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.

To enroll in an Extended Studies distance education course, the enrollment form located in the back of the *Extended Studies Catalog* or on the website (www.dce.ttu.edu) must be completed. All Texas Tech students must have the signature of their academic dean on the enrollment forms. An Extended Studies college-level course is \$92 per semester hour for both print-based and online courses. In addition, students must pay a \$25 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, a \$14 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 *Undergraduate Catalog* concerning the Texas Academic Skills Program (TASP) test. Contact the TASP Office in Admissions, 136 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

Anthropology (ANTH)
2302. Cultural Anthropology

Communication Studies (COMS)
2300. Public Speaking

Economics (ECO)
2301, 2302. Principles of Economics I, II

English (ENGL)
1301. Essentials of College Rhetoric
1302. Advanced College Rhetoric
2305. Introduction to Poetry
2311. Technical Writing
3326. American Novel
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
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

Journalism (JOUR)

3350. History of American Journalism

Mass Communications (MCOM)

1300. Introduction to Mass Communications

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

Political Science (POLS)

1301. American Government, Organization

2302. American Public Policy

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)

1320. Current Social Problems

Spanish (SPAN)

1507. Comprehensive Spanish Review-First Year

Telecommunications (TELE)

3310. Introduction to Telecommunications

College of Business Administration

Accounting (ACCT)

2300. Financial Accounting

2301. Managerial Accounting

Business Law (BLAW)

3391. Business Law I

Information Systems and Quantitative Sciences (ISQS)

3344. Introduction to Production and Operations Management

Marketing (MKT)

3350. Introduction to Marketing

College of Education

Educational Instructional Technology (EDIT)

2318. Computing and Information Technology

5318. Introduction to Small Computers in Education

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

3320. The Contemporary Family

Restaurant, Hotel, and Institutional Management (RHIM)

2312. Introduction to Beverage Management

3322. Hospitality Control II

3350. Travel and Tourism I

3460. Food Systems Management

College of Visual and Performing Arts

Music History and Literature (MUHL)

2309. Heritage of Music

Music Theory (MUTH)

1300. Songwriting

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).



Graduate Studies and Research



Dr. Ronald M. Anderson
Dean

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www.ttu.edu/gradschool

About the Graduate School

Graduate study is much more than a continuation of undergraduate work. It is distinguished by the 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, nearly all graduate schools exercise some type of selectivity in their 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 to his or her best interest or that of the university.

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 almost 110 different master's programs and some 57 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 770 master's degrees and 147 doctoral degrees.

The Graduate School strives to maintain flexibility through a combination of options from the 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.



Administrative Staff

Graduate School

Robert W. Sweazy, Ph.D., Professor of Civil Engineering and Vice President for Research, Graduate Studies, and Technology Transfer

Ronald M. Anderson, Ph.D., Professor of Mathematics and Statistics, Dean

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

Allan D. Headley, Ph.D., Professor of Chemistry and Biochemistry, Associate Dean

Ralph Ferguson, M.P.A., Assistant Dean

Katy F. Henderson, Manager of Financial and Administrative Services

Cindy L. Shepherd, Executive Assistant to the Dean

Gloria McNeme, Senior Administrative Assistant

Barbi Dickensheet, Thesis-Dissertation Coordinator

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 and the Provost (or a designated representative) are *ex officio* and nonvoting members of the council.

Elective 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. Appointive 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 after names listed below indicate the year of expiration of term of office. In addition, a student representative is appointed each year by the Graduate Dean.

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.

- **Ronald M. Anderson, Ph.D.**, Professor of Mathematics and Statistics and Dean of the Graduate School
- **Roger Barnard, Ph.D.**, Professor of Mathematics and Statistics (2005)
- **Lora Deahl, Ph.D.**, Professor of Music (2003)
- **Philip Dennis, Ph.D.**, Professor of Anthropology (2003)
- **Cary Green, Ph.D.**, Associate Professor of Plant and Soil Science (2004)

- **Tim Dodd, Ph.D.**, Associate Professor of Restaurant, Hotel, and Institutional Management (2003)
- **Fred Hartmeister, Ph.D.**, Professor of Education and Law (2004)
- **Karlene Hoo, Ph.D.**, Associate Professor of Chemical Engineering (2004)
- **William Maki, Ph.D.**, Professor of Psychology (2003)
- **Bill Pasewark, Ph.D.**, Professor of Accounting (2005)
- **Michael Peters, Ph.D.**, Professor of Architecture (2004)
- **Becky Rickly, Ph.D.**, Associate Professor of English (2005)
- **Thomas Steinmeier, Ph.D.**, Professor of Economics and Geography (2004)
- **John Stinespring, Ph.D.**, Faculty Senate Representative, Associate Professor of Art (2003)

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 conceived of as 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 the 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 in a variety of areas, 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, 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 which 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, established over a quarter century ago, encourages study of arid and semiarid environments and 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.

Various 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, now nearly four decades in existence.

Reflecting many of the university's research strengths, Texas Tech University Press publications 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, to interact with present and future leaders of their respective disciplines, and most importantly, to 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 have been raised in recent years, 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
 Center for Petroleum Mathematics
 Center for Public Service
 Center for the Interaction of the Arts and Sciences
 Center for the Study of the Vietnam Conflict
 Cooperative Institute for Convective Meteorology Studies
 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

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)
 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
 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, 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 (such 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 far more affordable than those at other institutions. Not only is the State of Texas known nationwide for its low tuition rates (as recognized by the *Chronicle of Higher Education*), but Texas Tech is outstanding among the state's universities for its reasonable costs. Texas Tech is able to help many of its 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.

For a complete discussion of graduate study costs and financial assistance, refer to the "Registration and Finances" catalog section.

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 (see "International Student Admission" on the following pages for non-U.S. citizen fees). 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.

Five types of admission are granted:

- Admission to a master's or doctor's degree program
- Admission as a nondegree student enrolled in undergraduate courses only (PGRD)
- Admission as a temporary nondegree student (GTMP)
- Admission as a nondegree student seeking teacher certification (CERT, GHEC)
- Admission as a nondegree student seeking continuing professional development (CPED)

The requirements for each type are explained on the next page.

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 Program 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.ttu.edu/gradschool 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 in the case of the College of Business Administration and a few select programs) score report** no more than five years old. This is a requirement for all applicants for degree programs regardless of educational background. 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.**

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 their applications have been forwarded to the department for consideration and also 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.

Three general categories of criteria are used 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). The scores 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 the sole criterion for making admission decisions.
3. **Individual Profile**—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.

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

There are four categories of nondegree admission:

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 in order 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 certifica-

tion 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 category is designed to meet the needs of professionals such as engineers, certified public accountants, architects, social workers, teachers, administrators, counselors, and other professions that require continuing professional educational development. In addition to applying to Graduate Admissions, students must request permission for this nondegree status from the graduate advisor of 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.ttu.edu/gradschool.
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.
3. Submit official, in good standing, transcripts that are sent directly from all higher education institutions 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 be potentially 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.

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

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. 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.

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.

International Student 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.ttu.edu/gradschool. 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 ad-

dress 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 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

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. 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.
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 upon the same general criteria as specified under the "Master's or Doctoral Program Admission Procedures" on page 61 of this catalog.

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 readmission 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.

General Test of the Graduate Record Examination (GRE) and Graduate Management Admission Test (GMAT). The general test of the Graduate Record Examination (GRE) is an examination yielding three scores—verbal, quantitative, and analytical writing. The Graduate Management Admission Test (GMAT) is designed to help assess the qualifications of applicants for study in business and management and it consists of three sections—verbal, quantitative, and analytical writing.

The Graduate School requires that applicants submit a score only for the general test of the GRE; however, a few departments may also require a subject test score. That information may be obtained by contacting the department in which the student is interested.

Both tests are prepared and scored by the Educational Testing Service:

GRE—P.O. Box 6000, Princeton, NJ 08541-6000, (609) 771-7670, fax (609) 771-7906

GMAT—P.O. Box 6103, Princeton, NJ 08541-6103, (609) 771-7330, fax (609) 883-4349

The GRE and GMAT are administered on computer at various testing centers throughout the world several times each week. Information on the computer-based tests is available through Graduate Admissions at Texas Tech or the Educational Testing Service (www.gre.org).

International students should note that the tests are entirely in English. There are no foreign language editions of the tests.

The information and registration bulletins and examination dates may be obtained from the Educational Testing Service (www.gre.org).

Each applicant is individually responsible for making arrangements to take the GRE or GMAT and for having the official score report sent to the Office of Graduate Admissions, Texas Tech University, P.O. Box 41030, Lubbock, TX 79409-1030. The institution code is 6827.

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.

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, Web-based registration is available to all admitted students. Instructions for Web registration and add-drop on the Web site can be found at <http://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 print-out 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 not on campus 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 not on campus 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.

Registration When Using University Facilities. 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. 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," "The Master's Degree," and "The Doctorate." 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 and imposed 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.

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 Association, an organization devoted to supporting the interests of graduate 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.

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.

Transferred and Extension Work. 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 at another university. Extension work completed through Texas Tech's Division of Extended Learning may be considered if the student had been officially admitted to the Graduate School prior to enrolling for the courses. (See "Degree Programs" on this page for further details.) 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 satisfactorily certain specified courses in English usage (without graduate credit) 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 at the outset of their work.

Degree Programs

• Master's Degree

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 Examinations (or Graduate Management Admissions Test for business applicants), 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) they must carry graduate credit, (2) they must be acceptable to the student's major department, and (3) each course must be approved for the student by the department offering it. This approval is indicated in the degree plan by the signature of the department chairperson (or graduate advisor) concerned. Its purpose is to make sure that a student does not enroll for a course for which he or she is not prepared.

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 their students' progress 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 a fractional 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 the Division of 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 extension courses and courses completed elsewhere may ordinarily be credited toward a master's degree.

Graduate credit is **not** granted for courses taken by correspondence.

Language Requirement. Although it is not a school-wide requirement, many departments require a reading knowledge of one or more foreign languages. (For information on this requirement, where it exists, see the appropriate departmental section in this catalog.) The essential purpose 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 the 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. (For information on this requirement, where it exists, see the appropriate departmental section of this catalog.) 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.

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.

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.ttu.edu/gradschool 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.

Thesis Fee. 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.

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.

Final Comprehensive Evaluation. The Graduate School strongly encourages each program to require of each master's student a final comprehensive evaluation in the semester of intended graduation. This should be in a format most appropriate to the major field. At departmental discretion, the evaluation format may differ for thesis and nonthesis or professional and predoctoral students. The final evaluation should require a synthesis and application of knowledge acquired during the course of study and research leading to the master's degree; no student should expect the evaluation to be based solely on performance in the classroom.

A student is eligible to undergo evaluation only after having been admitted to candidacy by the Graduate Dean. As soon as possible after the evaluation, a written report of the outcome should be sent to the Graduate Dean. A student who does not receive a satisfactory

evaluation may be assessed once again after an interval of four 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.

• Doctorate

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.

Major and Minor. The doctorate requires at least 60 semester hours of graduate work, exclusive of the dissertation. The Graduate School does not require a formal minor. However, the student may pursue a minor or one may be required by the student's advisory committee or by the program faculty in which the major is taken. If a minor is taken, it must include at least 15 graduate hours in a program outside the student's major. The minor will be declared in the student's Program for the Doctoral Degree (see 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 is begun. Revisions of the plan are permitted as needed.

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.

Languages and Tool Subjects

• **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. (For information on this requirement, where it exists, see the appropriate departmental section of this catalog.) When 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.

Advisory Committee. As soon as an applicant's program 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.

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.

When Examination Is Satisfactory. 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.

When Examination Is Not Satisfactory. 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.

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.

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.ttu.edu/gradschool 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.

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.

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.

Intervals Between Examinations. At least four months must intervene between the qualifying examination and the final examination.

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.

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.

Joint Degree Programs

In addition to the interdisciplinary study opportunities described on pages 69–75, the Graduate School offers the following joint degree programs between diverse disciplines and academic units within the university. For more information, consult the catalog sections related to these individual schools and departments.

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

Opportunities for Interdisciplinary Study

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 "named" interdisciplinary options appear on the following pages. However, students should be aware of innumerable unnamed 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.

Applied Linguistics

Coordinator: Dr. Sharon A. Myers, Associate Professor of Applied Linguistics and Spanish.

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.

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 laboratory. The internship may be carried out at an industrial research laboratory, a government laboratory, or a not-for-profit foundation laboratory.

The biomedical track is a 21-month program consisting of two semesters (nine months) of 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 requirement 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 medical or agricultural areas of practice utilizing a knowledge of biotechnology in the practice of law. 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.

Comparative Literature

Director: Dr. Sharon Diane Nell, Associate Professor of French; Graduate Advisor: Dr. Bruce C. Clarke, Professor of English

Administered by the Comparative Literature Committee, which is composed of faculty from the Department of English and the Department of Classical and Modern Languages and Literatures, 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.

Ethnic Studies

Director: Dr. Jorge Iber, Associate Professor of History

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).

Fine Arts

Director: Dr. Brian D. Steele, Associate Professor of Art

An interdisciplinary 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 an interdisciplinary 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 an interdisciplinary 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.

In addition, the director of the Fine Arts program 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 in business administration and public administration, as well as in the arts, are available. See the Interdisciplinary Studies section of this catalog or contact the Director, Fine Arts Doctoral Program, College of Visual and Performing 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). |

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 tran-

script 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, 5331, HMG 5324, 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 their 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

| | |
|------------|--|
| MUSM 5327. | Museum Collection Management (3:2:3). |
| MUSM 5330. | Museum Law, Ethics, and Standards (3:3:0). |
| MUSM 5331. | Museum Interpretation and Communication (3:2:3). |
| MUSM 5340. | Museum Data Management (3:1:6). |
| C S 5356. | Advanced Database Management Systems (3:3:0). |
| MGT 5370. | Organization and Management (3:3:0). |
| MKT 5360. | Marketing Concepts and Strategies (3:3:0). |
| LAW 6025. | Land-Use Planning Law (3:3:0). |
| RHIM 5350. | Advanced Travel and Tourism (3:3:0). |

Interdisciplinary Studies

Coordinators: Dr. Wendell Aycock, Professor of English and Comparative Literature, Associate Dean, Graduate School; Dr. Allan Headley, Professor of Chemistry and Biochemistry, Associate Dean, 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. Most students pursue the 36-hour, nonthesis plan, but the thesis 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 under-

graduate 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 counsel 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.

International 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 stu-

dents 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.

Land-Use Planning, Management, Design

Coordinator: Dr. Saif-UI Haq, Assistant Professor of Architecture

This interdisciplinary program leading to a Ph.D. degree 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 the 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.

This doctoral degree requires 66 semester hours of graduate work beyond the bachelor's degree, 6 of which are tool requirements, plus a minimum of 12 hours of dissertation. This includes a 24-hour core of the program which consists of a variety of courses taught in the colleges of Agricultural Sciences and Natural Resources, Architecture, Arts and Sciences, Business Administration, Engineering and in the School of Law. This fundamental knowledge is expanded by a specialization in one of four tracks: Environmental-Natural Resource Planning and Management; Public Policy Administration; Community Planning and Design; and Historic Preservation. 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 a committee drawn from three or more departments and two or more colleges will arrange a student's course of study in both the core and 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). |

Latin American and Iberian Studies

Director: Dr. Alberto Julián Pérez, Associate Professor of Spanish

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.

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). |
| 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). |

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.

Joint programs of study leading to the degrees of Doctor of Jurisprudence (J.D.) and Master of Business Administration (M.B.A.), Master of Public Administration (M.P.A.), and the M.S. degree in Agricultural Economics are available. 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, 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 sub-disciplines, 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 their 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.

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). |

Public Administration

Director: Dr. Lisa A. Dicke, Assistant Professor of Political Science

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. The program is administered by the Center for Public Service, which is in the Department of Political Science.

Students are required to take 36 hours of graduate courses, including a specified core curriculum of 18 hours of public administration courses. All degree candidates lacking substantial prior administrative experience must also register for 6 hours of internship credit and complete internship responsibilities in a government or non-profit agency. Students will not be allowed to graduate with less than a B grade in any core course. A core course may be retaken only once. There are no foreign language or thesis requirements. 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.

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.

Risk-Taking Behavior

Coordinator: Dr. Nancy J. Bell, Professor of Human Development and Family Studies

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 developmental, social psychological, sociological, and biosocial perspectives. 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). |

Sports Health

Director: Dr. T. Gilmour Reeve, Professor and Chairperson, Department of Health, Exercise, and Sport Sciences

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 (cardiovascular endurance, body composition, muscular strength and endurance, and flexibility) 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, cardiac and pulmonary rehabilitation specialist, 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. This degree provides the required knowledge for certifications offered by leading organizations such as the American College of Sports Medicine and the National Strength and Conditioning Association.

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. Current course descriptions may be found in the listings of the various departments.

Program Courses

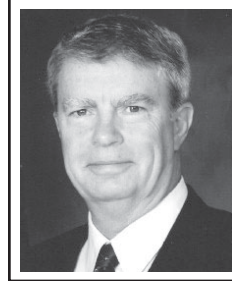
| | |
|------------|---|
| ESS 5002. | Internship in Sports Health (V1-6). |
| ESS 5305. | Motor Learning (3:3:0). |
| ESS 5306. | Biomechanics of Exercise and Sport (3:3:0). |
| ESS 5308. | Physiology of Exercise (3:3:0). |
| ESS 5310. | Biomechanics of Musculoskeletal System (3:3:0). |
| ESS 5311. | Stress Management and Cardiac Disease (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 5331. | Research in Sports Health (3:3:0). |
| ESS 5332. | Applied Phys. of Exercise (3:3:0). |
| ESS 5333. | Administration of Sports Health Programs (3:3:0). |
| ESS 5334. | Clinical Exercise Testing and Prescription (3:3:0). |
| ESS 5337. | Electrocardiography (3:3:0). |
| ESS 5338. | Cardiopulmonary Rehabilitation (3:3:0). |
| ESS 6000. | Master's Thesis (V1-6). |
| HLTH 5313. | Health Behavior and Health Promotion (3:3:0). |
| HLTH 5344. | Psychosocial Aspects of Health (3:3:0). |



School of Law

Walter B. Huffman Dean

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About the School

With a 10-year average pass rate of 89 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 (20:1) 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 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

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. An applicant's record must be of sufficiently high quality to demonstrate that the applicant is qualified for the study of law. In exceptional cases, the work of the last two college years will be weighed more heavily than that of earlier years.

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.

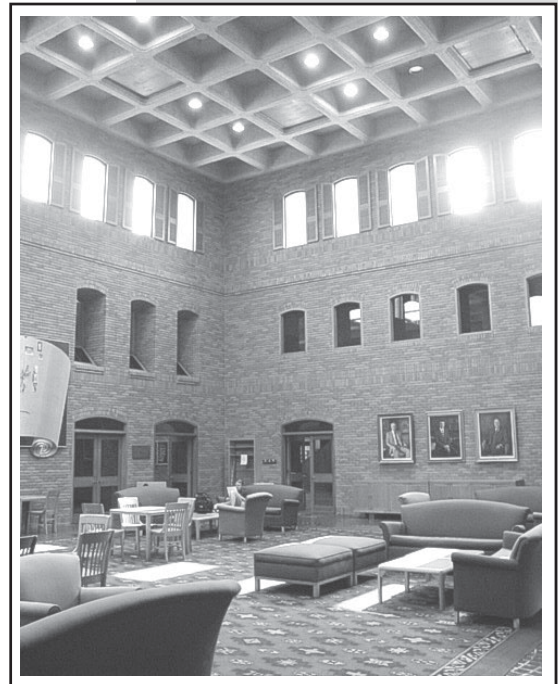
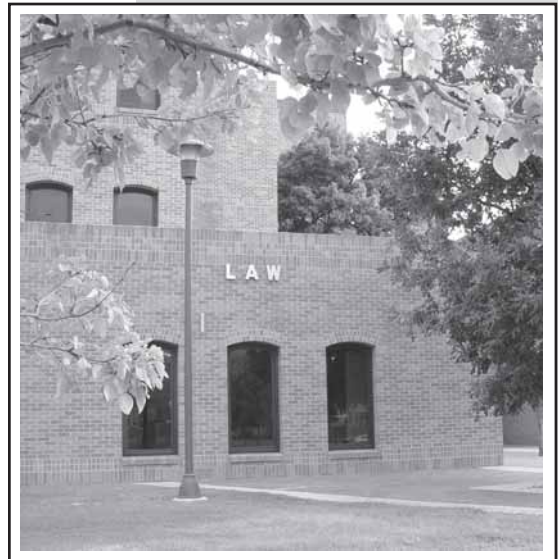
The School of Law does not prescribe a specific prelegal curriculum for its applicants. The wide range of lawyer tasks and the difference in offerings from school to school preclude such an approach. However, all students should strive toward the following goals when planning their college program:

- 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.
- Develop the power to think creatively.

Because students are admitted only in the fall, 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.

For further details, consult the online *Law School Catalog* at the following Web address: www.depts.ttu.edu/officialpublications.

In addition to housing classrooms, seminar rooms, and offices for approximately 700 students and faculty, the Law School has an expansive law library with student carrels fitted for computer terminals, a courtroom, computer laboratory, lounge area, snack area, and student organization offices.



Law Faculty

Baker, Dick, Adjunct Faculty in Law, 1994. B.S., New Mexico, 1967; J.D., Baylor, 1973. Admitted to practice in Texas.

Bard, Jennifer S., Associate Professor of Law, 2003. B.A., Wellesley, 1983; J.D., Yale, 1987; M.P.H., Connecticut, 1997. Admitted to practice in New York, Connecticut, Massachusetts, District of Columbia, and before the U.S. Supreme Court, Ninth Circuit Court of Appeals, Southern District of New York, Eastern District of New York, and District of Connecticut.

Benson, Daniel H., Horn Professor of Law and Adjunct Professor of Sociology, 1973. B.A., Texas (Austin), 1958; J.D., 1961; M.A., Texas Tech, 1974. Admitted to practice in Texas and District of Columbia.

Bubany, Charles P., Adjunct Faculty in Law, 1971. B.A., Saint Ambrose, 1962; J.D., Washington, 1965. Admitted to practice in Missouri.

Camp, Bryan T., Associate Professor of Law, 2001. B.A., Haverford Coll., 1982; J.D., Virginia, 1987; M.A., 1988; LL.M., Columbia, 1993. Admitted to practice in Virginia and the U.S. Claims Court.

Casto, William R., Alvin R. Allison Professor of Law, 1983. B.A., Tennessee (Knoxville), 1970; J.D., 1973; J.S.D., Columbia, 1983. Admitted to practice in Tennessee.

Cochran, J. Wesley, Professor of Law, 1991. B.A., Austin Coll., 1976; J.D., Houston, 1978; M.L.L., Washington, 1980. Admitted to practice in Texas.

Conboy, Joseph B., Adjunct Faculty in Law, 1982. B.S., Canisius, 1954; J.D., Georgetown U. Law Center, 1956; LL.M., George Washington National Law Center, 1972. Admitted to practice in New York and Texas.

Cook, Terence L., Assistant Dean, School of Law, 2002. B.A., Texas A&M, 1996; J.D., Texas Tech, 1998. Admitted to practice in Texas.

Cunningham, Larry, Assistant Professor of Law, 2003. B.S., John Jay College; J.D., Georgetown, 2000. Admitted to practice in Virginia, New York, and before the U.S. Court of Appeals for the Fourth District and the U.S. District Court for the Eastern District of Virginia.

Eckstein, Gabriel E., Associate Professor of Law, 2003. B.A., Kent State, 1989; M.S., Florida State, 1992; J.D., American, 1995; LL.M., 1997. Admitted to practice in New York, District of Columbia, West Virginia, and before the Federal District Courts of West Virginia.

Eissinger, James R., Professor of Law, 1972. B.A., Wartburg, 1960; J.D., North Dakota, 1964. Admitted to practice in North Dakota and Texas.

Fletcher, Kay Patton, Lecturer and Assistant Dean, School of Law, 1987. B.S., Baylor, 1971; J.D., Texas Tech, 1980. Admitted to practice in Texas.

Floyd, Daisy Hurst, Professor of Law, 1990. B.A., Emory, 1977; M.A., 1977; J.D., Georgia, 1980. Admitted to practice in Georgia and Texas.

Floyd, Timothy W., J. Hadley Edgar Professor of Law, 1989. B.A., Emory, 1977; M.A., 1977; J.D., Georgia, 1980. Admitted to practice in Georgia and Texas.

Fortney, Suraya (Susan) Saab, Professor of Law, 1992. B.A., Trinity, 1974; J.D., Antioch School of Law, 1977; LL.M., Columbia, 1992; J.S.D., Columbia, 1997. Admitted to practice in Texas.

Hensley, D. Murray, Adjunct Faculty in Law, 1983. B.B.A., Texas Tech, 1979; J.D., 1982. Admitted to practice in Texas.

Holloway, Kay Granbery, Legal Practice Professor, 2000. B.A., Texas (Austin), 1961; J.D., Florida, 1975. Admitted to practice in Florida.

Huffman, Walter B., Professor and Dean, School of Law, 2002. B.A., Texas Tech, 1967; M.Ed., 1968; J.D., 1977. Admitted to practice in Texas and before the U.S. Supreme Court.

Hunt, Donald M., Adjunct Faculty in Law, 1974. B.A., McMurry, 1956; LL.B., Texas (Austin), 1961. Admitted to practice in Texas.

James, Vaughn E., Associate Professor of Law, 2001. B.A., Virgin Islands, 1986; M.Div., Andrews, 1991; M.B.A., State U. of New York (Albany), 1993; J.D., Syracuse, 1998. Admitted to practice in New York.

Jones, T. Dale, Legal Practice Associate Professor, 1999. B.S., Texas Tech, 1965; J.D., Texas, 1968. Admitted to practice in Texas.

Krahmer, John E., Professor of Law and Foundation Professor of Commercial Law, 1971. B.A., Iowa, 1965; J.D., 1966; LL.M., Harvard, 1967. Admitted to practice in Iowa.

Kramer, Bruce M., Maddox Professor of Law, 1974. A.B., California (Los Angeles), 1968; J.D., 1972; LL.M., Illinois, 1975. Admitted to practice in California and Texas.

Lughlin, Angela M., Legal Practice Assistant Professor, 2002. B.A., Virginia, 1995; J.D., Northeastern, 1999. Admitted to practice in Virginia and Texas and before the Virginia Supreme Court and the U.S. District Court for the Northern District of Texas.

Lee, Dellas W., Professor of Law, 1974. LL.B., British Columbia, 1959; LL.M., Illinois, 1962; S.J.D., Michigan, 1969. Admitted to practice in British Columbia.

Lewis, Calvin Lionel, Associate Professor of Law, 2003. B.A., Norfolk State; J.D., Virginia, 1978. Admitted to practice in Virginia and before the U.S. Army Court of Criminal Appeals.

Lopez, Frank R., Associate Professor of Law, 2001. B.B.A., Texas, 1984; J.D., California (Berkeley); 1990. Admitted to practice in Texas and California.

Miller, Kathleen A. Portuán, Legal Practice Professor of Law, 2001. B.A., Pittsburgh, 1970; M.L.S., 1980; J.D., Ohio Northern, 1989. Admitted to practice in Ohio.

Myhra, Alison G., Professor of Law, 1991. B.A., North Dakota, 1982; B.S.Ed., 1982; J.D., 1985; LL.M., Harvard, 1991. Admitted to practice in Minnesota and North Dakota.

Pawlowic, Dean G., Professor of Law, 1989. B.A., Creighton, 1970; M.A., 1972; J.D., 1979. Admitted to practice in Nebraska.

Phelan, Marilyn E., Robert H. Bean Professor of Law, 1974. B.A., Texas Tech, 1959; M.B.A., 1967; Ph.D., 1971; J.D., Texas (Austin), 1972; Admitted to practice in Texas. Certified Public Accountant.

Ramirez, Jorge A., Associate Professor of Law, 2000. B.A., Harvard, 1984; J.D., 1990. Admitted to practice in Texas, U.S. Court of Appeals, Fifth Circuit, and U.S. District Courts for the Southern and Western Districts of Texas.

Rosen, Richard Dave, Associate Dean for Administration and External Affairs, 2003. B.A., Ohio State, 1970; J.D., Miami, 1973; LL.M., Virginia, 1987. Admitted to practice in Florida and before the U.S. Supreme Court and the U.S. Courts of Appeal for the Fifth, Ninth, Tenth, and Federal Circuits.

Shannon, Brian D., Charles Thornton Professor and Associate Dean, School of Law, 1988. B.S., Angelo State, 1979; J.D., Texas, 1982. Admitted to practice in Texas.

Skillern, Frank F., George W. McCleskey Professor of Water Law, 1971. A.B., Chicago, 1964; J.D., Denver, 1966; LL.M., Michigan, 1969. Admitted to practice in Colorado and Texas.

Soonpaa, Nancy, Associate Professor of Law and Director of the Legal Practice Program, 2001. B.A., North Dakota, 1983; M.A., 1990; J.D., 1987. Admitted to practice in North Dakota.

Spain, Larry R., Associate Professor of Law, 2001. B.A., Iowa, 1973; J.D., Creighton, 1976. Admitted to practice in Texas, North Dakota, and Nebraska.

Sutton, Victoria V., Professor of Law, 1999. B.S., North Carolina State, 1977; B.S., 1980; M.P.A., Old Dominion, 1986; Ph.D., Texas (Dallas), 1988; J.D., American, 1998. Admitted to practice in District of Columbia and the U.S. Court of Appeals for the Federal Circuit.

Torres, Arturo Lopez, Professor of Law and Associate Dean, Director of Law Library and Information Technology, 2000. B.A., Nevada, 1971; M.Ed., 1973; J.D., Willamette, 1979; Ph.D., Arizona, 1980; M.L.S., Washington, 1984.

Van Cleave, Rachel Ann, Professor of Law, 1995. B.A., Stanford, 1986; J.D., California (Hastings College of the Law), 1989; J.S.M., Stanford, 1994. Admitted to practice in California.

Weninger, Robert A., Professor of Law, 1974. B.B.A., Wisconsin, 1955; LL.B., 1960; LL.M., Chicago, 1964. Admitted to practice in Wisconsin and California.

Emeritus Faculty

Bateman, Harold Marion, Professor of Law, Emeritus, 1972-1990.

Cummins, David Charles, Professor of Law, Emeritus, 1970-2000.

Edgar, James Hadley Jr., Robert H. Bean Professor of Law, Emeritus, 1971-1992.

Jones, U. V., Professor of Law, Emeritus, 1966-1980.

Larkin, Murl Alton, Maddox Professor of Law, Emeritus, 1968-1989.

Marple, Annette Wilson, Associate Professor of Law, Emeritus, 1973-1992.

Maxwell, Richard Wayne, Associate Professor of Law, Emeritus, 1975-1991.

Quilliam, William Reed Jr., George Herman Mahon Professor of Law, Emeritus, 1966-1995.

Schoen, Rodric Bruce, Thornton Professor of Law, Emeritus, 1971-2000.

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.

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.

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 100) 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.

Library Research

The Texas Tech University Library offers a one-hour credit course designed to teach students how to do research in a university library. Because information comes in a variety of forms, the plethora of printed publications (e.g., books, newspapers, magazines) and resources available online and on microform can be overwhelming. As a result, it is important to learn which resources are most appropriate for research assignment needs, how to find and use those resources, and how to evaluate resources.

“Introduction to Library Research” (LIBR 1100) has three main objectives: present the physical arrangement and services of the Texas Tech University Libraries, provide an overview of the range of resources that a university library provides, and outline a systematic plan for using those resources for a research paper or project.

Only a small number of the available resources in the Texas Tech University Library are specifically cited in the course’s workbook. However, the librarians teaching this course can direct students to library resources that are appropriate to their specific needs.

The course consists of six lecture sessions, five workshops, a mid-term exam, a final exam, and a practicum exam.

Contact information: Dr. Jon R. Hufford, (806) 742-2236.

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 directed by Dr. Gwendolyn Sorell, associate professor of human development and family studies.

A minor consists of 18 hours of women’s studies electives. Three of the courses should 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): C LT 4305, ENGL 2307, 3387, 3389, HDFS 3318, 3319.

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 five-week field training. Attendance at field training is contingent upon selection to the Professional Officer Course and is normally scheduled between the sophomore and junior years.

Detailed information about the alternative programs is available from the chair of the respective departments. Advanced Course, Professional Officers Course, and scholarship students receive a monthly allowance. In addition to completing the above requirements, students who wish to enroll in the ROTC commissioning program must be citizens of the United States, be not less than 17 years of age, and be able to complete work for a baccalaureate degree and all other 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

David R. Lefforge, Chairperson

Colonel, U.S. Air Force, Professor, 2002.
B.S.B.A., Arizona, 1975; M.B.A., Golden Gate U., 1994; M.N.S.M., National Defense U., 1995.

Faculty

Ball, Lester A., Major, U.S. Air Force, Assistant Professor of Aerospace Studies, 2001. B.A., Texas Tech, 1989.

Monroe, Michael J., Major, U.S. Air Force, Assistant Professor of Aerospace Studies, 2002. B.A., South Carolina, 1978; M.A., South Dakota, 1988; M.S., Air Force Inst. Tech., 1993.

Curoe, Lee E., Captain, U.S. Air Force, Assistant Professor of Aerospace Studies, 2002. B.A., Angelo State Univ., 1993; M.B.O.M., LaVerne, 2001.

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, mis-

sions 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.

Department of Military Science

David S. Reid, Chairperson

Lieutenant Colonel, U.S. Army, Professor and Chairperson, Department of Military Science, 1999. B.A., Texas Tech, 1982; M.Ed., Georgia, 1990.

Faculty

Beall, Kevin, Major, U.S. Army, Enrollment Counselor, 2002. B.A., California State (Long Beach), 1988.

Carter, Kevin, Sergeant First Class, U.S. Army, Instructor in Military Science, 2002.

DeCavele, Jon, Master Sergeant, U.S. Army, Instructor in Military Science, 2000.

Mahana, Shawn, Major, U.S. Army, Assistant Professor of Military Science, 2002. B.A., Washington State, 1985.

Payne, David, Captain, U.S. Army, Assistant Professor of Military Science, 2002. B.S., Texas A&M, 1994.

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 National Advanced Leadership Camp 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 weekend each semester. FTX includes such activities as rappelling, land navigation, marksmanship, and small-unit tactics. These weekend activities are optional for basic course students but are required for advanced course cadets and intended to reinforce skills learned in the classroom and lab environment.

Leadership Laboratory. All students enrolled in Military Science are required to enroll in the Leadership Lab 501. Students are given the opportunity during lab to practice skills learned in the classroom. Each student is assigned to a specific cadet company within the cadet battalion and is normally advanced in leadership position in accordance with class level and experience. The laboratory location will vary from the classroom to a field training area. Lab training includes such activities as rappelling, rope bridging, poncho rafting, land navigation, and first aid training. With approval of the department chairperson, those students whose schedules conflict with Leadership Lab 501 may enroll in Leadership Lab 502.

Summer Training

Leaders Training Course. Students who desire to enter the Military Science program, have no prior military service, and have only 2 to 2.5 years remaining until graduation may choose to attend a five-week ROTC Leaders Training Course at Ft. Knox, Kentucky. Satisfactory completion of this camp satisfies the

requirements for the basic course. Upon completion of Leaders Training Course, students may then contract and enter the advanced course. Transportation, room and board, and an allowance are paid for the 5-week period.

National Advanced Leadership Camp. 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.

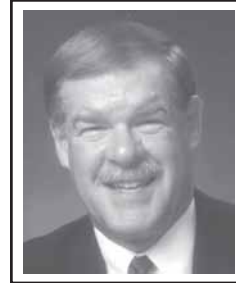
Special Schools. Army ROTC students may apply for summer training in Army Airborne, Air Assault, or Northern Warfare Schools. Junior level students also may request assignment to a Cadet Troop Leadership Training (CTLT) position for experience training with an active Army unit. CTLT training is normally for 3 weeks; however, a few positions may be available for extended training (5 weeks) overseas.



Honors College

Dr. Gary M. Bell
Dean

103 Holden Hall, Box 41017
Lubbock, TX, 79409-1017
(806) 742-1828
Fax (806) 742-1805
honors@ttu.edu
www.honr.ttu.edu



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.

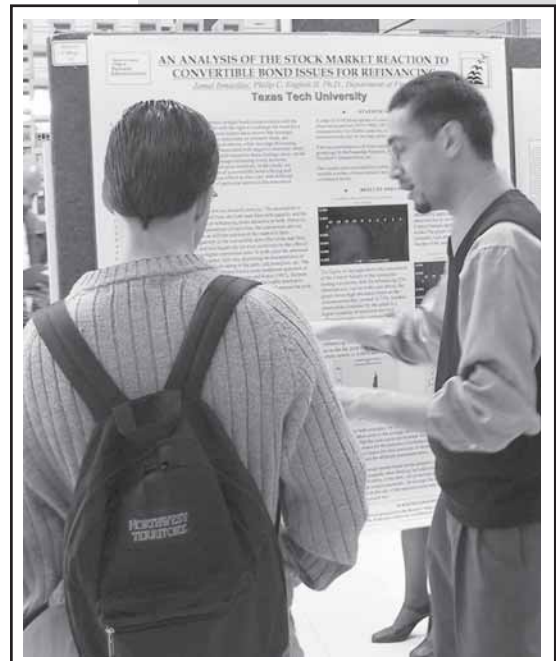
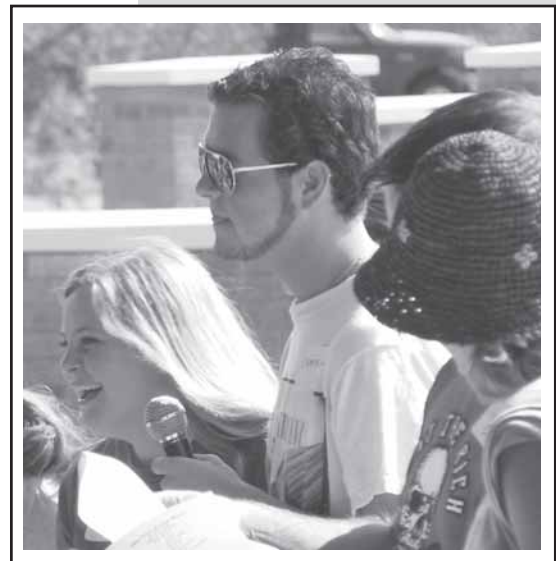
Those who graduate from the Honors College after acquiring at least 24 Honors credit hours (including two seminars) graduate with "Honors," a distinction that is noted on diplomas and transcripts and receives special recognition at graduation ceremonies. Those who also complete a senior thesis consisting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

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-I 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.

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 on the Honors Web site 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 specific requirements for Honors students, see the *Honors Student Handbook* on the Honors Web site.



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 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 Administration. 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.

Contact information: Dr. Susan Tomlinson, 103 Holden Hall, susan.tomlinson@ttu.edu, (806) 742-1828.

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 general requirements and 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 track 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, 103 Holden Hall, Kenneth.R.Davis@ttu.edu, (806) 742-1828.

Faculty

Gary M. Bell, Dean

Professor of History and Associate Vice Provost, 1993. B.A., Brigham Young, 1966; M.A., 1968; Ph.D., California (Los Angeles), 1974.

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.

Bolch, Kambra K., Assistant Professor of Honors and Associate Dean, Honors College, 1998. B.A., Texas Tech, 1991; J.D., Texas, 1994.

Brink, James Eastgate, Associate Professor of History and Honors and Vice Provost, 1976. B.A., Kansas, 1967; M.A., Washington, 1970; Ph.D., 1974.

Davis, Kenneth R., Professor in Honors, 1989. B.M.E., Georgia State, 1973; M.M., Tennessee, 1981; D.M.A., Eastman School of Music, 1984; M.A., St. John's College, 2002.

Haragan, Donald R., Professor of Honors and Geosciences and Interim President, 1969. B.S., Texas, 1959; M.S., Texas A&M, 1960; Ph.D., Texas, 1969.

Tomlinson, Susan L., Assistant Professor of Honors and Director, Natural History and Humanities Degree, 2001. B.F.A., Texas Tech, 1980; M.S., 1993; Ph.D., 1997.

Wilhelm, Ronald Joseph, Assistant Professor of Honors and Physics, 2002. B.S., Bowling Green State, 1985; M.S., 1989; Ph.D., Michigan State, 1995.



College of Agricultural Sciences and Natural Resources

Dr. John Abernathy
Dean

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Lubbock, TX, 79409-2123
(806) 742-2808
[www.depts.ttu.edu/
agriculturalsciences/](http://www.depts.ttu.edu/agriculturalsciences/)



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.

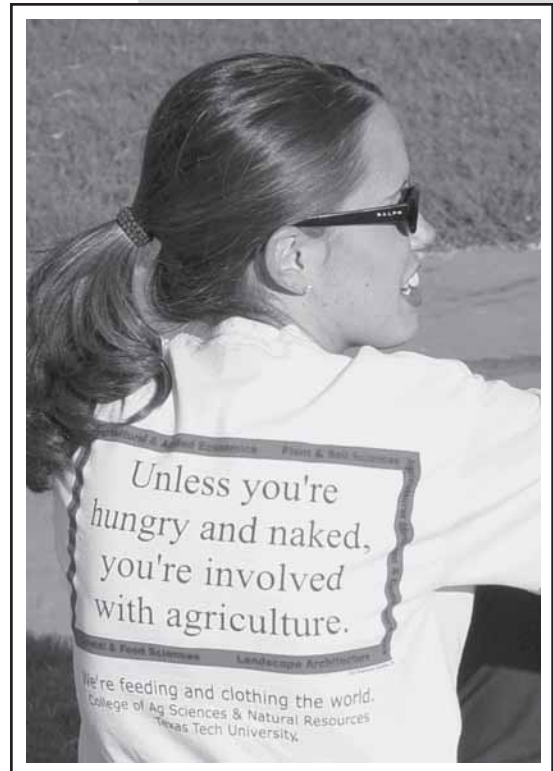
As the size and complexity of farms and ranches continue to increase, more technology and management information is needed by students who plan careers as producers of farm and ranch products. Through proper selection of courses, opportunity is provided for training in the business aspects of agriculture 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 and the various facets of environmental quality. Food safety and quality are covered in these courses. 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.



The College of Agricultural Sciences and Natural Resources has six departments that offer a number of degree programs, minors, and areas of specialization. The programs for each department are described on the following pages.

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 Academic Information 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 of the College of Agricultural Sciences and Natural Resources.

Selecting a Major. If students know which course of study they wish to pursue, they should select that major field when they initially enroll. 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 majoring 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, Integrated Pest Management, 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 in order 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. Students are encouraged to read the Academic Information section of this catalog.

Other requirements include the following:

1. Students must file an application for Senior Audit with the Dean's office before or during the semester in which they are enrolled for their 90th semester hour. Substitution and elective sheets must also 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 sections on Admissions and Registration. Entering freshmen are encouraged to take examinations in English, mathematics, and similar courses for credit by examination. These are usually given prior to the beginning of the fall semester. Transfer students should also read the subsections on "Admission of Transfer Students" and "Transfer of Credits from Other Colleges and Universities."

Undergraduate Research Program. The undergraduate research program consists of a two-course series. AGSC 4300 (Research Methodology) is offered in Fall Semesters. The second course in the series is offered in Spring Semesters as a Special Problems course under the guidance of a faculty mentor. This course provides opportunities to gain an understanding 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 major in CASNR completing the course series may apply for competitive research grants, as well as participate in Undergraduate Research presentations and awards. Coursework completed will apply to individual degree programs. For more information contact a CASNR faculty advisor or the Dean's Office.

Graduate Program

Programs are available through the College of Agricultural Sciences and Natural Resources leading 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 to enter a diversity of careers. A student may select an emphasis in the following departments: Agricultural and Applied Economics, Agricultural Education and Communications, Animal Science and Food Technology, 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 of 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 will consist of at least three faculty members. Advisory committees for the Ph.D. degree in Agricultural and Applied Economics will consist of four or five members. Advisory committees for Ph.D. degrees in the departments of Range, Wildlife, and Fisheries Management, Plant and Soil Science, and Animal Science and Food Technology will have five members on their advisory committees.

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

Don E. Ethridge, Chairperson

Professor, 1981. B.S., Texas Tech, 1965; M.S., 1967; Ph.D., North Carolina State, 1970.

Faculty

Elam, Emmett Walker, Associate Professor, 1987. B.B.A., Memphis, 1969; M.S., 1970; Ph.D., Illinois, 1978.

Ethridge, M. Dean, Adjunct Faculty in Agricultural and Applied Economics; Merchandising, Environmental Design, and Consumer Economics; and Director, International Textile Center, 1993. B.S., Texas Tech, 1967; M.S., California (Berkeley), 1968; Ph.D., 1971.

Harman, Wyatt L., Adjunct Faculty, 1994. B.S., Texas Tech, 1961; M.S., Texas A&M, 1966; Ph.D., Oklahoma State, 1974.

Johnson, Phillip N., Associate Professor, 1994. B.S., Texas Tech, 1970; M.S., 1972; Ph.D., 1993.

Knight, Thomas O., Professor, 2002. B.S., Oklahoma State, 1975; M.S., 1977; Ph.D., Missouri (Columbia), 1984.

Lansford, Vernon, Assistant Professor, 2002. B.S., New Mexico State, 1983; M.S., 1985; Ph.D., Missouri (Columbia), 2001.

Lyford, Conrad, Assistant Professor, 2001. B.S., Texas A&M, 1988; M.S., 1991; Ph.D., Michigan State, 1998.

Malaga, Jaime, Assistant Professor, 2001. B.S., Universidad Nacional De Ingenieria (Peru), 1977; M.S., Texas A&M, 1991; Ph.D., 1997.

Middleton, Marty, Instructor, 1997. B.S., Texas Tech, 1994; M.S., 1996.

Misra, Sukant K., Associate Professor and Associate Dean, College of Agricultural Sciences and Natural Resources, 1993. B.A., Utkal University, India, 1979; M.A., 1981; M.S., Mississippi State, 1986; Ph.D., 1989.

Mohanty, Samarendu, Assistant Professor, 2000. B.S., U. of Ag. Sci., (India), 1989; M.S., Nebraska (Lincoln), 1992; Ph.D., 1995.

Phillips, Ronald Glenn, Adjunct Faculty, 1999. B.S., Texas Tech, 1990; B.S., 1991; J.D., 1994.

Rejesus, Roderick M., Assistant Professor, 2002. B.S., U. of Philippines (Los Baños), 1992; M.S., Clemson, 1995; Ph.D., Illinois (Urbana-Champaign), 2001.

Segarra, Eduardo, Professor, 1987. B.A., U. Autonoma De Nuevo Leon, 1979; M.S., Missouri (Columbia), 1982; Ph.D., Virginia Polytechnic Inst. and State U., 1986.

Smith, Jackie G., Adjunct Faculty, 1994. B.S., Texas Tech, 1971; M.S., Florida, 1973; Ph.D., Oklahoma State, 1978.

Suwen, Pan, Research Assistant Professor, 2002. B.S., Zhejiang Ag. Univ., 1991; M.S., Beijing Ag. Univ., 1994; Ph.D., Iowa State, 2002.

Willis, David B., Assistant Professor, 1999. B.S., Rocky Mountain (Montana), 1975; M.A., Washington State, 1987; Ph.D., 1993.

Emeritus Faculty

Freeman, Billy Gervice, Associate Professor, Emeritus, 1973-1997.

Graves, James Wilton, Professor, Emeritus, 1961-1998.

Kennedy, Rex Page, Associate Professor, Emeritus, 1967-1991.

Owens, Thomas Richard, Associate Professor, Emeritus, 1966-1999.

About the Program

This department supervises the following degree programs: AGRIBUSINESS, *Bachelor of Science*; AGRICULTURAL AND APPLIED ECONOMICS, *Bachelor of Science*, *Master of Science*, and *Doctor of Philosophy*. 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. Others become self-employed business operators or managers. State Cooperative Extension Services, financial institutions, the United States Department of Agriculture, utility companies, and many state and government agencies also hire graduates.

The opportunity to participate in the University Honors College is available to students in the Agricultural and Applied Economics Program who demonstrate high academic achievement and who 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 University Honors College are found in the university 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> | |
| AGSC 1111, Agricultural Industry | 1 | *Lab. Science | 4 |
| *Lab. Science | 4 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | MATH 1331, Intro. Math. Anal. II | 3 |
| MATH 1330, Intro. Math. Anal. I | 3 | AAEC 2305, Fund. of AAEC | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | AGSC 2301, Comp. in Agr. II | 3 |
| Ag. Elective | 3 | TOTAL | 16 |
| TOTAL | 17 | | |
| 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. of 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 |
| Elective | 3 | Elective | 3 |
| TOTAL | 18 | TOTAL | 18 |
| 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 | AAEC 3316, Prod. Eco. | 3 |
| ACCT 2300, Elem. Acct. I | 3 | AAEC 3401, Ag. Stat. | 4 |
| ECO 3311, Int. Macro. | 3 | AAEC 3100, Seminar | 1 |
| Electives | 6 | Electives | 6 |
| TOTAL | 18 | TOTAL | 17 |
| FOURTH YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| AGSC 4300, Res. Meth. | 3 | AAEC 4301, Problems | 3 |
| **AAEC Group 1 | 6 | **AAEC Group 2 | 6 |
| AAEC 4312, Appl. Math. Econ. or AAEC 4302, Stat. Meth. | 3 | Elective | 6 |
| Elective | 3 | TOTAL | 15 |
| TOTAL | 15 | | |

Departmental CORE Policy: Includes AAEC 3315, 3316, 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—134. (Students must fulfill the university multicultural requirement.)

*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. Agriculture electives must be selected from PSS 1321, RWFM 2301, 2302, or ANSC 1401.

†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. 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 27 elective hours including 9 hours of required electives (chosen from upper-level B A, ECO, or AAEC courses not required elsewhere) and 18 hours of free electives (chosen from any other courses not used elsewhere in the degree program). Suggested courses for students interested in specific areas are as follows:

Agricultural Business Management: Choose electives from AAEC 3303, 4317, and appropriate upper level courses in BA or ECO, such as 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 BA or ECO such as ACCT 3304, 3305, 3306, 3315; FIN 3320, 3323, 4323; MGT, BLAW.

Real Estate: Choose electives from AAEC 4303, 4313, 4316, appropriate courses in CASNR, and appropriate courses in BA 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 College of Business Administration.

| FIRST YEAR | | | |
|---|----|----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| AGSC 1111, Ag. Industry | 1 | *Lab. Science | 4 |
| *Lab. Science | 4 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | MATH 1331, Intro. Math. Anal. II | 3 |
| MATH 1330, Intro. Math. Anal. I | 3 | AAEC 2305, Fund. of AAEC | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | ***Ag. Elective | 3 |
| ***Ag. Elective | 3 | TOTAL | 16 |
| TOTAL | 17 | | |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| ECO 2302, Prin. of Eco. II | 3 | ECO 3311, Int. Macro. | 3 |
| AGSC 2301, Computers in Ag. II | 3 | AAEC 3401, Ag. Stat. | 4 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | HIST 2301, Hist. of U.S. 1877 | 3 |
| ACCT 2300, Elem. Acct. I | 3 | ACCT 2301, Elem. Acct. II | 3 |
| †Sophomore English | 3 | **Visual & Performing Arts | 3 |
| POLS 2302, Amer. Publ. Pol. | 3 | TOTAL | 16 |
| TOTAL | 18 | | |
| 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 | AAEC 3316, Prod. Eco. | 3 |
| ISQS 3344, Prod. Op. Mgt. | 3 | †††AGBS Group 2 | 3 |
| MGT 3373, Mgt. Comm. | 3 | FIN 3323, Mo., Bank., and Cr. | 3 |
| MKT 3350, Intro. to Mkt. | 3 | MGT 3370, Org. and Mgt. | 3 |
| BLAW 3391, Bus. Law I | 3 | AAEC 4316, Ag. Fin. Anal. | 3 |
| TOTAL | 18 | 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. | 3 |
| AAEC 4302, Stat. Meth. | 3 | MGT 4375, Inter. Mgt. | 3 |
| AAEC 4315, Agribus. Mgt. | 3 | FIN 4328, Inter. Finance | 3 |
| MKT 4358, International Mkt. | 3 | ††BA Course | 3 |
| Electives | 2 | TOTAL | 15 |
| TOTAL | 17 | | |

Departmental CORE Policy: Includes AAEC 3315, 3316, 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.

*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.

††B A Courses—Select one additional upper level course in ACCT, FIN, ISQS, MGT, or MKT.

†††AGBS Curriculum Groups: Select 1 course from Group 1—AAEC 4305, 4306, or 4313; select 1 course from Group 2—AAEC 4303, or 4317. Minimum hours required for graduation—133. (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 2.5 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 | | | |
|------------------------------------|--|-------------|--------------------------------------|---------------|----|
| | | <i>Fall</i> | | <i>Spring</i> | |
| AGSC 1111, Agr. Industry | | 1 | *Lab. Science | | 4 |
| *Lab. Science | | 4 | ENGL 1302, Adv. Coll. Rhetoric | | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | | 3 | MATH 1331, Intro. Math. Anal. II | | 3 |
| MATH 1330, Intro. Math. Anal. I | | 3 | POLS 2302, Amer. Public Pol. | | 3 |
| POLS 1301, Amer. Govt., Org. | | 3 | AGSC 2301, Comp. in Agr. II | | 3 |
| ††Ag. Elective | | 3 | TOTAL | | 16 |
| TOTAL | | 17 | | | |
| | | SECOND YEAR | | | |
| | | <i>Fall</i> | | <i>Spring</i> | |
| 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 | | | |
| | | <i>Fall</i> | | <i>Spring</i> | |
| AAEC 4316, Ag. Fin. Anal. | | 3 | AAEC 3100, Seminar | | 1 |
| AAEC 3315, Ag. Price Theory | | 3 | AAEC 3304, Farm & Ranch Bus. Mgt. | | 3 |
| ECO 3311, Int. Macroeconomics | | 3 | AAEC 3316, Prod. Eco. | | 3 |
| BLAW 3391, Business Law I | | 3 | FIN 4328, International Fin. | | 3 |
| FIN 3323, Prin. of Mon. Bank, Cre. | | 3 | MKT 4358, International Mkt. | | 3 |
| MGT 4375, International Mgt. | | 3 | ISQS 3344, Intro. to Prod. and Oper. | | 3 |
| TOTAL | | 18 | TOTAL | | 16 |
| | | FOURTH YEAR | | | |
| | | <i>Fall</i> | | <i>Spring</i> | |
| Upper Level BA Elective | | 3 | AAEC 4301, Prbs. Appl. Eco. Anal. | | 3 |
| AGSC 4300, Research Methodology | | 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 |

Departmental CORE Policy: Includes AAEC 3315, 3316, 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 148 hours.

See the College of Business Administration section of the catalog for information on lower division requirements. Students interested in pursuing a BBA degree in majors other than general business should visit with a COBA advisor about additional course requirements.

*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.

†Choose from university Core Curriculum requirements.

All courses in AAEC, MATH, ECO, ENGL, B A, and AGSC 2301 must be completed with a grade of C or better.

††Ag. Electives must be selected from PSS 1321, RWFM 2301, 2302, or ANSC 1401.

†††AGGB Curriculum Group: Select 5 courses from AAEC 4303, 4305, 4306, 4312, 4313, 4315, and 4317.

To advance to the upper division of the business administration program, satisfactory completion of the first and second year courses and a cumulative 2.5 GPA at Texas Tech is required.

Graduate Program

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. option is expected to demonstrate competency by satisfactorily completing a comprehensive written examination.

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 areas such as 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 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 examination.

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.

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 but the LSAT test will suffice for both applications.

Department of Agricultural Education and Communications

Mathew T. Baker, Chairperson

Professor, 2000. B.S., Texas Tech, 1979; M.Ed., 1986; Ph.D., Ohio State, 1990.

Faculty

Akers, Cynthia L., Assistant Professor, 1997. B.S., Texas Tech, 1991; M.S., 1992; Ed.D., 2000.
Boyd, Barry L., Assistant Professor, 2002. B.S., Texas A&M, 1982; M.S., Texas A&M, 1983; Ph.D., Texas A&M, 1991.
Bullock, Susie J. R., Instructor, 2001. B.S., Texas Tech, 1975; M.S., Maryland, 1982.
Briers, Gary E., Professor, 2002. B.S., Texas A&M, 1971; M.Ed., Texas A&M, 1974; Ph.D., Iowa State, 1978.
Cepica, Marvin John, Professor and Executive Associate Dean, College of Agricultural Sciences and Natural Resources, 1977. B.S., Texas Tech, 1966; M.S., 1967; Ed.D., Oklahoma State, 1977.
Christiansen, James E., Professor, 2002. B.S., Arizona, 1951; M.Ag.Ed., Arizona, 1957; Ph.D., Ohio State, 1965.
Cummings, Scott R., Assistant Professor, 2002. B.S., Texas A&M, 1985; M.P.H., Texas, 1989; Dr.P.H., Texas, 1995.
Doerfert, David L., Associate Professor, 2002. B.S., Wisconsin (River Falls), 1982; M.S., Ohio State, 1989; Ph.D., 1989.
Dooley, Kim E., Associate Professor, 2002. B.S., Texas A&M, 1984; M.Ed., Texas A&M, 1987; Ph.D., Texas A&M, 1995.
Elbert, Chanda D., Assistant Professor, 2002. B.S., Southern University Agriculture and Mechanical College, 1995; M.S., Nebraska, 1996; Ph.D., Pennsylvania State, 2000.
Fraze, Steven Dee, Associate Professor, 1988. B.S., Lubbock Christian, 1975; M.Ed., Texas Tech, 1978; Ph.D., Texas A&M, 1986.
Harlin, Julie F., Assistant Professor, 2002. B.S., Texas A&M, 1993; M.S., Texas A&M, 1994; Ph.D., Oklahoma State, 1999.
Kistler, Mark J., Assistant Professor, 2002. B.S., Florida, 1987; M.Ag., 1993; Ph.D., Texas A&M, 2002.
Larke, Alvin Jr., Professor, 2002. B.S., South Carolina State, 1968; M.Ed., South Carolina State, 1974; Ph.D., Missouri-Columbia, 1982.
Lawver, David E., Professor, 1989. B.S., Missouri, 1977; M.Ed., 1983; Ed.D., Mississippi State, 1988.
Lindner, James R., Assistant Professor, 2002. B.S., Auburn, 1989; MBA, Auburn, 1992; Ph.D., Ohio State, 2000.
Murphy, Tim H., Associate Professor, 2002. B.S., Missouri-Columbia, 1985; M.Ed., Missouri-Columbia, 1990; Ph.D., Texas A&M, 1995.
Shinn, Glen C., Professor, 2002. B.S., Oklahoma State, 1963; M.Ed., Missouri-Columbia, 1970; Ph.D., Missouri-Columbia, 1971.
Smith, James H., Assistant Professor, 2000. B.B.A., Northeast Louisiana, 1976; M.Ed., Louisiana Tech, 1996; Ph.D., Texas A&M, 1999.
Townsend, Christine D., Professor, 2002. B.S., Ohio State, 1975; M.S., Ohio State, 1979; Ph.D., Iowa State, 1981.
Vestal, Tom A., Associate Professor, 2002. B.S., Tarleton State, 1977; M.Ed., Texas Tech, 1982; Ph.D., Texas A&M, 1998.
Wingenbach, Gary J., Assistant Professor, 2002. B.S., Oregon State, 1991; M.Ag., Oregon State, 1992; M.A.T., Oregon State, 1993; Ph.D., Iowa State, 1995.

Emeritus Faculty

Eggenberger, Ulrich Lewis, Professor, Emeritus, 1961-1993.

About the Program

This department supervises the following degree programs: INTERDISCIPLINARY AGRICULTURE and AGRICULTURAL COMMUNICATIONS, *Bachelor of Science*; AGRICULTURAL EDUCATION, *Master of Science* and *Doctor of 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

The department administers the agricultural education certification program. The teacher certification program involves courses from most 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 and junior colleges offers a life-long career for many graduates and alternative employment opportunities for others. Students seeking teacher certification may also receive a degree in another agricultural area and, with proper planning, receive certification in agricultural education. Students seeking teacher certification should also refer to the section entitled "Teacher Education."

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 introductory information about this college or contact the departmental chair.

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.

Interdisciplinary Agriculture (Agricultural Education) Curriculum—Teacher Certification

| | | FIRST YEAR | |
|--|-------------|---|---------------|
| | <i>Fall</i> | | <i>Spring</i> |
| AGSC 1111, The Ag. Industry | 1 | PSS 1321, Agronomic Plant Sc. | 3 |
| BIOL 1401 or 1402 | 4 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | HIST 2300, Hist. of U.S. to 1877 | 3 |
| MATH 1320, Coll. Algebra | 3 | CHEM 1305, Ess. Chem. I | 3 |
| ANSC 1401, Gen. Animal Sci. | 4 | CHEM 1105, Exp. Gen. Chem. I | 1 |
| TOTAL | 15 | MATH 1321, Trigonometry | 3 |
| | | TOTAL | 16 |
| | | SECOND YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| Free Elective | 3 | *PSS 1411, Prin. of Hort. | 4 |
| ACOM 2302, Sci. Communications | 3 | COMS 2300, Public Speaking | 3 |
| POLS 1301, Amer. Govt.. Org. | 3 | AAEC 2305, Fund. Ag. & Appl. Eco. | 3 |
| HIST 2301, Hist. of U.S. Since 1877 | 3 | POLS 2302, Amer. Pub. Pol. | 3 |
| AGSM 2303, Welding & Metalwork | 3 | *Ag. Elective | 3 |
| TOTAL | 15 | †Vis. & Perf. Arts and/or Multicultural | 3 |
| | | TOTAL | 19 |
| | | THIRD YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| AGED 2300, Intro. to Ag. Ed. | 3 | AAEC 3304, Farm & Ranch Bus. Mgt. | 3 |
| PSS 2432, Prin. & Pract. Soils | 4 | ANSC 3305, Appl. Animal Nutrition | 3 |
| AGSM 3303, Engine Theory | 3 | AGED 2302, Ag. Data Base | 3 |
| ANSC 3402, Animal Genetics or PSS 3421, Plant Genetics | 4 | AGSM 4302, Ag. Bldgs. | 3 |
| ENGL 2301 or 2307 | 3 | AGED 3330, Ag. Agencies | 3 |
| TOTAL | 17 | Ag. Elective | 3 |
| | | TOTAL | 18 |
| | | FOURTH YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| EDSE 4322, Diversity Learn. Envir. | 3 | AGSM 4305, Cond. Ag. Mech. Prog. | 3 |
| EDSE 4310, Learn. Cogn. & Instr. | 3 | AGED 4304, Meth. of Tchg. Ag. Sci. | 3 |
| AGED 3313, Mgmt. of SAEPs | 3 | AGED 4306, Student Tchg. | 9 |
| AGED 3331, Prin. of Ag. Leadership | 3 | EDSE 4311, Curr. Development | 3 |
| EDLL 4382, Read & Write Sec. Classes | 3 | TOTAL | 18 |
| Ag. Elective | 3 | | |
| TOTAL | 18 | | |

Minimum hours required for graduation—136. (Students must fulfill the university multicultural requirement.)
 *Students will select one of the plans listed below according to their interest. Selection of one of these plans will not prevent a student from teaching in the other agriscience areas.
 †Choose from Core Curriculum requirements.
 Production Agriculture: At least 3 hrs. of advanced agricultural credit.
 Preemployment Laboratory in Meats Processing: ANSC 2301, 3403.

Agricultural Communications Curriculum

| | | FIRST YEAR | | | |
|-------------------------------------|-------------|-------------|------------------------------------|--------|----|
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| AGSC 1111, The Ag. Industry | | 1 | ANSC 1401, Gen. Animal Science | | 4 |
| BIOL 1401 or 1402 | | 4 | ENGL 1302, Adv. College Rhetoric | | 3 |
| ENGL 1301, Ess. College Rhetoric | | 3 | HIST 2300, Hist. of U.S. to 1877 | | 3 |
| MATH 1320, College Algebra | | | AAEC 2305, Fund. Ag. & Appl. Eco. | | 3 |
| or 1321, Trigonometry | | 3 | MATH 2300, Statistics | | 3 |
| ACOM 2301, Intro. Ag. Com. | | 3 | TOTAL | | 16 |
| AGED 2302, Ag. Data Base | | 3 | | | |
| TOTAL | | 17 | | | |
| | | | | | |
| | | SECOND YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| RWFM 2301, Introductory Wildlife | | 3 | **JOUR 2310, News Writing | | 3 |
| CHEM 1305, Chem. & Society | | 3 | POLS 1301, Amer. Govt. Org. | | 3 |
| CHEM 1105, Exp. Gen. Chem. I | | 1 | PSS 1411, Prin. of Horticulture | | |
| ACOM 2302, Sci. Communications | | 3 | or 3421, Fund. Prin. of Genetics | | 4 |
| HIST 2301, Hist. of U.S. Since 1877 | | 3 | ADV 2310, Prin. Of Advertising | | 3 |
| *Humanities Elective | | 3 | AGED 2300, Intro to Ag. | | 3 |
| TOTAL | | 16 | TOTAL | | 16 |
| | | | | | |
| | | THIRD YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| POLS 2302, Am. Public Pol. | | 3 | ACOM 3300, Comm. Ag. to the Public | | 3 |
| COMS 2300, Public Speaking | | 3 | AGSC 3301, Ag. Leadership Prin. | | 3 |
| P R 2310, Prin. of Public Relations | | 3 | Specialized Elective | | 6 |
| PSS 1321, Agronomic Plant Science | | 3 | PHOT 2310, Basic Photography | | 3 |
| Basic Ag. Elective | | 3 | Advanced Ag. Elective | | 3 |
| EM&C 3310, Intro. To Telecomm. | | 3 | TOTAL | | 18 |
| TOTAL | | 18 | | | |
| | | | | | |
| | | FOURTH YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| ACOM 3301, Video Prod. In Ag. | | 3 | Specialized Elective | | 3 |
| Specialized Elective | | 3 | Advanced Ag. Elective | | 6 |
| *Visual & Performing Arts Elective | | 3 | Electives | | 2 |
| Advanced Ag. Elective | | 3 | ACOM 4310, Dev. of Ag. Pub. | | 3 |
| AGED 4302, Transfer of Ag. Tech. | | 3 | ACOM 4300, Adv. Computer | | 3 |
| ACOM 4100, Sem. in Ag. Comm. | | 1 | TOTAL | | 17 |
| TOTAL | | 16 | | | |

Minimum hours required for graduation—134. (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



Department of Animal and Food Sciences

Kevin Roy Pond, Chairperson

Professor, 1996. B.S., Cornell, 1977; M.S., Texas A&M, 1979; Ph.D., 1982.

Faculty

Albin, Robert Custer, Professor, 1964. B.S., Texas Tech, 1961; M.S., 1962; Ph.D., Nebraska, 1965.

Alvarado, Christine, Assistant Professor, 2001. B.S., Texas A&M, 1994; M.S., 1997; Ph.D., 2001.

Blanton, John R., Assistant Professor, 1999. B.S., New Mexico State, 1993; M.S., 1995; Ph.D., Purdue, 1998.

Brady, (Heidi) Adelaide Anne, Associate Professor, 1995. B.A., Virginia, 1976; M.S., Pennsylvania State, 1981; Ph.D., Texas A&M, 1992.

Brahears, Mindy M., Assistant Professor, 2001. B.S., Texas Tech, 1992; M.S., Oklahoma State, 1994, Ph.D., 1997.

Brock, Bo A., Instructor, 1998. B.S., West Texas State, 1986; B.S., Texas A&M, 1988; D.V.M., 1990.

Brooks, Chance, Assistant Professor, 2001. B.S., Texas Tech, 1994; M.S., 1997; Ph.D., Texas A&M, 2000.

Cole, Noel Andy, Adjunct Faculty, 1985. B.S., West Texas State, 1971; M.S., Oklahoma State, 1973; Ph.D., 1975.

Dowd, Scot, Adjunct Faculty, 2002. B.S., Texas, 1994; M.S., 1996; Ph.D., Arizona, 2000.

Elliott, Clay, Instructor, 1998. M.S., Texas Tech, 1998.

Galyean, Michael L., Distinguished Thornton Chair, 1998. B.S., New Mexico State, 1973; M.S., Oklahoma State, 1975; Ph.D., 1977.

Green, L. Wayne, Adjunct Faculty, 1998. B.S., North Carolina State, 1977; M.S., 1979; Ph.D., Virginia Tech 1981.

Guay, Christopher Joseph, Instructor, 1997. B.S., Tarleton State, 1985; M.S., 1989.

Herring, Andy Dale, Adjunct Faculty, 1994. B.S., Tarleton State, 1988; M.S., Texas A&M, 1991; Ph.D., 1994.

Jackson, Samuel Paul, Associate Professor, 1988. B.S., Texas Tech, 1986; M.S., Texas A&M, 1988; Ph.D., Texas Tech, 1993.

Kim, Sung Woo, Assistant Professor, 2001. B.S., Seoul National (Korea), 1993; M.S., 1995; Ph.D., Illinois, 1999.

McGlone, John J., Professor of Animal Science and Cell Biology and Biochemistry, 1984. B.S., Washington State, 1977; M.S., 1979; Ph.D., Illinois, 1981.

Miller, Markus F., Professor, 1990. B.S., Texas Tech, 1982; M.S., 1984; Ph.D., Texas A&M, 1987.

Miller, Ronald Max, Associate Professor, 1960. B.S., Texas Tech, 1958; M.S., Michigan State, 1960; Ph.D., 1971.

Neill, Jimmy D., Adjunct Faculty, 2002. B.S., Texas Tech, 1961; M.S., Missouri (Columbia), 1963; Ph.D., 1965.

Pence, Barbara Constable, Adjunct Faculty, 1993. B.A., Texas Tech, 1977; M.S., 1979; Ph.D., 1984.

Pinchak, William E., Adjunct Faculty, 2002. B.S., Angelo State, 1978; Ph.D., Wyoming, 1983.

Prien, Samuel David, Associate Professor, 1993. B.S., Texas Tech, 1978; M.S., 1980; Ph.D., 1991.

Richardson, C. Reed, Professor, 1976. B.S., Kentucky, 1971; M.S., 1973; Ph.D., Illinois, 1976.

Thompson, Leslie D., Associate Professor, 1986. B.S., Florida, 1980; M.S., 1983; Ph.D., 1986.

Thomson, Daniel U., Adjunct Faculty, 2000. B.S., Iowa State, 1990; M.S., South Dakota State, 1993; Ph.D., Texas Tech, 1996; D.V.M., Iowa State, 2000.

Vizcarra, Jorge, Assistant Professor, 2001. B.S., Montevideo (Uruguay), 1981; M.S., Oklahoma State, 1991; Ph.D., 1994.

Wheeler, Thomas L., Adjunct Faculty, 1999. B.S., Texas Tech, 1984; M.S., 1986; Ph.D., Texas A&M, 1989.

Winder, John A., Adjunct Faculty, 1998. B.S., New Mexico State, 1977; M.S., 1979; Ph.D., Colorado State, 1987.

Emeritus Faculty

Curl, Samuel Everett, Professor and Dean, College of Agricultural Sciences and Natural Resources, Emeritus, 1961-1997.

Hudson, Frank Alden, Professor, Emeritus, 1960-1988.

Long, Robert Allen, Professor, Emeritus, 1976-1991.

Preston, Rodney Leroy, Horn Professor and Thornton Distinguished Chair, Emeritus, 1982-1996.

Tribble, Leland Floyd, Professor, Emeritus, 1967-1989.

About the Program

This department supervises the following degree programs: ANIMAL SCIENCE, *Bachelor of Science, Master of Science, and Doctor of Philosophy*; FOOD TECHNOLOGY, *Bachelor of Science and Master of 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 three emphases: business, production, or 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 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 below.

| FIRST YEAR | | | |
|-------------------------------------|-------|--|-------|
| <i>Fall</i> | | <i>Spring</i> | |
| AGSC 1111, The Ag. Industry | 1 | AAEC 2305, Fund. Ag. & Appl. Eco. | 3 |
| ANSC 1401, Gen. Anim. Sci. | 4 | CHEM 1306 Prin. Chem. II | 3 |
| CHEM 1305, Prin. of Chem. I | 3 | CHEM 1106 Prin. Chem. II (Lab.) | 1 |
| CHEM 1105, Prin. Chem. I (Lab.) | 1 | (CHEM 1308, 1108 req. for Sci. Emp.) | 3 |
| (CHEM 1307, 1107 req. for Sci.) | | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | ANSC 2301, Lvstk. & Meat Eval. I | 3 |
| MATH 1320 or 1330 | 3 | MATH 1321 or 1331 | 3 |
| (MATH 1350 or 1321 req. for Sci.) | | (MATH 1351 or 2300 req. for Sci. Emp.) | 3 |
| PSS 1321, or AGSC 2300 | 3 | (MATH 2300 req. for Meat Sci. Emp.) | 3 |
| (FD T 2302 req. for Meat Sci.) | | TOTAL | 16 |
| TOTAL | 18 | | |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| POLS 1301, Amer. Gov. Org. | 3 | POLS 2302, Amer. Pub. Pol. | 3 |
| BIOL 1402, Biol. of Animals | 4 | FD T 2300, Prin. Food Tech. | 3 |
| ENGL 2311, Patt. of Reports | 3 | HIST 2300, Hist. of U.S. to 1877 | 3 |
| CHEM 2303, Intro. Org. Chem. | 3 | ANSC 2401, Anat. & Phys. Dom. An.4 | 4 |
| CHEM 2103, Intro. Org. Chem. Lab. 1 | 1 | **Approved Elective | 3-4 |
| (CHEM 2305, 2105 req. for Sci.) | | TOTAL | 16-17 |
| **Approved Elective | 3-4 | | |
| TOTAL | 17-18 | | |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| ANSC 3401, Repro. Physiol. | 4 | HIST 2301, Hist. of U.S. Since 1877 | 3 |
| ANSC 3301, Prin. Nutr. | 3 | **Approved Elective | 7-8 |
| ANSC 3402, Anim. Brd. & Genetics | 4 | ANSC 3307, Feeds & Feeding | 3 |
| COMS 2300, Public Speaking | 3 | (ANSC 4000 req. for Meat Sci. Emp.) | 3 |
| ANSC 3403, Sel., Proc. Meats | 4 | *Humanities and/or Multicultural | 3 |
| TOTAL | 18 | ANSC 3100 An. Sci. Seminar | 1 |
| | | TOTAL | 17-18 |
| FOURTH YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| Production Elective | 4 | Production Electives | 8 |
| *Visual & Performing Arts | 3 | Free Electives | 7-10 |
| **Approved Elective | 8-9 | (Meat Sci. Emp. 7 hrs. elect.) | 3 |
| TOTAL | 15-16 | TOTAL | 15-18 |

Minimum hours required for graduation—134. (Students must fulfill the multi-cultural requirement.)
 *Choose from Core Curriculum requirements.
 Production electives: Animal Business, Production, and Science—Students will select 12 hours from the following: ANSC 4401, 4402, 4403, or 4406. Meat Science—ANSC 4400 and students will select 8 hours from the following: ANSC 4401, 4403, or 4406.
 **Students will select one of the emphases listed below according to their area of interest:
Animal Business: Additional required courses—ACCT 2300, BLAW 3391, AAEC 3301, 3302, 3304 and 3401 or MATH 2345, 3 hours from AAEC 3303, 4303, 4317, or 4320; free electives—8-9 hours.
Animal Production: Additional required courses—MBIO 3400, ANSC 3306 or 4400; approved electives—ANSC 2205, 2302, 2303, 2304, 3203, 3204, 3303, 3304, 3308, 3309, 3310, 4000, 4001, 4202, 4302, 4306, 4400, 4401, 4402, 4403, 4406, FD T 3303, AAEC 3301, 3302, 3304, 3401, 4317, 4320, PSS 2432, 3321, 3322, or 4421, AGSC 2300 or 2301, plus other approved electives for a total of 12 hours; free electives—6-8 hours.
Animal Science: Additional required courses—CHEM 2306, 1106, AAEC 3401, PSS 3421; approved electives—ANSC 3306, 4000, 4001, 4202, 4300, 4400, MBIO 3400, 3401, BIOL 1401, 3302, 3420, ZOOL 3405, 3401, 4304, 4306, 4312, 4409, PHYS 1306, 1103, 1307, 1104, CHEM 3311, 3312, 3402, or 4303, plus other approved electives under animal production option for a total of 12 hours; free electives—8-10 hours.
Meat Science: Additional courses required—MBIO 3400, ANSC 4404, AGED 2302, FD T 3301, 4303, 4306, and 3303 or 3309, plus 7 hours from the following: ANSC 2302, 3203, 3204, 3306, 3307, FD T 3302, 3304, 4304, 4305, PSS 2432, 3321, 3322, 4421, AAEC 3301, 3302, 3303, 3304, 3305, 3401, 4317, 4320, or RWFM 3303.

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 population 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 are given below.

FIRST YEAR

| Fall | | Spring | |
|-----------------------------------|----|-----------------------------------|----|
| AGSC 1111, The Ag. Industry | 1 | AAEC 2305, Fund. Ag. & Appl. Eco. | 3 |
| BIOL 1402, Biol. of Animals | 4 | CHEM 1308, Prin. Chem. II | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | CHEM 1108, Prin. Chem. II (Lab.) | 1 |
| MATH 1330 or 1351 | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| (Math 1320 or 1330 req. for Ind.) | | **Approved Electives | 3 |
| CHEM 1307, Prin. Chem. I | 3 | ANSC 1401, Gen. Anim. Science | 4 |
| CHEM 1107, Prin. Chem. I (Lab.) | 1 | TOTAL | 17 |
| TOTAL | 15 | | |

SECOND YEAR

| Fall | | Spring | |
|---|----|-------------------------------------|----|
| 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

| Fall | | Spring | |
|-------------------------------|----|---------------------------------|----|
| 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 | |
| FD T 3302, Adv. Food Anal. or | | FD T 4305 | 3 |
| FD T 4303 | 3 | FD T 3303, Food Sanitation or | |
| MBIO 3400, Microbiology | 4 | FD T 3309, Food Safety | 3 |
| **Approved Elective | 3 | TOTAL | 17 |
| TOTAL | 17 | | |

FOURTH YEAR

| Fall | | Spring | |
|---------------------------|-------|-----------------------------|----|
| 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 & | |
| AAEC 3401, Ag. Statistics | 4 | Cer. Grains or FD T 3301 | 3 |
| *Visual & Performing Arts | 3 | **Approved Elective | 3 |
| Electives | 4 | Elective | 7 |
| TOTAL | 17-18 | TOTAL | 16 |

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.

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.

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.

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 this catalog.

Students who receive stipends have special responsibilities in research and teaching. These awards include waiver of nonresident tuition.

Department of Landscape Architecture

Alon Kvashny, Chairperson

Professor, 2000. B.L.A., Georgia, 1966; M.L.A., Michigan, 1969; Ed.D., West Virginia, 1977.

Faculty

Billing, John C. Jr., Associate Professor, 1989. B.S., California State Polytechnic, 1972; M.L.A., 1977; M. Urban Planning, 1978.

Hamed, Safai-Eldin A., Assistant Professor, 1998. B.Arch., Cairo, 1968; M.L.A., Georgia, 1973; Ph.D., Virginia Polytechnic, 1988.

Kavanagh, Jean Stephans, Associate Professor, 1990. B.S.L.A., Cornell, 1976; M.L.A., 1982; FASLA.

Klein, Charles H., Assistant Professor, 2002. B.S.L.A., West Virginia, 1977; M.S.L.A., Morgan State, 1999.

Mills, Louis V. Jr., Assistant Professor, 2001. B.A., Middlebury Coll., 1971; M.L.A., State U. of New York, 1977; Ph.D., Arizona, 1997.

Sherrod, Alice, Assistant Professor, 2000. M.Arch, Texas (Arlington), 1994; M.Psych., 1990; M.L.A., Pennsylvania, 1996.

Emeritus Faculty

Marlett, William Robert, Associate Professor, Emeritus, 1968-1995.

Musiak, Thomas Alec, Professor and Chairperson, Emeritus, 1988-2000.

About the Program

This department offers the following degree programs: LANDSCAPE ARCHITECTURE, *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 the "Opportunities for Interdisciplinary Study" section of this catalog.) 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 1313, 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 |
| *LARC 3302, Dev. of Land. Arch. | 3 | *LARC, 2200, LA Portfolio Prep. | 2 |
| *LARC 2401, Basic Design Land. Arch. | 4 | AAEC 2305, Fund. of Ag. & Appl. Eco. or | |
| *LARC 2308, Comp. Aid. Des. in LA | 3 | Ind. or Group Behavior | 3 |
| TOTAL | 16 | *LARC 2309, Advanced CAD in LA | 3 |
| | | THIRD YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| ENGL 2311, Technical Writing | 3 | *RWFM 4314, Watershed Planning. | 3 |
| *PSS 3318, Woody Plants | 3 | *LARC 3402, Master Planning | 4 |
| RWFM 2302, Ecology & Conservation | 3 | *LARC 3403, Planting Design | 4 |
| *LARC 3401, LA Site Design | 4 | *LARC 3404, LA Site Cons. & Dev. | 4 |
| *LARC 2404, LA. Grading & Drainage | 4 | TOTAL | 15 |
| TOTAL | 17 | | |
| | | FOURTH YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| PSS 2330, Urban Soils | 3 | COMS 2300, Public Speaking | 3 |
| GEOG 3300, Geo. Info. Systems | 3 | *LARC 4402, Reg. Plan & Design | 4 |
| *LARC 4401, Urban Design | 4 | *LARC 4303, Environmental Mgt. | 3 |
| *LARC 4404, LA Materials & Details | 4 | Directed Electives | 6 |
| LARC 4302, Env. Planning | 3 | TOTAL | 16 |
| TOTAL | 17 | | |
| | | 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 4405, LA Sen. Project Studio | 4 |
| *LARC 4406, Collaboration Studio | 4 | LARC 4100, Seminar | 1 |
| LARC 4311, Professional Practice | 3 | Directed Electives | 6 |
| *LARC 4101, Proposal Writing in LA | 1 | TOTAL | 14 |
| TOTAL | 15 | | |

Minimum hours required for graduation—155. (Students will fulfill the university multicultural requirement by completing LARC 3302.)

An internship, approved in the previous semester, must be completed prior to graduation.

*Must be passed with a minimum grade of C or better.

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 33 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.

To enter the M.L.A. program, all of the admission requirements established by the Graduate School must be met. In addition, 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 having this support have special responsibilities in research projects.

Department of Plant and Soil Science

Dick Auld, Chairperson

Professor, 1991. B.S., New Mexico State, 1970; M.S., 1973; Ph.D., Montana State, 1976.

Faculty

Abernathy, John R., Professor and Dean, College of Agricultural Sciences and Natural Resources, 1997. B.S., Oklahoma State, 1967; M.S., 1969; Ph.D., Illinois, 1972.

Abidi, Noureddine, Adjunct Faculty, 2001. B.S., Univ. Oujda (Morocco), 1991; M.S., 1992; Ph.D., Univ. Montpellier II (France), 1996.

Acosta-Martinez, Veronica, Adjunct Faculty, 2002. B.S., Puerto Rico, 1994; M.S., Purdue, 1997; Ph.D., Iowa State, 2000.

Allen, Bonnie L., Rockwell Professor, 1959. B.S., Texas Tech, 1948; M.S., Michigan State, 1951; Ph.D., 1960.

Allen, Vivien G., Thornton Distinguished Professor, 1995. B.S., Tennessee (Martin), 1962; M.S., Louisiana State, 1973; Ph.D., 1979.

Armstrong, J. Scott, Associate Professor, 1999. B.S., Texas Tech, 1982; M.S., Oklahoma State, 1985; Ph.D., Colorado State, 1994.

Baughman, Todd, Adjunct Faculty, 2000. B.S., Oklahoma State, 1989; M.S., 1992; Ph.D., Mississippi State, 1994.

Boman, Randal K., Adjunct Faculty, 1999. B.S., Oklahoma State, 1979; M.S., 1981; Ph.D., 1994.

Brashears, Alan D., Adjunct Faculty, 1999. B.S., Texas A&M, 1961; M.S., 1963; Ph.D., Texas Tech, 1981.

Bronson, Kevin F., Adjunct Faculty, 1999. B.S., Maryland, 1981; M.S., Philippines (Los Baños), 1984; Ph.D., Auburn, 1989.

Burke, John J., Adjunct Faculty, 1982. B.S., Arizona State, 1973; M.S., 1975; Ph.D., Illinois, 1979.

Burow, Mark D., Assistant Professor, 2001. B.A., St. Olaf Coll., 1981; Ph.D., Wisconsin (Madison), 1990.

Calhoun, Daniel Steve, Adjunct Faculty, 1999. B.S., Texas A&M, 1980; M.S., Florida, 1985; Ph.D., 1988.

Dahlberg, Jeffery A., Adjunct Faculty, 2000. B.A., Occidental Coll., 1980; M.S., Arizona, 1987; Ph.D., Texas A&M, 1992.

Dotray, Peter A., Associate Professor, 1993. B.S., Minnesota, 1986; M.S., Washington State, 1989; Ph.D., Minnesota, 1993.

Gannaway, John R., Adjunct Faculty, 1982. B.S., Texas A&M, 1964; M.S., 1971; Ph.D., 1973.

Green, Cary J., Associate Professor, 1995. B.S., Purdue, 1987; M.S., Iowa State, 1989; Ph.D., 1993.

Hellman, Edward, Associate Professor, 2001. B.S., Illinois, 1977; M.S., 19080; Ph.D., Arkansas, 1982.

Hequet, Eric F., Adjunct Faculty, 1999. B.S., Paris XI, 1980; M.S., 1982.

Hopper, Norman W., Piper Professor and Associate Dean, College of Agricultural Sciences and Natural Resources, 1976. B.S., Texas Tech, 1965; M.S., 1967; Ph.D., Iowa State, 1970.

Keeling, J. W., Adjunct Faculty, 1987. B.S., Texas Tech, 1974; M.S., 1977; Ph.D., 1985.

Krieg, Daniel R., Leidigh Professor, 1970. B.S., Texas A&M, 1965; Ph.D., 1970.

Lascano, R. J., Adjunct Faculty, 1986. B.S., Texas A&M, 1974; M.S., 1977; Ph.D., 1982.

Leser, James F., Adjunct Faculty, 1984. B.S., Nevada, 1969; M.S., 1973; Ph.D., Arizona, 1981.

Maas, Stephan J., Professor, 2001. B.S., Texas A&M, 1973; M.S., 1975; Ph.D., 1985.

Mahan, James R., Adjunct Faculty, 1990. B.S., Southwestern Oklahoma State, 1975; M.S., Texas A&M, 1979; Ph.D., 1984.

Mauget, Steven A., Adjunct Faculty, 2002. B.S., California (Santa Cruz), 1988; M.S., California (Davis), 1992; Ph.D., 1996.

Maunder, A. Bruce, Adjunct Faculty, 1993. B.S., Nebraska, 1956; M.S., Purdue, 1958; Ph.D., 1960.

Maurer, Michael, Assistant Professor, 1999. B.S., California State (Fresno), 1985; M.S., 1989; Ph.D., Florida, 1994.

McKenney, Cynthia B., Assistant Professor, 1984. B.S., Texas Tech, 1979; M.S., 1986; Ed.D., 2000.

McMichael, Bobbie L., Adjunct Faculty, 1979. B.S., Texas A&M, 1964; M.S., 1967; Ph.D., 1971.

Montague, D. Thayne, Assistant Professor, 1999. B.S., Brigham Young, 1990; M.S., Auburn, 1993; Ph.D., Utah State, 1998.

Oliver, Mel, Adjunct Faculty, 1991. B.S., Northeast London Polytechnic, 1974; M.S., Calgary, 1977; Ph.D., 1983.

Parajulee, Megha N., Assistant Professor, 2001. B.S., H. P. Krishi Vishva Vidyalyaya U., 1987; M.S., Wisconsin, 1991; Ph.D., 1994.

Payton, Paxton, Adjunct Faculty, 2002. B.A., Texas (Austin), 1993; Ph.D., Texas Tech, 1999.

Peffley, Ellen B., Professor, 1984. B.S., New Mexico State, 1977; M.S., 1981; Ph.D., 1985.

Peterson, Gary C., Adjunct Faculty, 1991. B.S., Kansas State, 1976; M.S., Oklahoma State, 1978; Ph.D., 1982.

Porter, Dana O., Adjunct Faculty, 1999. B.S., Texas A&M, 1987; M.S., 1989; Ph.D., Mississippi State, 1993.

Ramkumar, Seshadri S., Adjunct Faculty, 2000. B.S., Anna U. (India), 1992; M.S., 1994; Ph.D., U. Leeds (England), 1998.

Rosenow, Darrell T., Adjunct Faculty, 1980. B.S., Kansas State, 1958; M.S., 1960; Ph.D., Texas A&M, 1970.

Rummel, Don R., Adjunct Faculty, 1981. B.S., Texas A&M, 1960; M.S., 1964; Ph.D., 1970.

Rush, Charlie, Adjunct Faculty, 2001. B.S., Texas (Permian Basin), 1974; M.Ag. Texas A&M, 1976; Ph.D., 1981.

Schubert, Albert Michael, Adjunct Faculty, 2000. B.S., Texas Tech, 1968; M.S., 1971; Ph.D., Texas A&M, 1975.

Sheetz, Richard H., Adjunct Faculty, 1999. B.S., National U. (Cordoba, Argentina), 1974; M.S., Georgia, 1979; Ph.D., Texas Tech, 1984.

Stout, John, Adjunct Faculty, 1997. B.S., Texas, 1982; M.S., Colorado State, 1986; Ph.D., North Carolina State, 1994.

Thorvilson, Harlan G., Professor, 1984. B.A., Luther, 1967; M.S., Iowa State, 1969; Ph.D., 1984.

Trolinder, Norma, Adjunct Faculty in Plant and Soil Science, 1987. B.S., Texas Tech, 1976; M.S., 1978; Ph.D., 1985.

Trostle, Calvin, Adjunct Faculty, 2000. B.S., Kansas State, 1984; M.S., Texas A&M, 1993; Ph.D., Minnesota, 1997.

Upchurch, Dan R., Adjunct Faculty, 1986. B.S., New Mexico State, 1978; M.S., California-Davis, 1980; Ph.D., Texas Tech, 1985.

Velten, Jeff, Adjunct Faculty, 1999. B.S., California State (Fullerton), 1973; M.S., California (San Diego), 1976; Ph.D., 1981.

Wanjura, Donald F., Adjunct Faculty, 1986. B.S., Texas A&M, 1961; M.S., Clemson, 1963; Ph.D., Arizona, 1971.

Wheeler, Terry A., Adjunct Faculty, 1994. B.S., Worcester Polytechnic Inst., 1982; M.S., Texas A&M, 1987; Ph.D., North Carolina State, 1990.

Xin, Zhangou, Adjunct Faculty, 2002. B.S., Beijing Ag., 1982; M.S., Kansas State, 1985; Ph.D., Minnesota, 1993.

Xu, Wenwei, Assistant Professor, 1998. B.S., Ag. U. of Gansu Province, 1982; M.S., Chinese Academy of Ag. Science, 1985; Ph.D., Missouri (Columbia), 1992.

Zartman, Richard E., Professor, 1974. B.S., Ohio State, 1968; Ph.D., Kentucky, 1974.

Zobeck, Ted M., Adjunct Faculty, 1992. B.S., Michigan, 1973; M.S., Michigan State, 1976; Ph.D., New Mexico State, 1980.

Emeritus Faculty

Ashdown, Donald, Professor, Emeritus, 1952-1984.

Downes, John Dixon, Professor, Emeritus, 1970-1984.

Harvey, Clark, Professor, Emeritus, 1954-1979.

Matches, Arthur Gerald, Thornton Distinguished Professor, Emeritus, 1981-1994.

Phillips, Sherman Alfred Jr., Associate Professor, Emeritus, 1982-2002.

Tereshkovich, George, Professor, Emeritus, 1968-1995.

Zukauckas, Edward William Jr., Associate Professor, Emeritus, 1952-1984.

About the Program

This department supervises the following degree programs: AGRONOMY, HORTICULTURE, and INTEGRATED PEST MANAGEMENT, *Bachelor of Science*; CROP SCIENCE, ENTOMOLOGY, HORTICULTURE, and SOIL SCIENCE, *Master of Science*; AGRONOMY, *Doctor of Philosophy*. A minimum of 134 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 integrated pest management investigate the basic biological, physical, and social sciences. More importantly, they bring such knowledge to focus on problems in pest control and plant development through genetics; plant growth through management; and plant material use for food, fiber, or the aesthetic good of humankind.

Agronomy includes the study of soil, plant genetics, breeding, biotechnology, molecular biology, physiology, biochemistry, weed and pest control, and crop management as applied to the efficient and economical production of field crops. Students study how to use and manage soils, which includes the application of biological, chemical, and physical sciences with regard to natural and man-affected environments.

Horticulture today is the application of basic scientific information to the growing and use of edible (fruits, nuts, and vegetables) and ornamental plants (annual and perennial flowers and woody plants). Today's horticulture students focus on the challenges and practices of genetics and breeding, propagation, biotechnology, production, management, handling and storage, marketing, and use of horticultural plants.

Integrated pest management students learn how insects, weeds, and pathogens impact plant growth and learn how to control these pests 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 integrated pest 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. Students must earn a grade of C or better in all departmental courses required for graduation.

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 |
| BIOL 1401, Biol. of Plants | 4 | MATH 1321, Trigonometry or | |
| MATH 1320, Coll. Algebra or | | MATH 1331, Intro. Math. Anal. | 3 |
| MATH 1330, Intro. Math. Anal. | 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 | Elective | 3 |
| TOTAL | 17 | TOTAL | 16 |

| SECOND YEAR | | | |
|-----------------------------------|----|----------------------------|----|
| Fall | | Spring | |
| CHEM 2303, Intro. Organ. Chem. or | | HIST 2301, U.S. Since 1877 | 3 |
| CHEM 2305, Organic Chem. I | 3 | PSS 2401, Intro. Ento. | 4 |
| CHEM 2103, Intro. Chem. Lab. | | **Required Elective | 3 |
| or CHEM 2105, Chem. Lab. | 1 | **Directed Elective | 4 |
| HIST 2300, U.S. to 1877 | 3 | Free Elective | 3 |
| ENGL 2311, Rpts. & Corresp., or | | TOTAL | 17 |
| ENGL 3365, Prof. Rpt. Writ. | 3 | | |
| AAEC 2305, Fund. AAEC or | | | |
| ECO 2301, Prin. of Econ. | 3 | | |
| PSS 2432, Prin. & Prac. Soils | 4 | | |
| TOTAL | 17 | | |

| THIRD YEAR | | | |
|--------------------------|----|--------------------------|----|
| Fall | | Spring | |
| **Required Elective | 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 |
| Free Elective | 3 | **Required Electives | 6 |
| 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 | **Required Electives | 8 |
| **Required Electives | 6 | Free Elective | 3 |
| Free Electives | 4 | TOTAL | 17 |
| TOTAL | 18 | | |

Minimum hours required for graduation—134. (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: Required electives—PSS 3421 plus 25 hours from the following: PSS 3321, 3322, 3323, 3324, 4321, 4325, 4332, 4335, 4336, 4337, or 4421; directed electives (4 hours from the following)—atmospheric science, chemistry, geology, mathematics, or physics.

Environmental Soil Science: Required 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.

Graduate Program

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.

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.

Horticulture Curriculum

| FIRST YEAR | | | |
|---------------------------------|----|----------------------------------|----|
| Fall | | Spring | |
| PSS 1411, Prin. of Hort. | 4 | AAEC 2305, Fund. of AAEC | 3 |
| CHEM 1307, Prin. Chem. I | 3 | BIOL 1401, Biol. of Plants | 4 |
| CHEM 1107, Prin. Chem. I (lab.) | 1 | CHEM 1308, Prin. Chem. II | 3 |
| MATH 1320, Coll. Alg. | 3 | CHEM 1108, Prin. Chem. II (lab.) | 1 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | MATH 1330, Intro. Math. Anal. | 3 |
| TOTAL | 17 | TOTAL | 17 |

| SECOND YEAR | | | |
|----------------------------------|----|-------------------------------------|----|
| Fall | | Spring | |
| HIST 2300, Hist. of U.S. to 1877 | 3 | HIST 2301, Hist. of U.S. Since 1877 | 3 |
| ENGL 2311, Pat. & Rept. Cor. | 3 | PSS 2312, Propagation Meth. | 3 |
| PSS 2401, Intro. Ento. | 4 | PSS 2432, Prin. & Pract. Soils | 4 |
| PSS 2313, Herb. Plants | 3 | POLS 2302, Amer. Pub. Pol. | 3 |
| PSS 3318, Woody Plants | 3 | Free Electives | 3 |
| TOTAL | 16 | **Directed Elective | 3 |
| | | TOTAL | 19 |

| THIRD YEAR | | | |
|-------------------------------|----|-------------------------------|-------|
| Fall | | Spring | |
| COMS 2300, Public Speaking or | | PSS 3421, Genetics | 4 |
| COMS 3358, Bus. & Prof. Comm. | 3 | BOT 3401, Plant Physiology or | |
| *Humanities or Multicultural | 3 | PSS 3323, Crop Growth | 3-4 |
| **Directed Elective | 7 | *Vis. & Perf. Arts | 3 |
| **Required Elective | 3 | **Required Elective | 6 |
| TOTAL | 16 | TOTAL | 16-17 |

| FOURTH YEAR | | | |
|---------------------------|----|-------------------------|-----|
| Fall | | Spring | |
| PSS 4425, Ag. Plant Path. | 4 | PSS 4301, Ag. Compounds | 3 |
| PSS 4100, Seminar | 1 | **Directed Elective | 6 |
| **Directed Elective | 3 | **Required Elective | 4 |
| **Required Elective | 6 | Free Elective | 0-3 |
| Free Elective | 3 | TOTAL | 16 |
| 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.

Directed and required electives are subject to approval of the academic advisor.

Horticultural Science: Required 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—19 hours from the following areas of study: Business Administration, AAEC, BIOL, CHEM, F S, LARC, MBIO, PSS, PSY, RWFM, SOC.

Turfgrass Management: Required electives—15 hours from the following: PSS 3317, 4000, 4001, 4305, 4411, 4415, AGSM 2302, 3302, LARC 1401, 2401; directed electives—19 hours from PSS 3309, 4313, 4314, 4335, 4421.

Integrated Pest Management Curriculum

| FIRST YEAR | | | | FOURTH YEAR | | | |
|----------------------------------|-------|----------------------------------|----|--|-------|------------------------------|-------|
| Fall | | Spring | | Fall | | Spring | |
| ENGL 1301, Ess. College Rhetoric | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 | *Electives | 9-10 | AAEC 3401, Ag. Statistics or | |
| HIST 2300, Hist. of U.S. to 1877 | 3 | HIST 2301, Hist. of U.S. 1877 | 3 | PSS 4305, Integrated Pest Mgt. | 3 | MATH 2300, Stat.Math. | 3-4 |
| BIOL 1403, Biology I | 4 | BIOL 1404, Biology II | 4 | PSS 4415, Agric. Biotechnology | 4 | PSS 3421, Genetics | 4 |
| PSS 1321, Agr. Plant Sci. | 3-4 | Visual & Performing Arts | 3 | PSS 4100, Seminar | 1 | PSS 4301, Agric. Compounds | 3 |
| or PSS 1411, Princ. of Hort. | | PSS 2401, Intro. Entomology | 4 | TOTAL | 17-18 | *Electives | 8 |
| *Elective | 2 | TOTAL | 17 | | | TOTAL | 18-19 |
| TOTAL | 15-16 | | | | | | |
| SECOND YEAR | | | | Minimum hours required for graduation—134. (Students must fulfill the university multicultural requirement.) | | | |
| Fall | | Spring | | Students will select one of the emphases listed below according to their area of interest. | | | |
| MATH 1330, Intro. Math. Analysis | | MATH 1331, Intro. Math. Anal. or | | *Directed, required, and free electives within an emphasis are subject to approval of the academic advisor. | | | |
| or MATH 1320, College Algebra | 3 | MATH 1330, Intro. Math. Anal. | 3 | Integrated Pest Management Science: Required electives—AGSC 2300, PSS 3304, 3307, 3401; directed electives (22-24 hours from the following)—PSS 2311, 2313, 3309, 3321, 3322, 3323, 3324, 3402, 4321, 4335, 4425; RWF 3302; BIOL 3303, 3307, 4305, 4306; ZOOL 3406, 4312; ATMO 1300 and 1100, BOT 3302, 3401; free electives 6 hours. | | | |
| CHEM 1307, Prin. Chem. I | 3 | CHEM 1308, Prin. Chem. II | 3 | Biotechnology: Required electives—AAEC 2305 or MATH 2300, BIOL 3320 and 3120, PSS 4425, BOT 3401 or PSS 3323, BOT 4304, CHEM 3311, 3312, 3313; directed electives—6-9 hours from any 2000 or above PSS course; or the following ANSC courses 2401, 3306, 3401, 3402; free electives—2 hours. Specialization in one of the three disciplines within PSS is encouraged. | | | |
| CHEM 1107, Prin. Chem. I (lab.) | 1 | CHEM 1108, Prin. Chem. II (lab.) | 1 | | | | |
| ENGL 2311, Technical Writing | 3 | COMS 3358, Bus. Comm. or | 3 | | | | |
| POLS 1301, Amer. Gov., Org. | 3 | COMS 2300, Public Speaking | 3 | | | | |
| Humanities or 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 | *Electives | 12 | | | | |
| MBIO 3400, Microbiology | 4 | TOTAL | 16 | | | | |
| PSS 4421, Prin. Weed Science | 4 | | | | | | |
| *Electives | 6 | | | | | | |
| TOTAL | 18 | | | | | | |

Department of Range, Wildlife, and Fisheries Management

Ernest B. Fish, Chairperson

Professor, 1973. B.S., Colorado State, 1964; M.S., 1966; Ph.D., Arizona, 1973.

Faculty

Ballard, Warren B. Jr., Associate Professor, 1998. B.S., New Mexico State, 1969; M.S., Kansas State, 1971; Ph.D., Arizona, 1993.
Boal, Clint W., Assistant Professor, 2000. B.S., Arizona, 1991; M.S., 1993; Ph.D., 1997.
Bowman, Jeffrey C., Adjunct Faculty, 2000. B.S., Queen's U. (Canada), 1992; M.S., Laurentian U. (Canada), 1996; Ph.D., U. of New Brunswick (Canada), 2000.
Britton, Carlton M., Professor, 1980. B.S., Texas Tech, 1968; M.S., 1970; Ph.D., Texas A&M, 1975.
Cronin, Matthew A., Adjunct Faculty, 1998. B.S., State U. of New York, 1976; M.S., Montana State, 1986; Ph.D., Yale, 1989.
Dabbert, C. Brad, Associate Professor, 1996. B.S., Oklahoma State, 1989; M.S., Arkansas, 1991; Ph.D., Oklahoma State, 1995.
Drawe, D. Lynn, Adjunct Faculty, 1976. B.S., Texas A&I, 1964; M.S., Texas Tech, 1967; Ph.D., Utah State, 1971.
Gipson, Philip S., Adjunct Faculty, 2000. B.S., U. Central Arkansas, 1964; M.S., Arkansas, 1967; Ph.D., 1971.
Haukos, David A., Adjunct Faculty, 1993. B.S., South Dakota State, 1986; M.S., 1988; Ph.D., Texas Tech, 1991.
Krausman, Paul R., Adjunct Faculty, 1998. B.S., Ohio State, 1968; M.S., New Mexico State, 1971; Ph.D., Idaho, 1976.

Patino, Reynaldo, Professor, 1989. B.S., Tokyo Univ. of Fisheries, 1980; M.S., Oregon State, 1983; Ph.D., 1988.

Pence, Danny B., Adjunct Faculty, 1983. B.S., Western Kentucky State, 1965; M.S., Louisiana, 1967; Ph.D., 1970.

Perry, Gad, Assistant Professor, 2002. B.S., Tel Aviv, 1987; M.S., 1990; Ph.D., Texas, 1995.

Peterson, Markus J., Adjunct Faculty, 1999. B.S., Idaho, 1976; M.S., Texas A&M, 1990; Ph.D., 1994.

Pope, Kevin L., Assistant Professor, 1998. B.S., Texas A&M, 1991; M.S., Auburn, 1993; Ph.D., South Dakota State, 1996.

Rhodes, Olin Eugene, Adjunct Faculty, 1992. B.S., Furman, 1983; M.S., Clemson, 1987; Ph.D., Texas Tech, 1991.

Smith, Loren M., Caesar Kleberg Professor, 1984. B.S., Northeast Missouri State, 1977; M.S., South Dakota State, 1980; Ph.D., Utah State, 1983.

Sosebee, Ronald Eugene, Professor, 1969. B.S., Abilene Christian, 1964; M.S., New Mexico State, 1966; Ph.D., Utah State, 1970.

Sullivan, Robert M., Adjunct Faculty, 2000. B.S., Humboldt State, 1974; M.S., 1979; Ph.D., New Mexico, 1988.

Villalobos, Carlos, Associate Professor, 1996. B.S., Chihuahua, 1980; M.S., 1988; Ph.D., Texas Tech, 1995.

Wallace, Mark C., Associate Professor, 1996. B.S., Washington, 1981; M.S., Arizona, 1984; Ph.D., 1991.

Wester, David B., Professor, 1983. B.S., Colorado State, 1976; M.S., Texas Tech, 1979; Ph.D., 1984.

Wilde, Gene R., Associate Professor, 1995. B.S., Nevada (Las Vegas), 1978; M.S., 1984; Ph.D., Oklahoma State, 1994.

Winslow, Jerome C., Assistant Professor, 2000. B.S., Michigan, 1971; B.S., Pennsylvania State, 1981; Ph.D., Wyoming, 1999.

Emeritus Faculty

Hunter, John Ray, Associate Professor, Emeritus, 1963-1999.

Pettit, Russell Dean, Associate Professor, Emeritus, 1969-1989.

About the Program

This department supervises the following degree programs: RANGE MANAGEMENT, WILDLIFE AND FISHERIES MANAGEMENT, and ENVIRONMENTAL CONSERVATION OF NATURAL RESOURCES, *Bachelor of Science*; FISHERIES SCIENCE, RANGE SCIENCE, and WILDLIFE SCIENCE, *Master of Science* and *Doctor of Philosophy*.

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 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 such as barbecues.

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.

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 | AGSC 2300, Computers in Ag. | 3 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | TOTAL | 16 |
| TOTAL | 17 | | |
| | | 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 |
| BOT 3404, Tax. Flowering Plants | 4 | PSS 2432, Prin. & Pract. Soils | 4 |
| POLS 1301, Amer. Govt., Org. | 3 | BOT 3401, Plant Physiol. | 4 |
| CHEM 2303, Intro. Org. Chem. | 3 | TOTAL | 17 |
| CHEM 2103, Chem. (Lab.) | 1 | | |
| TOTAL | 18 | | |
| | | 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 |
| POLS 2302, Amer. Pub. Pol. | 3 | AAEC 3401, Ag. Stat. | 4 |
| PSS 4332, Soil Class. | 3 | AAEC 3302, Ag. Finance | 3 |
| PSS 3321, For. & Past. Crops | 3 | HIST 2301, Hist. Since 1877 | 3 |
| ANSC 3301, Prin. Nutri. | 3 | **Required Elective | 3 |
| TOTAL | 17 | TOTAL | 19 |
| | | FOURTH YEAR | |
| | | Fall | Spring |
| RWFM 4302, Range Impr. | 3 | RWFM 4303, Range, Anal. & Plan. | 3 |
| RWFM 4304, Fire Ecol. & Mgt. | 3 | ENGL 2311, Technical Writing or RWFM 4314, Watershed Plan. | 3 |
| RWFM 4309, Rge-Wild. Hab. Mgt. | 3 | ANSC 4403, Beef Prod. or ANSC 4406, Sheep & Goat Prod. or ANSC 3302, Livestock Prod. | 3-4 |
| PSS 3421, Fund. Prin. Gen. or BIOL 3416, Genetics | 4 | Visual & Performing Arts | 3 |
| *Humanities - Multicultural | 3 | RWFM 4100, Seminar | 1 |
| **Required Elective | 3 | TOTAL | 16-17 |
| TOTAL | 19 | | |

Minimum hours required for graduation—139. (Students must fulfill the university multicultural requirement.)
 *Choose from Core Curriculum requirements.
 Required electives are subject to approval of the academic advisor.
 **Select at least two courses from: RWFM 4305, 4306, 4310, 4322.

Graduate Program

Those interested in pursuing a master’s or doctor’s degree in the Department of Range, Wildlife, and Fisheries Management should consult with the chairperson prior to enrolling for any course.

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.

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.

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 two semesters of calculus, one semester of experimental design, one semester of teaching practicum (RWFM 7210), and College Teaching in Agriculture (AGED 5310) or College Teaching (EDHE 5342).

Wildlife and Fisheries Management Curriculum

WILDLIFE MANAGEMENT TRACK

| FIRST YEAR | | FIRST YEAR | |
|------------------------------------|-----------|-------------------------------------|-----------|
| <i>Fall</i> | | <i>Spring</i> | |
| ENGL 1301, Ess. Coll. Rhet. | 3 | ENGL 1302, Adv. Coll. Rhet. | 3 |
| MATH 1330, Intro. Math. Anal. I or | | MATH 1331, Intro. Math. Anal. II or | |
| MATH 1350, Anal. Geo. | 3 | 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. | |
| RWFM 4100, Seminar | 1 | or RWFM 2307, Diversity of Life | 3 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | AGSC 2300, Computers in Ag. | 3 |
| TOTAL | 17 | TOTAL | 16 |

SECOND YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|------------------------------------|-----------|--------------------------------|-----------|
| BIOL 1403, Biol. I | 4 | BIOL 1404, Biol. II | 4 |
| ZOOL 2406, Com. Ana. Game Ani. | | RWFM 2305, Fresh Eco. and Fish | 3 |
| or ZOOL 3405, Vert. Struct. & Dev, | 4 | AAEC 2305, Fund. AAEC | 3 |
| RWFM 3501, Rng., For., Wet. | 5 | BIOL 3416, Genetics or | |
| CHEM 2303, Intro. Org. Chem. | 3 | PSS 3421, Fund. Prin. Genetics | 4 |
| CHEM 2103, Chem. (Lab.) | 1 | AAEC 3401, Ag. Stat. | 4 |
| TOTAL | 17 | TOTAL | 18 |

THIRD YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|--------------------------------|-----------|--------------------------------|--------------|
| RWFM 3302, Range Plant Ecol. | 3 | RWFM 3304, Prin. Range Mgt. or | |
| BOT 3401, Plant Physiol. | 4 | RWFM 4401, Fisheries Mgt. or | |
| **Required Elective | 3 | RWFM 3307 Prin. Cons. Sci. | 3-4 |
| POLS 1301, Amer. Govt. Org. | 3 | RWFM 4407, Wildlife Inv. Tech. | 4 |
| PSS 2432, Prin. & Pract. Soils | 4 | **Required Elective | 3 |
| TOTAL | 17 | HIST 2301, Hist. Since 1877 | 3 |
| | | POLS 2302, Amer. Pub. Pol. | 3 |
| | | TOTAL | 16-17 |

FOURTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|---------------------------------|-----------|------------------------------------|-----------|
| **Required Electives | 6 | RWFM 4303, Range. Anal. & Plan. or | |
| COMS 2300, Public Speaking | 3 | RWFM 4314, Watershed Plan. or | |
| *Visual & Performing Arts | 3 | RWFM 4320, Nat. Resource Policy | 3 |
| *Humanities - Multicultural | 3 | RWFM 4408, Wild. Pop. Dynamics | 4 |
| ENGL 2311, Technical Writing or | 3 | AAEC 4302, Stat. Methods in Ag. or | |
| TOTAL | 18 | RWFM 3308, Quant. Methods NR | 3 |
| | | RWFM 4100, Seminar | 1 |
| | | †Elective | 3 |
| | | **Required Electives | 3 |
| | | TOTAL | 17 |

Minimum hours required for graduation—137. (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 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.

**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.

Wildlife and Fisheries Management Curriculum

FISHERIES MANAGEMENT TRACK

| FIRST YEAR | | FIRST YEAR | |
|------------------------------------|-----------|-------------------------------------|-----------|
| <i>Fall</i> | | <i>Spring</i> | |
| ENGL 1301, Ess. Coll. Rhet. | 3 | ENGL 1302, Adv. Coll. Rhet. | 3 |
| MATH 1330, Intro. Math. Anal. I or | | MATH 1331, Intro. Math. Anal. II or | |
| MATH 1350, Anal. Geo. | 3 | 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. or | |
| RWFM 4100, Seminar | 1 | RWFM 2307, Diversity of Life | 3 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | AGSC 2300, Computers in Ag. | 3 |
| TOTAL | 17 | TOTAL | 16 |

SECOND YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|----------------------------------|--------------|------------------------------------|-----------|
| BIOL 1403, Biol. I | 4 | BIOL 1404, Biol. II | 4 |
| AAEC 2305, Fund. AAEC | 3 | BIOL 3416, Genetics or | |
| RWFM 2305, Fresh. Eco. and Fish. | 3 | PSS 3421, Fund. Prin. Genetics | 4 |
| RWFM 3501, Rng., For., Wet. or | | ZOOL 2406, Comp. Ana. Game An. | |
| BOT 4302, Field Botany or | | or ZOOL 3405, Vert. Struct. & Dev. | 4 |
| BOT 3403, Comp. Morph. of Plants | | POLS 1301, Amer. Govt. Org. | 3 |
| or BOT 3404, Tax. Flower. Plants | 3-5 | PSS 2401, Intro. Entomology | 4 |
| CHEM 2303, Intro. Org. Chem. | 3 | TOTAL | 19 |
| CHEM 2103, Intr. Org. (Lab.) | 1 | | |
| TOTAL | 17-19 | | |

THIRD YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|------------------------------------|--------------|------------------------------------|-----------|
| RWFM 4330, Aquaculture | 3 | RWFM 4335, Fisheries Science | 3 |
| BOT 3401, Plant Phys. or | | AAEC 3401, Ag. Stat. | 4 |
| PSS 3307, Insect Ana. & Phys. or | | ZOOL 4310, Intro. Ichthyology | 3 |
| ANSC 2401, Ana. Phys. Dom. | 3-4 | RWFM 4320, Nat. Res. Policy or | |
| HIST 2301, Hist of U.S. Since 1877 | 3 | PHIL 3325, Environmental Ethics or | |
| POLS 2302, Amer. Pub. Pol. | 3 | AGSC 3301, Ag. Leadership Prin. | 3 |
| **Elective | 3-4 | **Elective | 3 |
| TOTAL | 15-17 | TOTAL | 16 |

FOURTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|-----------------------------------|--------------|----------------------------------|--------------|
| RWFM 4407, Wildlife Inv. Tech. or | | *Humanities-Multicultural | 3 |
| ZOOL 4308, Ornithology or | | RWFM 4408, Wild. Pop. Dyn. or | |
| BIOL 4301, Herpetology or | | BIOL 3309, Pop. Comm. Ecosys. or | |
| BIOL 4407, Nat. Hist. Verts. | 3-4 | BIOL 4310, Community Ecology or | |
| RWFM 4401, Fisheries Mgt. | 4 | RWFM 3307, Prin. Con. Sci. | 3-4 |
| COMS 2300, Public Speaking | 3 | ENGL 2311, Technical Writing or | 3 |
| *Visual & Performing Arts | 3 | AAEC 4302, Stat. Methods in Ag. | |
| **Elective | 3 | RWFM 3308, Quant. Methods NR | 3 |
| TOTAL | 16-17 | RWFM 4100, Seminar | 1 |
| | | **Elective | 3-4 |
| | | TOTAL | 16-18 |

Minimum hours required for graduation—137. (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.

Environmental Conservation of Natural Resources

FIRST YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|------------------------------------|----|-------------------------------------|----|
| ENGL 1301, Ess. Coll. Rhet. | 3 | ENGL 1302, Adv. Coll. Rhet. | 3 |
| MATH 1330, Intro. Math. Anal. I or | | MATH 1331, Intro. Math. Anal. II or | |
| MATH 1350, Anal. Geo. | 3 | 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. Res. | 3 |
| RWFM 4100, Seminar | 1 | AGSC 2300, Computers in Ag. | 3 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | TOTAL | 16 |
| TOTAL | 17 | | |

SECOND YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|---------------------------------------|----|---------------------------------|----|
| BIOL 1403, Biol. I | 4 | BIOL 1404, Biol. II | |
| AAEC 2305, Fund. Ag. & Appl. Eco. | 3 | RWFM 2307, Diversity of Life | 3 |
| RWFM 3501, Rng., For., Wet. | 5 | ATMO 1300, Intro. to Atmo. Sci. | 3 |
| RWFM 2305, Fresh. Eco. & Mgt. | 3 | ATMO 1100, Atmo. Sci. (Lab.) | 1 |
| CHEM 2303, Intro. Org. Chem. or | | PSS 2432, Prin. & Pract. Soils | 4 |
| CHEM 2305, Org. Chem. I | 3 | *Physical Science Elective | 4 |
| CHEM 2103, Intr. Org. Chem. (Lab.) or | | TOTAL | 19 |
| CHEM 2105, Org. Chem. I (Lab.) | 1 | | |
| TOTAL | 19 | | |

THIRD YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|--------------------------------|-------|-------------------------------------|----|
| RWFM 3302, Range Plant Ecol. | 3 | AAEC 3401, Ag. Stat. | 4 |
| BIOL 3309, Pop., Comm., & Eco. | 3 | HIST 3327, Sur. Amer. Env. Hist. | 3 |
| **Animal Biology Elective | 3-4 | RWFM 3304, Prin. Range Mgt. | 3 |
| ††Specialized Elective | 3 | P R 3310, Prin. Public Relations or | |
| POLS 1301, Amer. Govt. Org. | 3 | AGSC 3301, Ag. Lead. Prin. | 3 |
| TOTAL | 15-16 | POLS 2302, Amer. Pub. Pol. | 3 |
| | | ††Specialized Elective | 3 |
| | | TOTAL | 19 |

FOURTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|----------------------------------|----|--------------------------------|----|
| COMS 2300, Public Speaking | 3 | RWFM 4407, Wildlife Inv. Tech. | 4 |
| ††Specialized Electives | 6 | RWFM 4314, Watershed Plan. | 3 |
| ENVE 3203, Envir. Measurement or | | ENGL 2311, Technical Writing | 3 |
| RWFM 3201, Veg. Inven. & Anal. | 2 | ††Specialized Electives | 6 |
| *Humanities-Multicultural | 3 | RWFM 4100, Seminar | 1 |
| *Visual & Performing Arts | 3 | TOTAL | 17 |
| TOTAL | 17 | | |

Minimum hours required for graduation—139. (Students must fulfill the university multicultural requirement.)

*Students will select one of the following courses to satisfy the physical science elective: GEOL 1303 and 1101, GEOG 1301 and 1101, 1302 and 1102.

**Students will select one of the following courses to satisfy the animal biology elective: ZOOL 3406, 4306, 4308, 4407, PSS 2401.

†Choose from Core Curriculum requirements.

††Students will select one of the following specializations according to their area of interest. Of the 18 hours required at least 12 hours must come from one of the specializations listed below:

Technical Environmental—additional required electives GEOG 3404, RWFM 4315, 4403, 4408, ENVE 2401, 3404, 4301, CHEM 2401, 3402, BIOL 4310.

Water Management—additional required electives RWFM 4335, 4401, 4330, LARC 4302.

Land Management—additional required electives RWFM 4302, 4303, 4304, LARC 4302, GEOL 1303, 1101, GEOG 1301, 1101, 1302, 1102, PSS 4331, 4332, 4335, 4337, MBIO 4401.

Animal Population Management and Conservation—additional required electives RWFM 4305, 4306, 4310, 4335, 4408, ZOOL 3406, 4306, 4308, 4407, PSS 2401.



College of Architecture

Andrew Vernooy Dean

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[www.arch.ttu.edu/
architecture/](http://www.arch.ttu.edu/architecture/)



About the College

The College of Architecture supervises the following degree programs: ARCHITECTURE, *Bachelor of Science in Architecture*, *Master of Architecture* (the professional degree), and *Master of Science in Architecture*; and LAND-USE PLANNING, MANAGEMENT, AND DESIGN, *Doctor of Philosophy*. Dual degrees are offered with the Bachelor of Science in Business Administration and Bachelor of Science in Civil Engineering. A dual degree is offered with the Master of Architecture and Master of Business Administration (ARBM).

Mission Statement. The College of Architecture educates students for the future practice of architecture and the advancement of knowledge of the discipline for the benefit of society.

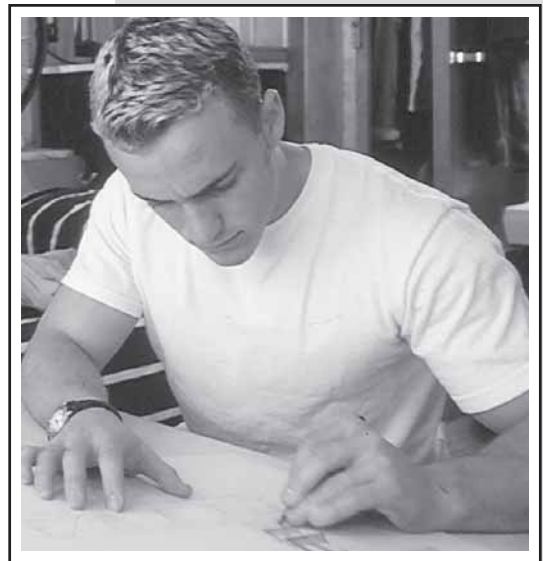
Mandatory Accreditation Statement. The National Architectural Accrediting Board provides the following statement: "In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure that are accredited by The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards."

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not by itself recognized as an accredited degree."

Undergraduate Program

Program Descriptions. The Bachelor of Science in Architecture (ARBS) consists of 131 credit hours at the undergraduate level. This degree gives students knowledge of and career opportunities in architecture, the building industry, and related fields. It is not an accredited degree by the NAAB and opportunities for professional licensing are limited on a state-by-state basis. Students may use this degree as a path to the professional degree or other graduate education. Students may pair this degree with a Bachelor of Science in Business Administration or a Bachelor of Science in Civil Engineering. The degrees are awarded simultaneously.

The Master of Architecture (ARMA) is the professional degree and is accredited by NAAB. It consists of 131 credit hours of undergraduate courses and 42 hours of graduate courses. The program has three components: general architecture, preprofessional, and professional (MARCH). Admission to the general architecture program is open to all students admitted into the university. Admission into the preprofessional program is competitive and is based upon a comprehensive review of the student's portfolio, essay and grade point average. Admission into the professional program (MARCH) requires 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 criteria rating form is available from the academic programs office. Students transferring into the preprofessional program from other programs or from other undergraduate majors will undergo a degree audit to determine requirements for leveling.

Students accepted into the Master of Architecture (professional program) may also choose to enter the Master of Business Administration program. This is a dual degree program and the degrees are awarded simultaneously. No further requirements are required to enter the M.B.A. program beyond acceptance into the Master of Architecture program.

The Master of Science in Architecture and the Ph. D. in Land-Use, Planning, Management, and Design programs are graduate degrees focused on research and specialization.

Transfer Courses. All transfer course work to be taken at any other institution must receive evaluation and approval from the Academic Programs Office. 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 Academic Information 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 pre-approved by the Academic Programs Office as "writing intensive".

Diversity Course. Students may fulfill this course with ARCH 4311, ARCH 4364 or other university courses listed with the Academic Programs Office.

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 as required by the course or as requested by the faculty. 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 Academic Programs Office 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 of Architecture reserves the right to retain, exhibit, and reproduce work submitted by students. Work submit-

ted 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 those regulations. At the graduate level only one (1) 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 Academic Programs Office 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 Academic Programs Office 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 Academic Programs Office 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

The Master of Architecture is a professional degree program, accredited by the National Architectural Accrediting Board. The Master of Science in Architecture is a post professional academic degree. The Master of Architecture/Master of Business Administration is a dual degree, awarded simultaneously.

All students, including those with degrees, must follow the Graduate School and the College of Architecture admission requirements. The following criteria, all or in part, will be considered in the admission process: GRE scores, GPA, transcripts, portfolio review, letters of recommendation, statement of interest, examples of extracurricular activities, and professional work. Students accepted into the Master of Architecture program are accepted into the Master of Business Administration program upon request. Students may enter the professional program directly from the College of Architecture's preprofessional program, or from any other program, including those with degrees in a discipline other than architecture. An audit of transcripts and portfolio will determine the amount of leveling courses required to comply with the accredited professional program.

Transfer courses applicable to a student's degree plan at the graduate level are determined by the college's administration and the Graduate School. Refer to the section on transfer credit for procedures.

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 in the graduate programs are required to have their own computer in the classroom or studio as required by the course or as requested by the faculty. Computer equipment and software must be compatible with college standards. Computer equipment and software requirements are posted on the college web site.

Ownership of Student Work. The College of Architecture reserves the right to retain, exhibit, and reproduce work submitted by students. Work submitted for a grade is the property of the college and remains such until it is returned to the student.

Architecture Research Center

The Architecture Research Center provides faculty and students with additional opportunities for study and research. The Center conducts research and service projects. Information on research and graduate assistantships can be obtained by contacting the college.

Master of Architecture Accredited Professional Degree

Mandatory Accreditation Statement. "In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree."

The college's Master of Architecture accredited 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 terminal 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. Students who have a bachelor's degree from non-architecture disciplines and wish to enter the program will be expected to complete leveling work that will not accrue graduate credit. Students may choose a written thesis or a non-thesis (design) option with departmental approval. Selecting the written thesis option must complete a minimum of 30 credit hours of graduate study, defend a thesis, and take an oral comprehensive examination (totaling a minimum of 36 credit hours). Students selecting the non-thesis (design) option must complete a minimum of 36 credit hours of graduate study, including a terminal project and an oral comprehensive examination.

Postprofessional degree students will have an individual degree plan developed with an advisory committee composed of a chairperson and two advisors (one member may be chosen from outside the college). With the student's full participation, the committee will plan the course of study based on the student's goals, program resources, and faculty strengths and interests. Several areas have developed courses of study that have a defined course program. These are the Historic Preservation Program and the Visualization Programs. Other areas of study are offered relative to faculty availability and expertise in areas such as Community Design, Urban Design or special topics studies. A certificate may be awarded by the College of

Architecture at the completion of specific program requirements.

Students have the opportunity to become involved with ongoing research projects. All students seeking a degree must complete the program in **residency**.

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. An individualized program is determined by the student's chair and committee consisting of 24 credit hours of required core courses, 21 credit hours of track courses, 15 credit hours of supporting courses, and 6 hours of tool courses. A minimum of 12 hours of dissertation is required with additional courses 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.

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.

Faculty

Akins, Future, Instructor, 2000. B.A., Texas Tech, 1977; M.F.A., 1977.
Aranha, Joseph Leslie, Associate Professor, 1981. B.Arch., Indian Inst. of Tech. (Kharagpur), 1978; M.Arch., Iowa State, 1981; Reg. Arch. (India).
Buelinckx, Hendrika, Associate Professor, 1995. M.Arch., St. Lukas, Brussels, 1980; M.S., Free U. of Brussels, 1981; Ph.D., California (Los Angeles), 1994.
Davis, James Theron, Associate Professor, 1982. B.F.A., Southern Mississippi, 1966; M.A.Ed., 1972; M.F.A., Mississippi, 1981.
Driskill, David A., Associate Professor, 1987. B.Arch., Texas Tech, 1971; M.Arch., Catholic U. of America, 1973; Reg. Arch. NCARB. (Texas); Reg. Interior Designer (Texas).
Ellis, Clifton Cox, Assistant Professor, 2002. B.A., Carson-Newman Coll., 1978; M.A., Tennessee, 1982; M.A., Virginia, 1995; Ph.D., 2000.
Faulk, Stephen L., Instructor, 1993. B.Arch., Texas Tech, 1971; M.Arch., Illinois, 1974; M.Arch., Harvard, 1978; Reg. Arch. (Texas and Massachusetts).
Flueckiger, Urs Peter, Assistant Professor, 1998. M.Arch., Virginia Polytechnic, 1996.
Gallegos, Matthew Edward, Assistant Professor, 1993. B.Arch., Notre Dame, 1977; M.Arch., Virginia, 1987; Ph.D., 2002; Reg. Arch. (Colorado).
Galley, Catherine C., Assistant Professor, 2002. Dipl. É.N.S.A.D., Ecole Nationale Supérieure des Arts Décoratifs (Paris), 1987; Architect D.P.L.G., École d'Architecture Paris-LaVillette, 1992; M.A.U.D., Harvard, 1994; Ph.D., Rutgers, 2001.
Giaccardo, Marc Alan, Associate Professor, 1992. B.F.A., New Mexico, 1972; M.Arch., 1977; Reg. Arch. (New Mexico).
Haq, Saif-Ul, Assistant Professor and Coordinator, Land-Use Planning, Management, and Design Program, 2000. S.M.Arch.S., Massachusetts Institute of Technology, 1992; B.Arch., Bangladesh U. of Engineering and Technology, 1986; Ph.D., Georgia Inst. Tech., 2001.

Hill, Glenn E., Associate Professor, 1984. B.Arch., Texas Tech, 1978; M.Arch., Colorado (Denver), 1985.
Jaddo, Lahib, Instructor, 1997. B.Arch., Rensselaer Polytechnic, 1980; M.Arch., Texas Tech, 1987; M.F.A., 1990.
Lindsey, Gary L., Instructor, 1999. B.Arch., Texas Tech, 1972; M.A., Abilene Christian, 1998; Reg. Arch. (Texas).
Louden, Elizabeth I., Associate Professor, 1989. B.Arch., Texas Tech, 1987; M.Arch., 1989.
Martin, Michael T., Instructor, 1980. B.Arch., Texas Tech, 1973; M.Arch., Texas (Arlington), 1991; Reg. Arch. (Texas).
Mross, Joanna, Professor, 1979. B.Arch., Virginia Polytechnic Inst., 1970; M.Arch., 1971; M.F.A. Texas Tech, 1983.
Mussotter, Michael P., Associate Professor, 2002. M.Arch., Rice, 1988; Dipl. Ing. Arch., Technische Universitaet Berlin (Germany), 1991.
Perl, Robert D., Associate Professor, 1979. B.Arch., Cincinnati, 1976; M.Arch., California (Berkeley), 1979; Reg. Arch. (Texas).
Peters, Michael Grant, Professor, 1979. B.Arch., Arizona, 1968; M.Arch., Harvard, 1971; Reg. Arch. (Massachusetts, and Texas).
Powell, Raymond D., Instructor, 1977. B.Arch., Texas Tech, 1961; Reg. Arch. (Arizona, Arkansas, Colorado, Florida, Kansas, Louisiana, Missouri, Nebraska, Nevada, New Mexico, and Texas).
Rex, Brian T., Assistant Professor, 2002. B.Sc.Arch., Texas (Arlington), 1990; B.Arch. Carleton (Canada), 1993; M.Sc. Adv. Arch. Des., Columbia, 1995.
Robertson, Stan A., Assistant Professor, 2003. M.Arch., Texas Tech, 1998.
Shacklette, Ben K., Assistant Professor, 1994. B.Arch., Texas Tech, 1986; M.Arch. Texas (Austin), 1996; Reg. Arch. (Texas).
Smith, Gary W., Associate Professor, 2001. B.Arch., Texas Tech, 1973; M.Arch., 1993; Reg. Arch. (Texas).

Stephens, Gary, Instructor, 1996. B.Arch., Texas Tech, 1991.
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.
Watkins, James C., Professor, 1983. B.F.A., Kansas City Art Inst., 1974; M.F.A., Indiana, 1977.
White, James Edmund, Professor, 1971. B.Arch., Texas (Austin), 1957; M.S., Texas Tech, 1973; Reg. Arch. (Texas).
White, John Poston, Professor, 1973. B.Arch., Texas (Austin), 1957; M.Arch., Nebraska, 1973; Reg. Arch. (Texas).
Yu, Kristina H., Lecturer, 2003. B.Arch., Illinois Inst. Tech., 1993; M.Arch., Harvard, 1995.

Emeritus Faculty

Barrick, Nolan Ellmore, Kleinschmidt Professor, Emeritus, 1953-1979.
Brogniez, Raymond Hector, Associate Professor, Emeritus, 1965-1979.
Childers, Carl John Jr., Professor, Emeritus, 1959-1985.
Felty, Billy Weldon, Associate Professor, Emeritus, 1958-1994.
Johnson, Melvin Hamilton, Associate Professor, 1980-1994.
McCutchan, Gordon Cartwright, Professor, Emeritus, 1962-1984.
Sasser, Elizabeth Skidmore, Professor, Emeritus, 1949-1990.
Stewart, William Addison, Professor, Emeritus, 1965-1984.
Thompson, Arthur Dudley, Professor, Emeritus, 1959-1997.
Thompson, Virginia Mahaley, Associate Professor, Emeritus, 1964-1997.
Warren, Terrel Barney, Professor, Emeritus, 1964-1976.
Williamson, Horace Hampton, Associate Professor, Emeritus, 1973-1986.

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 | |
|------------------------------------|------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| 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, Hist. Anc.- Baroque 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 1308, Prin. Physics I 3 | PHYS 2301, Prin. Physics II 3 |
| PHYS 1105, Prin. Physics I Lab 1 | PHYS 1106, Prin. Physics II Lab 1 |
| TOTAL 7 | TOTAL 7 |

Preprofessional Program. Competitive placement based on comprehensive review including student's portfolio, essay and grade point average.

| SECOND YEAR | |
|------------------------------------|--------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| 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, Building Systems 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 | |
|--------------------------------------|-------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| ARCH 3501, Arch. Design Studio III 5 | ARCH 3502, Arch. Design Studio IV 5 |
| ARCH 3353, Arch. Environ Systems I 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. Since 1877 3 | TOTAL 17 |
| TOTAL 18 | |

| FOURTH YEAR | |
|------------------------------------|--------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| 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, Eng. 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 | |
|------------------------------------|--|
| <i>Fall</i> | |
| **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 MARCH.

*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 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 Science in of 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 | |
|------------------------------------|---------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| ARCH 1311, Des. Env. & Soc. 3 | ARCH 1412, Architectonics Studio 4 |
| ARCH 2311, Anc.- Baroque 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 1330, Intro. Math Analysis 3 | MATH 1331, Intro. Math Analysis 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 | |
|------------------------------------|---------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| ARCH 2401, Arch. Design Studio I 4 | ARCH 2402, Arch. Design Studio II 4 |
| ARCH 2351, Building Systems 3 | ARCH 2354, CAD Devel. 3 |
| ARCH 2353, Computers in Arch. 3 | ARCH 3350, Building Technology 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 1306, Gen. Physics 3 | †Natural Lab Science (4 hrs) 4 |
| PHYS 1103, Physics Lab 1 | MKT 3350, Intro. to Marketing 3 |
| MGT 3370, Prin. Economics I 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 | |
|--------------------------------------|-------------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| ARCH 3501, Arch. Design Studio III 5 | ARCH 3502, Arch. Design Studio IV 5 |
| ARCH 3353, Arch. Environ. Sys. I 3 | ARCH 3354, Arch. Environ. Sys. II 3 |
| C E 3385, Structural Mechanics 3 | C E 4385, Structures 3 |
| HIST 2300 Hist US 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 hrs) 3 |
| HIST 2301 Hist. US since 1877 3 | TOTAL 3 |
| TOTAL 6 | |

| FOURTH YEAR | |
|---------------------------------|-----------------------------------|
| <i>Fall</i> | <i>Spring</i> |
| **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 hrs) 3 | MGT 4380 Strategic MGT 3 |
| * Advanced BA Course (3 hrs) 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 MARCH 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 | | Spring | |
| ARCH 1311, Design Env. & Soc. | 3 | ARCH 1412, Architectonics Studio | 4 |
| ARCH 2311, Anc.- Baroque 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 | | Spring | |
| ARCH 2401, Arch. Design Studio I | 4 | ARCH 2402, Arch. Design Studio II | 4 |
| ARCH 2351, Building Systems | 3 | ARCH 2394, Arch. Programming | 3 |
| ARCH 2353, Computers in Arch. | 3 | ARCH 2354, CAD Devel. | 3 |
| PHYS 1306, Gen. Physics | 3 | ARCH 3350, Building Technology | 3 |
| PHYS 1103, Physics Lab | 1 | ARCH 3373, Environ. Analysis - Site | 3 |
| Elective | 3 | TOTAL | 16 |
| TOTAL | 17 | | |

| 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 | 6 | TOTAL | 6 |

| THIRD YEAR | | | |
|------------------------------------|-----------|-----------------------------------|-----------|
| Fall | | Spring | |
| ARCH 3501, Arch. Design Studio III | 5 | ARCH 3502, Arch. Design Studio IV | 5 |
| ARCH 3353, Arch. Environ. Sy. I | 3 | ARCH 3354, Arch. Environ. Sys. II | 3 |
| C E 3385, Structural Mech. | 3 | C E 4385, Structures | 3 |
| ††Diversity Elective | 3 | **POLS 2302, Amer. Public Policy | 3 |
| Elective | 3 | *COMS Elective | 3 |
| TOTAL | 17 | TOTAL | 17 |

| FOURTH YEAR | |
|--------------------------------|-----------|
| Fall | |
| ***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 website (www.arch.ttu.edu).

*Or approved oral communication course.

**Or approved substitution.

***Optional courses 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 | | Spring | |
| ARCH 1311, Design Env. & Soc. | 3 | ARCH 1412, Architectonics Studio | 4 |
| ARCH 2311, Anc.- Baroque 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 2351, Building Systems | 3 | ARCH 2394, Arch. Programming | 3 |
| ARCH 2353, Computers in Arch. | 3 | ARCH 2354, CAD Devel. | 3 |
| PHYS 1306, Gen. Physics | 3 | ARCH 3350, Building Technology | 3 |
| PHYS 1103, Physics Lab | 1 | ARCH 3373, Environ. Analysis - Site | 3 |
| Elective | 3 | TOTAL | 16 |
| TOTAL | 17 | | |

| 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 | 6 | TOTAL | 6 |

| THIRD YEAR | | | |
|----------------------------------|-----------|-----------------------------------|-----------|
| Fall | | Spring | |
| ARCH 3501, Arch. Des. Studio III | 5 | ARCH 3502, Arch. Design Studio IV | 5 |
| ARCH 3353, Environ. Systems I | 3 | ARCH 3354, Environ. Systems II | 3 |
| C E 3385, Structural Mech. | 3 | C E 4385, Structures | 3 |
| *Diversity Elective | 3 | ††POLS 2302, Amer. Public Policy | 3 |
| Elective | 3 | +COMS Elective | 3 |
| TOTAL | 17 | TOTAL | 17 |

| FOURTH YEAR | | | |
|--------------------------------|-----------|-----------------------------------|-----------|
| Fall | | Spring (**Professional Level) | |
| ***ARCH 4601, Design Studio V* | 6 | ARCH 5604, Urban Design Studio | 6 |
| ARCH 4381, Urban Theory | 3 | ARCH 5365, Arch. Research 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 include: Completion of all academic course work in the first 3 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 (**Professional Level) | | Spring (**Professional Level) | |
| ARCH 5605, Adv. Design Studio | 6 | ARCH 5692, Arch. Design Thesis | 6 |
| ARCH 5395, Thesis Res. | 3 | ARCH 5392, Professional Practice | 3 |
| ARCH 5333, Studies in Arch. Hist. | 6 | 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 website (www.arch.ttu.edu).

***Optional courses 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 | | | |
|----------------------------------|----|----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| ARCH 1311, Design Env. & Soc. | 3 | ARCH 1412, Architectonics Studio | 4 |
| ARCH 2311, Hist. Anc.- Baroque | 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 | | | |
|----------------------------------|----|-------------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| ARCH 2401, Arch. Design Studio I | 4 | ARCH 2402, Arch. Design Studio II | 4 |
| ARCH 2353, Computers in Arch. | 3 | ARCH 2354, Comp. Asst. Des. | 3 |
| ARCH 2351, Building Systems | 3 | ARCH 2394, Arch. Programming | 3 |
| PHYS 1306, Gen. Physics | 3 | ARCH 3350, Building Technology | 3 |
| PHYS 1103, Physics Lab | 1 | ARCH 3373, Environ. Analysis - Site | 3 |
| Elective | 3 | TOTAL | 17 |
| TOTAL | 17 | | |

| 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 | 6 | TOTAL | 6 |

| THIRD YEAR | | | |
|----------------------------------|----|-----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| ARCH 3501, Arch. Des. Studio III | 5 | ARCH 3502, Arch. Design Studio IV | 5 |
| ARCH 3353, Arch. Environ. Sys. I | 3 | ARCH 3354, Arch. Environ. Sys. II | 3 |
| C E 3385, Structural Mech. | 3 | C E 4385, Structures | 3 |
| *Diversity Elective | 3 | +POLS 2302, Amer. Public Policy | 3 |
| Elective | 3 | ††COMS Elective | 3 |
| TOTAL | 17 | TOTAL | 17 |

| FOURTH YEAR | | | |
|------------------------------|----|--------------------------------------|----|
| <i>Fall</i> | | <i>Spring (**Professional Level)</i> | |
| ***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 3 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. In all Business Administration graduate courses, one A above a 3.0 GPA is required to receive the M.B.A. degree. All Business Administration courses must be completed with a minimum grade of B.

| SUMMER | | | |
|----------------------------|---|------------------------------|---|
| BLAW 5290, Bus Law | 3 | ACCT 5401, Fin. & Mgt. Acct. | 4 |
| ISQS 5345, Statistics | 3 | MGT 5376, Executive Skills | 3 |
| ISQS 5137, Mgt. Info. Sys. | 1 | TOTAL | 7 |
| TOTAL | 7 | | |

| FIFTH YEAR | | | |
|------------------------------------|----|--------------------------------------|----|
| <i>Fall (**Professional Level)</i> | | <i>Spring (**Professional Level)</i> | |
| ARCH 5605, Adv. Arch. Des. Studio | 6 | ARCH 5692, Arch. Design Thesis | 6 |
| ARCH 5395, Res., Prog. & Sch. | 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, Finance | 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 course offerings are available on the architecture website (www.arch.ttu.edu).

***Optional courses 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.

Master of Science in Architecture Certification in Historic Preservation

| <i>Fall</i> | | <i>Spring</i> | |
|------------------------------------|---|-----------------------------------|---|
| ARCH 5315, Res. Meth. Hist. Pres. | 3 | ARCH 5321, Hist. Bldg. Tech. Doc. | 3 |
| ARCH 5319, Arch. Hist. before 1865 | 3 | ARCH 5320, Arch. Hist. after 1865 | 3 |
| ARCH 5324, History and Theory | 3 | ARCH 5325, Conservation Policies | 4 |
| TOTAL | 9 | TOTAL | 9 |

SUMMER
Internship or off-campus program Summer Internship Program in Preservation Highly Recommended

| <i>Fall</i> | | <i>Spring</i> | |
|--------------------------------|---|-------------------|---|
| *Elective | 3 | *Elective | 3 |
| ARCH 5622, Preservation Studio | 6 | ARCH 6000, Thesis | 6 |
| TOTAL | 9 | TOTAL | 9 |

Total 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

| <i>Fall</i> | | <i>Spring</i> | |
|--------------------------------|---|----------------------------------|---|
| ARCH 5340, Design Vis. Seminar | 3 | ARCH 5344, Virtual Reality Tech. | 3 |
| ARCH 5341, Internet Media | 3 | ARCH 5345, Design Vis. Seminar | 3 |
| ARCH 5343, 3-D Anim./Imaging | 3 | ARCH 5365, Research Methods | 3 |
| TOTAL | 9 | TOTAL | 9 |

| <i>Fall</i> | | <i>Spring</i> | |
|----------------------------------|---|-------------------|---|
| ARCH 5345, Arch. Design Studio I | 3 | ARCH 6000, Thesis | 6 |
| ARCH Elective | 3 | Elective | 3 |
| ARCH 7000, Research | 3 | TOTAL | 3 |
| TOTAL | 9 | | |

Total Hours—36.



College of Arts and Sciences



Dr. Jane L. Winer
Dean

202 Holden Hall, Box 41034
Lubbock, TX, 79409-1034
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www.as.ttu.edu

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, the skills of thinking and communicating, and the 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 to communicate effectively, and a desire for life-long learning.

The courses and programs in Arts and Sciences also provide a base of knowledge and skills from which students may enter such professional fields of study as law and medicine.

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.

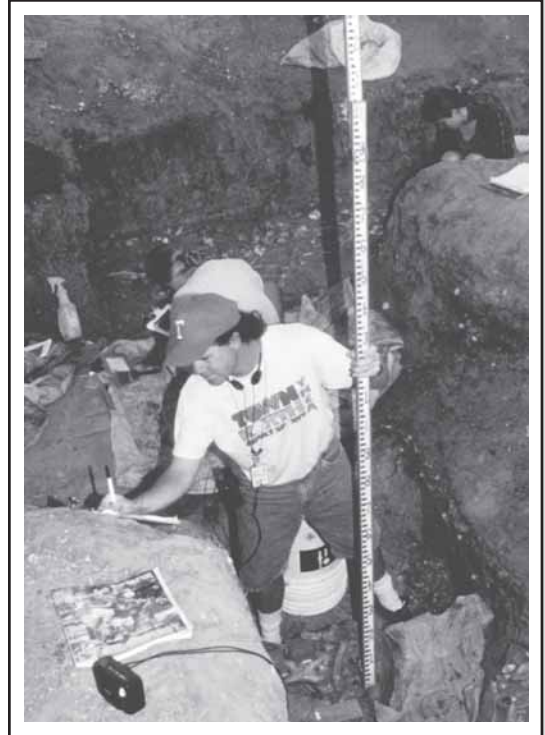
Course Load. A normal full-time course load is 12-19 hours per semester. In calculating the course load, the dean will consider all active correspondence courses as a part of the course load. Course loads in excess of 19 semester hours require approval by the Associate Dean in the Student Division of the College of Arts and Sciences. The maximum course load for a student on probation is 16 hours.

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. In all programs (except the Bachelor of General Studies distance program offered through Extended Studies) no more than 6 credit hours completed during the final 30 credit hours. Approval will be granted for one course at a time. 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 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, concentration area, or teaching field requirements for any degree program.

Grading Practices. The College of Arts and Sciences conforms to university grading practices as set forth in the major section entitled “Academic Regulations” in 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 in the Student Division of the College of Arts and Sciences.

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.

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. 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 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 section of this catalog describing teacher education and consult the College of Education and the chairperson or undergraduate advisor of the department in which they wish to major.

Undergraduate Program

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, and/or human sciences 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.

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, 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, HDFS 2320, 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 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. | |
| 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 A2301, 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 125-153 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 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 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. In addition, 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. 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 more information on this option 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 the course work in the general degree requirements, the three concentration areas, and in electives must total a minimum of 125 semester hours. Students should be aware that the later one enters the program the greater likelihood of needing more than the minimum of 125 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 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.) 126 |

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 international aspects. Requirements for the B.S. degree apply unless specifically shown to the contrary. The following courses are required for the B.S.I.E. degree:

| | |
|---|-----------------------|
| | <i>Semester Hours</i> |
| English | 12 |
| (Inc. ENGL 2311 & 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 3301, 3329, 4304, 4329. | |
| International Political Science | 9 |
| Three of the following: POLS 3360, 3361, 3363, 3366, 3371, 3372, 3373, 3374, 3375, 3376, 3378. | |
| Elective Courses | 5-14 |
| Total for degree | (min.) 126 |

For more information and academic advisement, contact the Department of Economics and Geography.

Interdepartmental, Interdisciplinary, and Special Programs

Asian Studies

The minor in Asian Studies allows students throughout the university to develop expertise in a vital part of the world today. 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, (808) 742-1004, patricia.pelley@ttu.edu.

Community and Urban Studies

The College of Arts and Sciences offers an interdisciplinary minor in community and urban studies. The program consists of an integrated course of study that provides the student with a conceptual and theoretical foundation for recognizing and approaching urban problems. An opportunity is also provided for observation and analysis of community and urban affairs. The program includes core courses in architecture, economics, geography, history, political science, and sociology as well as elective courses in architecture, business administration, economics, geography, history, landscape architecture, political science, sociology, and social work. **Contact information:** Dr. Yung-mei Tsai, 162 Holden Hall, (806) 742-2401, ext. 233; FAX (806) 742-1088; yung.mei.tsai@ttu.edu.

Comparative Literature

Comparative literature is designed for students who are interested in studying literature from interdisciplinary and multicultural perspectives. The Department of Classical and Modern Languages and Literatures participates in a comparative literature 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. Sharon Diane Nell, (806) 742-3145, sharon.nell@ttu.edu.

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, (806) 742-3601, norman.bert@ttu.edu.

Environmental Studies

The college offers an interdisciplinary minor in environmental studies. This minor is nontechnical in nature and is specifically designed for students seeking the Bachelor of Arts degree. Its focus is on the interaction of humans and the natural environment and the consequences of that interaction. The environmental studies minor does not seek to train professional environmentalists, but in combination with existing major programs, it will give the student a broad foundation for more advanced environmental studies programs, professional work in law, regional planning or resource management, various environmental positions in government, business, or teaching. The plan will also provide students with a better understanding of basic ecology and the nature of environmental problems so that they can make more knowledgeable value judgments on environmental issues, a vital concern in the contemporary world. The minor consists of 18 hours of elective courses. No more than 6 hours from any department or program may count toward the minor. At least 6 hours must be from upper division. Electives in the program include: AAEC 4313, ANTH 3308, 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

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.

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, (806) 742-3744, d.troyansky@ttu.edu.

Family Life Studies

The Colleges of Arts and Sciences and Human Sciences jointly offer an interdisciplinary minor

in family life studies. The program involves an integrated course of study and provides the student with a variety of perspectives on the family. The minor consists of 18 hours chosen from several disciplines. No more than 6 hours may be taken from any one department. Courses counted toward the major will not count toward the minor. At least 6 hours must be at the junior-senior level.

Courses may be selected from the following: HLTH 1300, 1305, 2302, 3313, 3314, HIST 3322, 3323, 3341, 4325, PSY 3341, 4300, 4301, 4310, SOC 2331, 3325, 3331, 4373, S W 331, 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.

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.

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, (806) 742-3121, jbarkdull@ttacs.ttu.edu.

Latin American and Iberian Studies (LAIS)

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 each 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 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 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. Both LAIS 2300 and 4300 are required.

In addition, the standard requirements for a B.A. degree must be met.

Linguistics

The Interdepartmental Committee on Linguistics offers a minor in linguistics for the B.A. degree. The minor consists of 18 hours of required and elective courses drawn from the departments of 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, (806) 742-1565, sharon.myers@ttu.edu.

Linguistics is concerned with (1) the scientific description and analysis of languages; (2) the study of language in its social and cultural context; (3) the evolution and historical development of language; (4) the formal study of communication systems involving the acquisition and use of language; (5) the relation of language to literature, philosophy, and other fields in the humanities; and (6) human biology and neurology as they affect the use of language. Linguistics shares interests with

speech, science, psychology, anthropology, sociology, literature, philosophy, and other fields of study. It is, therefore, an interesting and useful minor area for students majoring in these fields and one that can, in many cases, help students in developing an area of academic or professional specialization.

The linguistics minor for the B.A. 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.

Prelaw Studies

Students who are interested in law should be aware that the legal profession calls upon many fields of learning in the humanities, arts, social sciences, and natural sciences. As an advocate, negotiator, advisor, mediator, and public citizen, a lawyer needs analytical skills, breadth of vision, and a commitment to justice. The law is a humanistic pursuit based on the purposes and principles of the civilization it serves.

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.

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 school programs include dentistry, medicine, nursing, optometry, pharmacy, and allied health sciences.

Most professional school programs 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 professional school catalogs and 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 career 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 school programs 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.

Premedicine

The minimum admission requirements for most medical schools in the United States are at least 90 semester hours in an accredited college or university, including 6 semester hours of English, 3 semester hours of calculus, 14 semester hours of biology, 8 semester hours of general chemistry, 8 semester hours of organic chemistry, and 8 semester hours of physics.

All applicants to medical schools are required to take the Medical College Admission Test and submit their applications to the schools approximately one year prior to the date of the planned matriculation. For admission requirements of medical schools, students should consult the latest edition of *Medical School Admission Requirements*.

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.

Preoptometry

Admission requirements differ among the various professional schools. These courses fulfill requirements in general: 8 semester hours of biology, 8 semester hours of general chemistry, 8 semester hours of organic chemistry, 8 semester hours of physics, 4 semester hours of microbiology, 4 semester hours of physiology, 6 semester hours of mathematics including 3 semester hours of calculus, 3 semester hours of biochemistry, 3 semester hours of statistics, 3 semester hours of general psychology, 12 semester hours of English, 6 semester hours of U.S. history, and 6 semester hours of political science. Other recommended courses are cultural anthropology, logic, and ethics. Students should complete 90 or more semester hours and take the Optometry Admission Test before applying to the professional schools. Students should plan to complete a baccalaureate degree in the field of their choice before entering optometry school. Although a formal minimum of 90 semester hours is stated for some schools, preference is given to applicants with baccalaureate degrees. The University of Houston College of Optometry requires a baccalaureate degree of all entering students.

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

Students desiring admission to the Texas Tech University Health Sciences Center School of Nursing should apply directly to that program as well as to Texas Tech University. Application to the Texas Tech University Health Sciences Center School of Nursing is a separate application from the Texas Tech University application.

Students seeking admission to either diploma or collegiate programs in nursing other than at Texas Tech University Health Sciences Center may enroll in a prenursing curriculum at Texas Tech University. The specific non-nursing course requirements may vary among schools of nursing, but most include 8 semester hours of human anatomy and physiology, 4 hours of chemistry, 4 hours of microbiology, 3 hours of food and nutrition, 3 hours of statistics, 3 hours of human growth and development, 3 hours of general psychology, 3 hours of introduction to sociology or cultural anthropology, 6 hours of English, 6 hours of history, 6 hours of political science, and 3 hours of humanities or visual and performing arts.

To avoid complications in transferring, pre nursing students should not take courses pass-fail.

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.

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, (806) 742-2400, d.paul.johnson@ttu.edu.

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.

Other Courses: ANTH 3325, 3346, ART 3317, 3318, HIST 3340, 3348, 3394, 3395, 3398, 4374, PHIL 2320, POLS 3330, 3332.

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. **Contact information:** Dr. Anthony Qualin and Dr. Erin Collopy, Department of Classical and Modern Languages and Literatures, (806) 742-3145, orpvt@ttu.edu.

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.

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.

Department of Biological Sciences

John C. Zak, Chairperson

Professor, 1986. B.S., Pittsburgh, 1974; M.S., 1976; Ph.D., Calgary, 1981.

Faculty

Allen, Randy D., Professor of Biological Sciences and Plant and Soil Sciences, 1989. B.S., Southwestern Union Coll., 1978; M.S. Texas (Arlington), 1981; Ph.D., Texas A&M, 1986.

Baker, Robert James, Horn Professor of Biological Sciences and Heritage Management and Director, Natural Science Research Laboratory, 1967. B.S., Arkansas (Monticello), 1963; M.S., Oklahoma State, 1965; Ph.D., Arizona, 1967.

Bilimoria, Shân L., Associate Professor, 1978. B.Sc., Otago (New Zealand), 1971; Ph.D., 1975.

Bradley, Robert Dean, Associate Professor of Biological Sciences and Museum Science, 1994. B.S., Texas A&M, 1983; M.S., 1986; Ph.D., Texas Tech, 1991.

Burns, John Mitchell, Professor, 1969. B.S., New Mexico State, 1963; M.S., 1966; Ph.D., Indiana, 1969.

Cannon, Charles H. Jr., Assistant Professor, 2002. B.A., Harvard, 1989; Ph.D., Duke, 2000.

Carr, James A., Associate Professor of Biological Sciences and Chairperson, Neural and Behavioral Sciences Advisory Committee, 1991. B.S., Rutgers, 1982; M.A., Colorado, 1986; Ph.D., 1988.

Chesser, Ron Keith, Professor, 2000. B.S., Oklahoma, 1973; M.S., Memphis State, 1976; Ph.D., Oklahoma, 1981.

Collie, Nathan L., Associate Professor, 1991. B.S., Texas Tech, 1977; M.A., California (Berkeley), 1981; Ph.D., 1984.

Densmore, Llewellyn D. III, Associate Professor, 1985. B.S., Houston, 1975; M.S., 1977; Ph.D., Louisiana State U. School of Medicine, 1981.

Deslippe, Richard J., Assistant Professor, 1997. B.Sc., Guelph, 1985; M.Sc., Windsor, 1989; Ph.D., Alberta, 1994.

Diamond, Sandra, Assistant Professor, 2000. B.Sc., McGill, 1981; Ph.D., North Carolina State, 1999.

Dini, Michael Lawrence, Associate Professor, 1992. B.S., St. Mary's Coll. of Calif., 1977; Ph.D., Notre Dame, 1989.

Gollahon, Lauren St. Pierre, Assistant Professor, 1997. B.A., Barrington, 1981; M.S., Texas A&M, 1986; Ph.D., 1990.

Heintz, Caryl E., Professor and Associate Dean, College of Arts and Sciences, 1975. A.B., Wittenberg, 1962; M.S., Cincinnati, 1965; Ph.D., Indiana, 1968.

Held, Lewis Irving Jr., Associate Professor, 1987. B.S., Massachusetts Inst. of Technology, 1973; Ph.D., California (Berkeley), 1977.

Holaday, A. Scott, Associate Professor, 1983. B.S., Illinois, 1971; M.S., Florida, 1973; Ph.D., 1978.

Houck, Marilyn A., Associate Professor, 1991. B.S., Bloomsburg State (Pennsylvania), 1967; M.S., Pennsylvania State, 1969; Ph.D., 1980.

Jeter, Randall Mark, Associate Professor, 1985. B.S., Arizona, 1974; M.S., Oklahoma, 1976; Ph.D., California (Davis), 1982.

McGinley, Mark A., Associate Professor, 1991. B.A., California (Santa Barbara), 1980; M.S., Kansas State, 1983; Ph.D., Utah, 1989.

McIntyre, Nancy Estelle, Assistant Professor, 2000. B.S., Georgia, 1991; M.S., 1993; Ph.D., Colorado State, 1998.

Owen, Robert D., Associate Professor, 1991. B.S., Oklahoma, 1976; Ph.D., 1987.

Patino, Reynaldo, Professor, 1989. B.S., Tokyo, 1980; M.S., Oregon State, 1983; Ph.D., 1988.

Phillips, Carleton J., Professor, 1998. B.S., Michigan State, 1964; M.A., Kansas, 1967; Ph.D., 1969.

Reilly, Brian, Assistant Professor, 1999. B.S., North Colorado, 1980; M.S., 1982; Ph.D., New Mexico, 1989.

Rock, Christopher Dale, Associate Professor, 2002. B.A., California, 1985; Ph.D., Michigan, 1991.

Rylander, Michael Kent, Professor, 1965. B.A., North Texas State, 1956; M.S., 1962; Ph.D., Tulane, 1965.

Salazar-Bravo, Jorge, Assistant Professor, 2003. B.A., San Andres (Bolivia), 1988; Ph.D., New Mexico, 2000.

San Francisco, Michael J. D., Associate Professor, 1990. B.S., U. of Agricultural Sciences, 1977; M.S., Boston Univ., 1980; Ph.D., 1984.

Schmidt, Kenneth A., Assistant Professor, 2002. B.S., Illinois, 1992; Ph.D., 1997.

Strauss, Richard E., Associate Professor, 1992. B.A., West Chester State, 1974; M.S., Pennsylvania State, 1977; Ph.D., 1980.

Tissue, David T., Associate Professor, 1996. B.S., McGill U., 1980; M.S., San Diego State, 1984; Ph.D., California (Los Angeles), 1989.

Willig, Michael R., Professor, 1983. B.S., Pittsburgh, 1974; Ph.D., 1982.

Zhang, Hong, Associate Professor, 1995. Sc.B., Sichuan Univ., 1982; Ph.D., Michigan State, 1989.

Emeritus Faculty

Allen, Archie Cornelious, Associate Professor, Emeritus, 1963-1986.

Camp, Earl D., Professor, Emeritus, 1945-1985.

Coulter, Murray Whitfield, Associate Professor, Emeritus, 1964-1998.

Drew, Leslie, Professor, Emeritus, 1977-2000.

Elliot, Arthur McAuley, Professor, Emeritus, 1961-1995.

Jackson, Raymond Carl, Horn Professor, Emeritus, 1971-1997.

Kuhnley, Lyle Carlton, Associate Professor, Emeritus, 1959-1981.

Mecham, John Stephen, Professor, Emeritus, 1965-1992.

Mitchell, Robert Wetsel, Professor, Emeritus, 1965-1991.

Proctor, Vernon Willard, Professor, Emeritus, 1956-1992.

Roberts, Larry Spurgeon, Professor, Emeritus, 1979-1990.

Schmidly, David James, Professor and President, Emeritus, 1996-2002.

About the Program

This department supervises the following degree programs: **BIOLOGY**, *Bachelor of Science, Master of Science, Doctor of Philosophy*; **BIOLOGICAL INFORMATICS**, *Master of Science*; **CELL AND MOLECULAR BIOLOGY**, *Bachelor of Science*; **MICROBIOLOGY**, *Bachelor of Science, Master of Science*; **ZOOLOGY**, *Bachelor of Science, Master of Science, Doctor of Philosophy*.

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, 3320, 3120, 3416, and 4305.
- Group I—At least one course from BIOL 3302, BOT 3401, 3409, MBIO 3401, ZOOLOG 4409.
- Group II—At least one course from BIOL 3307, 3309.
- Group III—At least one course from BOT 3403, 3404, ZOOLOG 3406, 4321, 4407.
- Group IV—At least one junior or senior level botany and one junior or senior level zoology course (courses taken to meet Group I and Group III requirements can also be used to meet the Group IV requirement).
- 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, ZOOLOG 4409, or BIOL 3320 and 3120.
- Group II—At least one course from BOT 3404, ZOOLOG 3406, 4407.
- Three courses from Group III (BIOL 3307, 4301, 4310, MBIO 4401, ZOOLOG 4321) and Group IV (BOT 3404, ZOOLOG 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, ZOOLOG 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 encourages enrollment in 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, 4110 (4110 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 36.
- 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 Curricular 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 4304, 4310, 4409, ZOOL 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 requirements for the B.S. degree, including 18 hours of professional educational courses, will be qualified to teach high school biology in the public schools of Texas. The following courses to 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 the university's Testing and Evaluation Center, but advanced placement scores for BIOL 1401 and 1402 will not be accepted as credit toward major requirements in the department.

Graduate Program

The master's and doctoral programs include specializations in the areas of animal physiology and biomedical sciences, biological informatics, ecology and concentration biology, evolution and systematic biology, microbiology and plant physiology, and 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.

Sample Curriculum for Biological Sciences

| | | FIRST YEAR | |
|------------------------------|---|-------------------------------------|---|
| <i>Biology</i> | | <i>Cell & Molecular Biology</i> | |
| BIOL 1403, 1404 | 8 | BIOL 1403, 1404 | 8 |
| CHEM 1107, 1108 | 2 | CHEM 1107, 1108 | 2 |
| CHEM 1307, 1308 | 6 | CHEM 1307, 1308 | 6 |
| ENGL 1301, 1302 | 6 | ENGL 1301, 1302 | 6 |
| Mathematics | 6 | Mathematics | 6 |
| +Personal Fitness & Wellness | 2 | +Personal Fitness & Wellness | 2 |

| | | | |
|------------------------------|-----|------------------------------|---|
| <i>Microbiology</i> | | <i>Zoology</i> | |
| BIOL 1403, 1404 | 8 | BIOL 1403, 1404 | 8 |
| CHEM 1107, 1108 | 2 | CHEM 1107, 1108 | 2 |
| CHEM 1307, 1308 | 6 | CHEM 1307, 1308 | 6 |
| ENGL 1301, 1302 | 6 | ENGL 1301, 1302 | 6 |
| MATH 1351 or AAEC 3401 | 3 | Mathematics | 6 |
| Additional Mathematics | 2-3 | +Personal Fitness & Wellness | 2 |
| +Personal Fitness & Wellness | 2 | †Oral Communication | 3 |

| | | SECOND YEAR | |
|-----------------------------|------|-------------------------------------|------|
| <i>Biology</i> | | <i>Cell & Molecular Biology</i> | |
| BIOL 3416 | 4 | BIOL 2120 | 1 |
| Organic Chemistry | 4-8 | BIOL 3416 | 4 |
| †English | 6 | CHEM 3105, 3106 | 2 |
| ††For. Lang. | 6-10 | CHEM 3305, 3306 | 6 |
| †Oral Communication | 3 | †English | 6 |
| †Major, Minor, or Electives | 9-15 | ††Foreign Language | 6-10 |
| | | †Oral Communication | 3 |
| | | †Major, Minor, or Electives | 8-10 |

| | | | |
|--|------|-----------------------------|------|
| <i>Microbiology</i> | | <i>Zoology</i> | |
| MBIO 3401 | 4 | BIOL 3416 | 4 |
| CHEM 3105, 3106 | 2 | CHEM 3105, 3106 | 2 |
| CHEM 3305, 3306 | 6 | CHEM 3305, 3306 | 6 |
| †English | 6 | †English | 6 |
| ††Foreign Language | 6-10 | ††Foreign Language | 6-10 |
| MBIO Requirements, Technology, Applied Science, or Electives | 4-6 | †Oral Communication | 3 |
| | | †Major, Minor, or Electives | 9-15 |

| | | THIRD AND FOURTH YEARS | |
|----------------------------|-------|-------------------------------------|-------|
| <i>Biology</i> | | <i>Cell & Molecular Biology</i> | |
| BIOL 3320, 3120, 4305 | 7 | BIOL 3302 | 3 |
| Foreign Language | 6 | BIOL 3320, 3310 | 6 |
| †HIST 2300, 2301 | 6 | BIOL 4320 | 3 |
| PHYS 1306, 1307 | 6 | CHEM 3311, 3312 | 6 |
| PHYS 1103, 1104 | 2 | MBIO 3401 | 4 |
| POLS 1301, 2302 | 6 | Foreign Language | 6 |
| Major, Minor, or Electives | 25-37 | †HIST 2300, 2301 | 6 |
| | | PHYS 1306, 1307 | 6 |
| | | PHYS 1103, 1104 | 2 |
| | | POLS 1301, 2302 | 6 |
| | | Major, Minor, or Electives | 18-20 |

| | | THIRD AND FOURTH YEARS | |
|----------------------------------|-------|----------------------------|-------|
| <i>Microbiology</i> | | <i>Zoology</i> | |
| MBIO Requirements, and BIOL 4305 | 29-31 | BIOL 3320, 3120 | 4 |
| Foreign Language | 6 | Foreign Language | 6 |
| †HIST 2300, 2301 | 6 | †HIST 2300, 2301 | 6 |
| PHYS 1306, 1307 | 6 | PHYS 1306, 1307 | 6 |
| PHYS 1103, 1104 | 2 | PHYS 1103, 1104 | 2 |
| CHEM 3311, 3312 | 6 | POLS 1301, 2302 | 6 |
| POLS 1301, 1302 | 6 | Major, Minor, or Electives | 25-37 |
| Electives | 1-3 | | |

Total minimum hours for each major—126.

Advisement required; depending on circumstances, these courses should be deferred until sophomore year.

See chemistry prerequisites.

+Select from Arts and Sciences General Degree Requirements.

†Choose from Core Curriculum requirements.

††See foreign language requirements.

Department of Chemistry and Biochemistry

Richard Allen Bartsch, Chairperson

Horn Professor, 1974. B.A., Oregon State, 1962; M.S., 1963; Ph.D., Brown, 1967.

Faculty

Birney, David Martin, Professor, 1989. B.A., Swarthmore, 1978; M.Ph., Yale, 1987; Ph.D., 1987.

Blake, Robert E. Jr., Assistant Professor, 2001. B.A., California (San Diego), 1989; Ph.D., California Institute of Technology, 1996.

Bornhop, Darryl J., Professor, 1994. B.S., Missouri, 1980; M.A., 1982; Ph.D., Wyoming, 1987.

Casadonte, Dominick Joseph Jr., Professor, 1989. B.S., Case Western Reserve, 1977; M.S., Purdue, 1980; Ph.D., 1985.

Dasgupta, Purnendu Kumar, Horn Professor, 1981. B.Sc., Burdwan (India), 1968; M.Sc., 1970; Ph.D., Louisiana State, 1977.

Flowers, Robert A. II, Professor, 2001. B.S., East Stroudsburg, 1986; Ph.D., Lehigh, 1991.

Gellene, Gregory I., Professor, 1992. B.S., Georgetown, 1979; Ph.D., Cornell, 1983; M.S., 1984.

Harman, James Gordon, Associate Professor, 1987. B.S., New Mexico State, 1975; M.S., 1977; Ph.D., North Carolina State, 1982.

Headley, Allan Dave, Professor of Chemistry and Biochemistry; Coordinator, Interdisciplinary Studies; and Associate Dean, Graduate School, 1989. B.A., Columbia Union, 1976; Ph.D., Howard, 1982.

Holwerda, Robert Alan, Professor, 1974. B.S., Stanford, 1969; Ph.D., California Inst. of Technology, 1973.

Knaff, David Barry, Horn Professor Chemistry and Biochemistry and Codirector, Biotechnology Program, 1976. B.S., Massachusetts Inst. of Technology, 1962; M.S., Yale, 1963; Ph.D., 1966.

Korzeniewski, Carol, Professor, 1995. B.S., Oakland U., 1983; Ph.D., Utah, 1987.

Li, Guigen, Associate Professor, 1997. B.S., People's Republic of China, 1984; M.S., 1987; Ph.D., Arizona, 1995.

Liu, Shaorong, Associate Professor, 2002. B.Sc., Huzhong Normal U., 1982; M.Eng., Peking U., 1985; Ph.D., Texas Tech, 1995.

Marx, John Norbert, Associate Professor, 1967. B.S., St. Benedict's, 1962; Ph.D., Kansas, 1965.

Miller, Rebecca, Lecturer, 2001. B.S., Shippensburg, 1992; Ph.D., Duke, 1996.

Miracle, Gary, Visiting Assistant Professor, 2002. B.S., Michigan State, 1983; Ph.D., Wisconsin (Madison), 1996.

Morales, Jorge A., Assistant Professor, 2001. B.S., Universidad Nacional De Mar Del Plata (Argentina), 1989; M.S., 1989; Ph.D., Florida (Gainesville), 1997.

Nes, W. David, Professor, 1993. B.A., Gettysburg Coll., 1975; M.S., Drexel, 1977; Ph.D., Maryland, 1979.

Paré, Paul, Assistant Professor, 1999. B.A., New College (South Florida), 1985; Ph.D., Texas, 1991.

Poirier, Lionel William, Assistant Professor, 2001. B.S., Brown, 1988; Ph.D., California (Berkeley), 1997.

Quitevis, Edward Leon, Professor of Chemistry and Biochemistry and Joint Professor of Physics, 1984. B.S., California (Berkeley), 1974; M.A., 1976; Ph.D., Harvard, 1981.

Redington, Richard Lee, Professor, 1967. B.A., Minnesota, 1955; Ph.D., Washington, 1961.
Reid, Ted W., Adjunct Faculty, 1990. B.A., Occidental Coll., 1961; M.S., Arizona, 1963; Ph.D., California (Los Angeles), 1967.
Roundhill, D. Max, Professor, 1996. B.A., Oxford, 1965; Ph.D., London, 1967.
Shaw, Robert W., Assistant Professor, 1981. B.A., West Virginia, 1971; Ph.D., Pennsylvania State, 1976.
Shelly, Dennis C., Associate Professor, 1990. B.S., Huntington Coll., 1977; Ph.D., Texas A&M, 1982.
Shine, Henry Joseph, Horn Professor, 1954. B.Sc., London (England), 1944; Ph.D., 1947.
Tomlinson, Steven, Instructor, 2001. B.A., South Florida, 1995; Ph.D., Texas Tech, 2001.
Whittlesey, Bruce Rodman, Associate Professor, 1987. B.A., New Coll. of the U. of South Florida, 1978; Ph.D., Texas (Austin), 1985.

Emeritus Faculty

Draper, Arthur Lincoln, Associate Professor, Emeritus, 1959-1985.
McPherson, Clinton Marsud, Associate Professor, Emeritus, 1956-1984.
Mills, Jerry Lee, Professor, Emeritus, 1970-1995.
Adamcik, Joe Alfred, Associate Professor, Emeritus, 1957-1988.
Dennis, Joe, Professor, Emeritus, 1938-1976.
Anderson, John Arthur, Professor, Emeritus, 1961-1993.
Wilde, Richard Edward, Professor, Emeritus, 1963-1995.
Guerrant, William Barnett Jr., Professor, Emeritus, 1968-1984.

About the Program

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

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 pharmaceutical chemistry, technical sales, and chemical patent law). It may also provide a sufficient background in chemistry for employment as a chemist in an industrial 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, 4314, 4114 and 3 hours to be chosen from 3308, 3108, 4302, 4303, 4105, 4309, and 4310 | |
| MATH | 6 hours |
| 1350 (if needed), 1351, 1352 | |
| PHYS | 8 hours |
| 1306 & 1103 and 1307 & 1104 (or 1308 & 1105 and 2301 & 1106) | |
| 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.

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, 4314, 4114 | |
| BIOL 1403, 1404, 3320, 3416 | 15 hours |
| MATH | 6 hours |
| 1350 (if needed), 1351, 1352 | |
| PHYS | 8 hours |
| 1306 & 1103 and 1307 & 1104 (or 1308 & 1105 and 2301 & 1106) | |
| 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. Note that 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 the Testing Center 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 Deans' Office for approval to take the examination. For all other courses, it is the student's responsibility to obtain approval

from the Deans' 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 % 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 Chemistry Placement Examination.

Graduate Program

Students majoring in this department for advanced degrees must pass three diagnostic examinations by the end of their second long semester. These examinations are based on the undergraduate curriculum.

Each student is required to take the diagnostic examinations in his or her area of specialization and any two others or a series of three Biological Chemistry Examinations designed for students whose academic background emphasizes biochemistry. These examinations are offered three times a year.

A master's degree program includes a minimum of 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

cumulatives by the end of the second year and an additional three cumulatives by the end of the third year is required to satisfy the written part of the qualifying examination. Students in the inorganic 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 Curriculum, B.S. Degree

| FIRST YEAR | | | |
|-------------------------------------|--------------|--|--------------|
| <i>Fall</i> | | <i>Spring</i> | |
| 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 |
| 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 | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| 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 1308, Prin. of Physics I | 3 | PHYS 2301, Prin. of Physics II | 3 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | PHYS 1106, Prin. of Phys. II (Lab.) | 1 |
| †English | 3 | Minor | 3-4 |
| TOTAL | 17 | TOTAL | 16-17 |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| 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 | CHEM 4314, Instrumental Analysis | 3 |
| Foreign Language | 5 | CHEM 4114, Instrumental Lab. | 1 |
| POLS 1301, Amer. Govt., Org. | 3 | Foreign Language | 5 |
| Minor | 3-4 | POLS 2302, Amer. Pub. Pol. | 3 |
| TOTAL | 17-18 | TOTAL | 16 |
| FOURTH YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| CHEM 4303, Mol. Biochem. | 3 | CHEM 4309, Inorg. Chem. II | 3 |
| Minor | 3 | CHEM 4105, Inorg. Chem. Lab | 1 |
| †English | 3 | †Humanities Elective | 3 |
| +Senior Elective | 3-6 | †Social or Behavioral Science Elective | 3 |
| Foreign Language | 3 | +Senior Elective | 3 |
| TOTAL | 15-18 | Foreign Language | 3 |
| | | Minor | 3 |
| | | TOTAL | 13-19 |

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.

+Six elective hours from CHEM 4010 (3 hours), 4300, 4302, 4310 or with consent of the undergraduate advisor.

†Select from Arts and Sciences General Degree Requirements.

Biochemistry Curriculum, B.S. Degree

| FIRST YEAR | | | |
|-------------------------------------|--------------|-------------------------------------|--------------|
| <i>Fall</i> | | <i>Spring</i> | |
| CHEM 1307, Prin. of Chem. I | 3 | CHEM 1308, Prin. of Chem. II | 3 |
| CHEM 1107, Prin. of Chem. I (Lab.) | 1 | CHEM 1108, Chem. II (Lab.) | 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 | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| 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 1308, Prin. of Physics I | 3 | PHYS 2301, Prin. of Phys. II | 3 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | PHYS 1106, Prin. of Phys. II (Lab.) | 1 |
| Foreign Language | 5 | Foreign Language | 5 |
| TOTAL | 18 | TOTAL | 18 |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| 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 | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| CHEM 4311, Phys. Chem. Biol. Sci. | 3 | CHEM 4314, Instrumental Analysis | 3 |
| †Social/Behavioral Science Elective | 3 | CHEM 4114, Instrumental Lab. | 1 |
| †Visual/Performing Arts Elective | 3 | CHEM 4312, Physical Biochemistry | 3 |
| †Oral Communication | 3 | †Humanities Elective | 3 |
| +Senior Elective | 3-4 | †English | 3 |
| TOTAL | 15-16 | +Senior Elective | 3-4 |
| | | TOTAL | 16-17 |

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.

+Course chosen from CHEM 4010 (3 hours), 4300, MBIO 4402, BIOL 3320,

4320, ZOOL 3405 or with consent of the undergraduate advisor.

†Select from Arts and Sciences General Degree Requirements.

Department of Classical and Modern Languages and Literatures

Frederick Suppe, Chairperson

Professor of Philosophy and Chairperson, Department of Classical and Modern Languages and Literatures, 2000. A.B., California (Riverside), 1962; A.M., Michigan, 1964; Ph.D., 1967.

Faculty

Beard, Laura Jean, Associate Professor, 1995. B.A., Carleton Coll., 1984; M.A., Johns Hopkins, 1989; Ph.D., 1994.

Bermudez, Bonita, Assistant Professor, 2002. B.A., Rutgers, 1983; M.A., Maryland, 1987; Ph.D., Indiana, 2001.

Bravo, Roberto, Associate Professor, 1971. Lic. Letras, Nuevo Leon (Mexico), 1964; M.L.S., Texas (Austin), 1969; Ph.D., Complutense (Madrid), 1978.

Cabrera, Eduardo C., Associate Professor, 1998. B.A., California State, 1990; M.A., 1992; Ph.D., California (Irvine), 1996.

Chávez, Eliverio, Assistant Professor, 1985. B.A., New Mexico, 1972; M.A.T.S., 1974; Ph.D., 1984.

Christiansen, Peder G., Professor and Chairperson, Department of Philosophy, 1963. B.A., Carroll, 1956; M.A., Wisconsin, 1957; Ph.D., 1963.

Collopy, Erin M., Assistant Professor, 1995. B.A., Arizona, 1986; M.A., 1989, Ph.D., Washington, 1998.

Connelly, Jill, Assistant Professor, 1999. B.A., Gettysburg Coll., 1992; M.A., Chicago, 1994; Ph.D., 2000.

Corbett, Stephen S., Assistant Professor, 1979. B.A., Brigham Young, 1973; M.A., 1975; Ph.D., Purdue, 1979.

Finco, Aldo, Finco Professor, 1968. B.A., Boston, 1955; M.A., Middlebury, 1963; D.M.L., 1967.

Fry, Ingrid E., Associate Professor, 1995. B.A., Smith Coll., 1985; M.A., Washington, 1988; Ph.D., 1994.

Gafaïti, Abdelhafid, Qualia Professor, 1995. M.A., U. of Kent, 1980; D.E.A., U. of Paris-Nord, 1984; Ph.D., 1994.

George, Edward V., Professor, 1971. B.A., Niagara, 1959; M.S. in Ed., Canisius, 1962; M.A., Wisconsin, 1962; Ph.D., 1966.

Gorsuch, Greta J., Assistant Professor, 1999. B.A., Iowa, 1983; M.A.T., School For Int'l Training, 1990; Ed.D., Temple U., 1999.

Grair, Charles Alan, Associate Professor, 1996. B.A., Northwestern, 1986; M.A., Washington, 1988; Ph.D., 1994.

Grinstein, Julia Bordiga, Assistant Professor, 2000. B.A., Maryland (College Park), 1985. 1988; M.A., 1989; Ph.D., Pennsylvania, 1996.

Holland, James Edward, Associate Professor, 1967. A.B., William Jewell, 1963; M.A., Washington, 1966; Ph.D., Missouri, 1976.

Hopkins, Patricia Mary, Assistant Professor, 1969. B.A., St. Joseph, 1962; Ph.D., Missouri (Columbia), 1969.

Larmour, David H. J., Professor, 1987. B.A., Queen's (Belfast), 1982; M.A., Illinois (Urbana-Champaign), 1984; Ph.D., 1987.

McClain, Meredith, Associate Professor, 1976. B.Mus., Oberlin, 1964; M.A., Texas, 1970; Ph.D., 1976.

McVay, Ted. E. Jr., Associate Professor, 1989. A.B., North Carolina, 1970; Auburn, M.H.S., 1976; B.S., 1978; Ph.D., Louisiana State, 1989.

Myers, Sharon A., Associate Professor, 1992. B.A., California (San Diego), 1980; M.A., Washington (Seattle), 1987; Ph.D., Florida, 1992.

Nell, Sharon Diane, Associate Professor and Director, Comparative Literature Program, 1993. B.A., Houston (Univ. Park), 1977; M.A., 1981; Ph.D., Rice, 1989.

Pérez, Alberto Julián, Associate Professor and Director, Latin American and Iberian Studies Program, 1995. M.Ph., New York, 1984; Ph.D., 1986.

Pérez, Genaro J., Professor, 1995. B.A., Louisiana State, 1967; M.A., Tulane, 1973; Ph.D., 1976.

Pérez, Janet W., Horn Professor and Qualia Chair, 1977. B.A., Missouri (Kansas City), 1955; M.A., Duke, 1957; Ph.D., 1961.

Qualin, Anthony J., Assistant Professor, 1994. B.A., San Diego State, 1988; M.A., Washington, 1992; Ph.D., 1996.

Santos, Jose A., Assistant Professor, 1999. B.A., Paris XII, 1979; M.A., Virginia, 1985; Ph.D., City U. New York, 1991.

Smith, Rosslyn M., Professor of Spanish and Linguistics; Director, Teaching, Learning, and Technology Center; and Vice Provost For Outreach and Extended Studies, 1979. B.A., New Mexico, 1968; M.A., Wisconsin, 1970; Ph.D., New Mexico, 1975.

Stein, Susan Isabel, Associate Professor, 1992. B.A., Kansas, 1979; M.A., California (Irvine), 1983; Ph.D., 1991.

Stratton, Lorum H., Associate Professor, 1969. B.A., Brigham Young, 1963; M.A., Arizona, 1967; Ph.D., 1971.

Wood, Diane Sylvia, Professor, 1976. B.A., Northern Iowa, 1968; M.A., 1971; Ph.D., Wisconsin, 1975.

Zamora, Jorge, Assistant Professor, 2001. J.D., Universidad Nacional Autonoma De Mexico, 1984; M.A., Texas Tech, 1994; Ph.D., 1999.

Emeritus Faculty

Alexander, Beatrice Witte, Associate Professor, Emeritus, 1945-1984.

Andrews, Norwood Henry Jr., Professor, Emeritus, 1970-2001.

Bacon, Thomas Ivey, Associate Professor, Emeritus, 1974-1996.

Bubresko, Peter Drago, Associate Professor, Emeritus, 1964-1977.

Cismaru, Alfred, Professor, Emeritus, 1970-1995.

Cravens, Sydney Paul, Associate Professor, Emeritus, 1972-2002.

Dietz, Donald Thaddeus, Professor, Emeritus, 1978-1993.

Goebel, Ulrich, Professor, Emeritus, 1979-2001.

Maxwell, Henry James, Professor, Emeritus, 1963-1989.

Oberhelman, Harley Dean, Horn Professor, Emeritus, 1958-1995.

Patterson, William Taylor, Professor, Emeritus, 1961-1995.

Zyla, Wolodymyr Taras, Professor, Emeritus, 1963-1986.

About the Program

This department supervises the following degree programs: CLASSICS, FRENCH, GERMAN, and SPANISH, *Bachelor of Arts*; APPLIED LINGUISTICS, CLASSICS, GERMAN, and ROMANCE LANGUAGES, *Master of Arts*; and SPANISH, *Doctor of Philosophy*. 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. 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. An undergraduate major in French or Spanish consists of 30 hours at the 2000 level and above, including a minimum of five 4000 level courses. The German major consists of 30 hours at the 2000 level and above. 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. Students pursuing teacher certification must replace Classics with advanced Latin to complete 24 hours specifically in Latin.

A minor may be obtained in Classics, French, German, Greek, Italian, Japanese, Latin, Linguistics, Portuguese, Russian, or Spanish. The minor consists of a minimum of 18 hours (20 hours if a 1502, 1507, or JAPN 1501 course is included). The following first-year courses may count towards the minor: GRK 1301, ITAL 1301, JAPN 1501, or PORT 1301. First-year courses 1502 or 1507, but not 1501, may count for a minor in French, German, Latin, Russian, or Spanish. A minor includes 9 hours of upper-level courses in the language, 3 hours of which must be at the 4000 level. A Classics minor consists of 18 hours from the courses designated above for a Classics major, including 6 hours at the 3000 level or above. A Linguistics minor consists of 18 hours of courses listed in the Linguistics section of this catalog. College Level Examination Program (CLEP) credits are accepted by the department.

Students wishing to obtain information on a major or minor in one of these languages should consult the department's academic program assistant for a list of advisors. These 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.

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 may be affiliated with Texas Tech, such as the University of the Americas in Puebla and other similar programs, are not considered as resident courses.

Study Abroad Courses. Students enrolled in Spanish can earn 6 hours of junior and/or senior level credit by either studying in Spain or 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. The following courses may not be used to fulfill the foreign language requirement for any bachelor's degree: GERM 4312, RUSN 2303, 3301, 3302, and 4301.

Foreign language courses 1301 and 1302 or 1501 and 1502 or 1507 are prerequisites for courses 2301 or 2607; a minimum grade of B in SPAN 1507 is required to enroll in SPAN 2607. All first- and second-year courses are sequential and should be taken in their proper order beginning with 1301, 1501, or 1507 and progressing up through 2302 or 2607. If credit is earned for 1507, no credit will be awarded for 1501 and/or 1502. Students with two years of high school French, German, or Spanish are required to enroll in FREN 1507, GERM 1507, or SPAN 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.

Instruction is offered in Russian language and literature with independent study available in Slavic and some East European and Central Asian subjects. For information on a B.A. degree or a minor in Russian Language and Area Studies, see the description of the program under "Arts and Sciences Special Programs." Students who studied Russian before coming to Texas Tech should consult the advisor in Russian to determine the level at which to register for further study.

Bachelor of Arts and Master of Business Administration. This is a program of great practical value, made possible by cooperation between this department and the College of Business Administration. While minoring in business, undergraduates may major in one of four languages—French, German, Russian Language and Area Studies, or Spanish. To complete the M.B.A., students must qualify for graduate admission to the College of Business Administration.

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 grade point average.

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 Laboratory in Room 19 of the Foreign Languages Building. 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

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, and linguistics. Areas of emphasis for classics include literature, comparative literature, and linguistics. 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 College of Business Administration section of this catalog.

Graduate minors 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 may minor outside the department or within the department in one of the above areas. The courses for the minor may also consist of a cluster of courses on a related topic taken in several departments.

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 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.

Department of Communication Studies

K. David Roach, Chairperson

Professor, 1991. B.S., Abilene Christian, 1982; M.S., 1985; Ed.D., Texas Tech, 1989.

Faculty

Gring, Mark A., Assistant Professor, 2001. B.S., Texas, 1983; M.A., 1986; Ph.D., Ohio State, 1993.

Harlow, William F., Assistant Professor and Director, Forensics, 2002. B.A., Angelo State, 1997; M.A., Texas (El Paso), 1999; Ph.D., Texas A&M, 2002.

Heuman, Amy N., Assistant Professor, 2003. B.A., Spring Arbor, 1995; M.A., Western Michigan, 1998; Ph.D., Bowling Green State, 2003.

Hughes, Patrick, Assistant Professor, 2000. B.S., Augustana Coll., 1994; M.A., Illinois State, 1996; Ph.D., U. Denver, 2000.

Neal, Melanie Waters, Lecturer, 1990. B.A., Texas Tech, 1975; M.A., 1978.

Olaniran, Bolanle A., Associate Professor, 1991. B.B.A., Central State, 1985; M.B.A., 1987; Ph.D., Oklahoma, 1991.

Punyanunt, Narissra M., Assistant Professor, 2002. B.A., Texas Tech, 1996; M.A., 1997; Ph.D., Kent State, 2002.

Scholl, Juliann C., Assistant Professor, 2002. B.A., Nebraska, 1994; M.A., Alabama, 1996; Ph.D., Oklahoma, 2000.

Shafer, Ric, Lecturer and Assistant Director of Forensics, 2001. B.S., Kansas State, 1997.

Stewart, Robert A., Professor and Associate Dean, College of Arts and Sciences, 1984. B.S., Lubbock Christian, 1980; M.A., Texas Tech, 1981; Ed.D., West Virginia, 1984.

Williams, David E., Associate Professor, 1991. B.A., Otterbein Coll., 1985; M.A., Northern Illinois, 1987; Ph.D., Ohio, 1990.

Emeritus Faculty

Bliese, John Ross Edward, Professor, Emeritus, 1986-2002.

Deethardt, John Fred Jr., Professor, Emeritus, 1968-1989.

Simpson, Vera Loie Jarrard, Associate Professor, Emeritus, 1964-1985.

About the Program

This department supervises the following degree programs: COMMUNICATION STUDIES, *Bachelor of Arts* and *Master of Arts*.

Undergraduate Program

Study in communication at Texas Tech is designed to prepare professionals for careers in business, industry, social service, and education. To accomplish this goal, 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 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. Entering freshmen and transfer students are admitted on a provisional basis. 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.

Department of Economics and Geography

Joseph E. King, Chairperson

Professor of History; Chairperson, Department of Economics and Geography; and Director, Center For Historic Preservation and Technology, 1970. B.A., Fordham, 1964; M.A., Illinois (Urbana-Champaign), 1965; Ph.D., 1971.

Faculty

Al-Hmoud, Rashid, Assistant Professor of Economics, 2000. B.Sc., Jordan, 1991; M.S., Texas Tech, 1992; Ph.D., 1994.

Barbato, Lucia, Instructor in Geography, 2000. B.A., California State, 1984; M.A., California (Los Angeles), 1988.

Becker, Klaus, Associate Professor of Economics, 1989. Volkswirt (Grad.), U. Hamburg, 1979; M.A., Kansas, 1980; Ph.D., 1987.

Carter, Perry, Assistant Professor of Geography, 2002. A.B., Georgia, 1983; M.A., 1986; Ph.D., Ohio State, 1998.

Carton, Joel D., Assistant Professor of Economics, 1999. B.A., Montana, 1994; M.S., Oregon, 1999; Ph.D., 1999.

De Silva, Dakshina, Assistant Professor of Economics, 2003. B.S., Radford, 1995; M.S., 1997; Ph.D., Oklahoma, 2002.

Edwards, Jeffrey, Assistant Professor of Economics, 2003. B.A., North Carolina, 1996; M.A., Virginia Polytechnic and State U., 2001; Ph.D., 2003.

Elbow, Gary Stewart, Professor of Geography, 1970. B.S., Oregon State, 1960; M.A., Oregon, 1964; Ph.D., Pittsburgh, 1972.

Ewing, Bradley T., Associate Professor of Economics, 1998. B.B.A., Kent State, 1987; M.A., 1991; Ph.D., Purdue, 1994.

Gilbert, Ronald D., Associate Professor of Economics, 1977. B.A., Oklahoma State, 1965; M.S., 1968; Ph.D., 1970.

Jones, Linda Lea, Instructor in Geography, 1990. B.A., San Diego State, 1979; M.A., California (Los Angeles), 1986.

Keen, Benjamin D., Assistant Professor of Economics, 2002. B.S., Miami U., 1993; M.A., 1994; Ph.D., Virginia, 2002.

Kruse, Jamie Brown, Professor of Economics, 1996. B.S., Nebraska, 1979; M.S. Colorado State, 1983; Ph.D., Arizona, 1988.

Lee, Jeffrey A., Associate Professor of Geography, 1988. B.A., California (Los Angeles), 1979; M.A., 1984; Ph.D., Arizona State, 1990.

McComb, Robert P., Associate Professor of Economics, 1991. B.A., Iowa, 1975; M.S., Illinois, 1984; Ph.D., 1989.

Mulligan, Kevin R., Assistant Professor of Geography, 1999. B.A., California (Los Angeles), 1979; M.A., 1985; Ph.D., Texas A&M, 1997.

Rahnama, Masha, Associate Professor of Economics, 1996. B.A., Tehran, 1977; M.A., Iowa State, 1981; Ph.D., 1988.

Salazar, Deborah Anne, Assistant Professor of Economics and Geography, 2001. B.A., San Diego State, 1987; M.A., 1990; Ph.D., Texas (Austin), 1995.

Steinmeier, Thomas L., Professor of Economics, 1982. B.A., Northwestern, 1969; Ph.D., Yale, 1975.

Templer, Otis Worth, Professor of Geography, 1968. B.S., Texas A&M, 1954; J.D., Texas (Austin), 1959; M.A., Southern Methodist, 1964; Ph.D., California (Los Angeles), 1969; Member State Bar (Texas).

Von Ende, Eleanor Theresa, Associate Professor of Economics, 1990. B.A., Kansas, 1979; M.A., 1982; Ph.D., 1990.

Emeritus Faculty

Butler, Charles Edward, Associate Professor of Economics, Emeritus, 1971-1991.

Davidson, Claude Monroe, Professor of Geography, Emeritus, 1969-1998.

Gilliam, John Charles, Professor of Economics, Emeritus, 1962-1992.

Hill, Lewis Edgar, Professor of Economics, Emeritus, 1967-2000.

Jonish, James E., Professor of Economics, Emeritus, 1973-1998.

Troub, Roger M., Professor of Economics, Emeritus, 1967-1997.

Walker, Harry Stuart, Associate Professor of Economics, Emeritus, 1953-1986.

Wittman, John, Professor of Economics, Emeritus, 1960-1990.

About the Program

This department supervises the following degree programs: **ECONOMICS**, *Bachelor of Arts*, *Bachelor of Science*, *Master of Arts*, *Doctor of Philosophy*; **INTERNATIONAL ECONOMICS**, *Bachelor of Science in International Economics*; **GEOGRAPHY**, *Bachelor of Arts*. 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 noneconomics 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 various phenomena are distributed and move over the surface of the earth. The B.A. degree is intended to provide students with a background in the nature of human interactions with the environment and a solid grounding in data collection and analysis techniques such as field data collection, statistical analysis, and geographic information systems. Due to its broad nature, geography is a minor that complements most majors, allowing the student to delve into the geographical aspects of his or her major field of study. Undergraduate majors find interesting careers in the public and private sectors. Geographers work with local, state, and national government agencies and the military. In the private sector, there are increasing demands by business and industry for employees trained in field research methods, geographic information systems, statistical analysis, remote sensing, and other skills acquired by geography students. Geography majors also become teachers at the elementary, secondary, and post-secondary levels. In addition, the undergraduate program provides a foundation for students who wish to pursue

graduate study, whether in geography or some related professional field such as urban or regional planning, environmental and resource management, law, and public affairs.

The geography major consists of 31 hours of 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 Geography, is open to seniors with a 3.0 GPA or better and may be substituted for 3 hours of courses in either of the blocks. Requirements for the minor are GEOG 1401, 2351, 3300, and 9 hours of upper division geography.

Students majoring in geography must complete a minimum of 12 semester hours of geography courses in residence at Texas Tech University. The geography minor requires at least 6 hours in residence.

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 from the department.

Graduate Program

Students seeking a degree in economics should consult with the graduate advisor or the chairperson of the department.

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.

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.

Department of English

Sam A. Dragger Jr., Chairperson

Professor and Chairperson, Department of English, 1989. B.A., Dayton, 1972; M.A., Ohio, 1976; Ph.D., 1982.

Faculty

Aycock, Wendell Marshall, Professor of English and Comparative Literature; Coordinator, Interdisciplinary Studies; and Associate Dean, Graduate School, 1969. B.A., Texas Tech, 1962; M.A., 1965; Ph.D., South Carolina, 1969.

Baake, Kenneth R., Assistant Professor, 2000. B.A., Maryland, 1978; M.S., Texas (El Paso), 1995; Ph.D., New Mexico State, 2000.

Baehr, Craig M., Assistant Professor, 2002. B.A., New Mexico, 1992; M.A., 1995; Ph.D., 2002.

Barker, Thomas T., Professor, 1982. B.A., Texas (Austin), 1971; M.A., 1973; Ph.D., 1980.

Baugh, Scott L., Assistant Professor, 2002. B.A., Texas (Arlington), 1994; M.A., Texas Tech, 1996; Ph.D., Oklahoma State, 2001.

Brown, Lady Falls, Lecturer and Director, University Writing Center, 1989. B.A., Texas Tech, 1964; M.A., Texas, 1968; Ph.D., Texas Tech, 1989.

Carter, Locke, Assistant Professor, 1998. B.A., Southern California, 1982; M.A., Texas, 1988; Ph.D., 1997; M.B.A., Texas, 2001.

Ceniza, Sherry, Associate Professor, 1990. B.A., North Texas State, 1960; M.A., Illinois, 1965; Ph.D., Iowa, 1990.

Chico, Tita, Assistant Professor, 1999. A.B., Vassar Coll., 1991; M.A., 1994, Ph.D., New York, 1998.

Clarke, Bruce C., Professor of English and Graduate Advisor, Comparative Literature Program, 1982. B.A., Columbia, 1974; Ph.D., State U. of New York At Buffalo, 1980.

Conrad, Bryce D., Associate Professor, 1990. B.A., California State, 1975; M.A., 1978; Ph.D., Iowa, 1988.

Couch, Julie Nelson, Assistant Professor, 2002. B.A., Baylor, 1985; M.A., 1990, Ph.D., Brown, 2000.

Crowell, Douglas E., Associate Professor, 1981. B.A., Rice, 1974; M.A., Johns Hopkins, 1976; Ph.D., State U. of New York At Buffalo, 1981.

Daghistany, Ann Abernathy, Associate Professor, 1972. B.A., Boston, 1963; Ph.D., Southern California, 1971.

Desens, Marliss, Associate Professor, 1995. B.A., California (Los Angeles), 1978; M.A., 1980; Ph.D., 1989.

Duke, Cheryl L., Lecturer, 1984. B.A., McMurry, 1976; M.A., Texas Tech, 1983.

Fitzgerald, Colleen M., Assistant Professor, 2002. B.A., Loyola, 1991; M.A., Arizona, 1994; Ph.D., 1997.

Grass, Sean C., Assistant Professor, 2001. B.A., Bucknell, 1993; M.A., Pennsylvania State, 1996, Ph.D., 1999.

Heise, Jürgen Uwe, Lecturer, 1985. B.A., Trier (W. Germany), 1976; M.A., Texas Tech, 1981.

Hiemstra, Anne, Lecturer, 1995. B.A., Calvin Coll., 1980; M.A., California State U. (Fresno), 1982; Ph.D., Columbia U. (New York), 1996.

Hurst, Mary Jane, Professor of English and Associate Dean, College of Arts and Sciences, 1986. B.A., Miami U. of Ohio, 1974; M.A., 1980; Ph.D., Maryland, 1986.

Jones, Stephen G., Assistant Professor, 2000. B.A., Texas Tech, 1994; M.A., North Texas, 1996; Ph.D., Florida State, 1998.

Kemp, Fred O., Associate Professor, 1988. B.A., Texas (Austin), 1972; M.A., East Texas State, 1984; Ph.D., Texas (Austin), 1988.

Kimball, Miles A., Assistant Professor, 2002. B.A., Wayland Baptist, 1986; M.A., Baylor, 1990; Ph.D., Kentucky, 1997.

Koerber, Amy L., Assistant Professor, 2002. B.S., Georgetown, 1990; M.A., South Dakota, 1996; Ph.D., Minnesota, 2002.

Kuriyama, Constance B., Professor, 1982. B.A., Indiana, 1964; M.A., California (Berkeley), 1966; Ph.D., 1973.

Lang, Susan, Assistant Professor, 1999. B.A., Ohio State, 1987; M.A., 1989; Ph.D., Emory, 1992.

Manriquez, Betty Jean, Assistant Professor, 1999. B.S., Texas (El Paso), 1981; M.A., 1985; Ph.D., Arizona State, 1998.

McFadden, Brian J., Assistant Professor, 1999. B.A., Kenyon College, 1990; M.A., Notre Dame, 1995; Ph.D., 1999.

McLaughlin, Sara P., Visiting Assistant Professor, 1984. B.A., Texas Tech, 1977; M.A., West Texas A&M, 1982.

McLean, Jacqueline, Lecturer, 2000. B.A., Chicago, 1989; M.A., 1991; Ph.D., New York, 1996.

Miner, Madonne M., Professor, 1997. B.A., Macalester Coll., 1975; M.A., Minnesota, 1978; Ph.D., State U. of New York (Buffalo), 1982.

Myers, Peter R., Lecturer, 1985. B.A., Texas Tech, 1979; M.A., 1985.

Patterson, Leslie Jill, Associate Professor, 1993. B.A., Abilene Christian, 1987; M.A., Texas A&M, 1989; Ph.D., Oklahoma State.

Poch, John, Assistant Professor, 2001. B.A., Georgia State, 1992; M.F.A., Florida (Gainesville), 1997; Ph.D., North Texas, 2000.

Purinton, Marjean D., Associate Professor, 1995. B.A., Tulsa, 1975; M.A., Oklahoma, 1977; Ph.D., Texas A&M, 1991.

Rice, Rich, Assistant Professor, 2002. B.A., Portland State, 1994; M.Ed., 1997; M.A., 1997; Ph.D., Ball State, 2002.

Rickly, Rebecca, Associate Professor, 1998. B.S., Ohio State, 1982; M.A., 1986; Ph.D., Ball State, 1995.

Rossini, Jon D., Assistant Professor, 2000. B.A., Cincinnati, 1993; Ph.D., Duke, 1999.

Rude, Carolyn D., Professor, 1981. A.B., Grove City, 1967; A.M., Illinois, 1969; Ph.D., 1975.

Rude, Donald W., Professor, 1971. B.A., Wichita State, 1959; M.A., 1961; Ph.D., Illinois, 1971.

Rylander, Elizabeth Anne, Lecturer, 1973. B.A., Texas Christian, 1965; M.A., Texas Tech, 1969.

Sadowski-Smith, Claudia, Assistant Professor, 2002. B.A., Leipzig, 1990; M.A., 1994; Ph.D., Delaware, 1998.

Samson, John William, Associate Professor, 1982. B.S., Bemidji State, 1975; M.A., Cornell, 1978; Ph.D., 1980.

Schoenecke, Michael K., Associate Professor, 1981. B.A., Central State, 1971; M.A., 1974; Ph.D., Oklahoma State, 1979.

Shelton, Jennifer L., Assistant Professor, 2001. B.A., Agnes Scott Coll., 1984; M.S., Northwestern, 1985; M.A., Vanderbilt, 1991; Ph.D., 1995.

Shu, Yuan, Assistant Professor, 2000. B.A., Nanjing, 1983; M.A., Indiana, 1991; Ph.D., 1999.

Wenthe, William J., Associate Professor, 1992. B.A., Holy Cross, 1979; M.A., Virginia, 1985; Ph.D., 1992.

Whitlark, James S., Professor, 1979. B.A., Wayne State, 1971; M.A., 1973; Ph.D., Chicago, 1976.

Emeritus Faculty

Brewer, Charles William, Associate Professor, Emeritus, 1972-1996.

Brewer, Mary Louise, Associate Professor, Emeritus, 1941-1973.

Crider, John Richard, Associate Professor, Emeritus, 1966-1996.

Culp, James William, Professor, Emeritus, 1967-1984.

Davis, Dale Waverly, Associate Professor, Emeritus, 1968-1999.

Davis, Kenneth Waldron, Professor, Emeritus, 1960-1994.

Eddleman, Floyd Eugene, Professor, Emeritus, 1958-1990.

Gilbert, Beverly Brian, Associate Professor, Emeritus, 1961-1993.

Higdon, David Leon, Horn Professor, Emeritus, 1971-2001.

Langford, Thomas Alexander, Professor and Dean, Graduate School, Emeritus, 1961-2001.

McBride, Mary Fletcher, Associate Professor, Emeritus, 1972-1992.

McCullen, Joseph Thomas Jr., Professor, Emeritus, 1949-1980.

McDonald, Walter Robert, Horn Professor, Emeritus, 1971-2002.

Mogan, Joseph John, Professor, Emeritus, 1966-1996.

Nall, Kline Allen, Professor, Emeritus, 1944-1980.

Shaw, Patrick Wilbert, Professor, Emeritus, 1972-2002.

Wages, Jack Douglas, Professor, Emeritus, 1968-1999.

About the Program

This department supervises the following degree programs: ENGLISH, *Bachelor of Arts, Master of Arts, and Doctor of Philosophy*; TECHNICAL COMMUNICATION, *Master of Arts; TECHNICAL COMMUNICATION AND RHETORIC, Doctor of Philosophy*. 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. To support these five programs, the English department has developed networked computer classrooms where students benefit from the latest technology-based instructional methods. It also has a usability testing laboratory.

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 three international journals—*Conradiana, The Eighteenth Century: Theory and Interpretation, and The Iron Horse Review*.

English majors and minors should report to the undergraduate advisor for academic advice. Graduate students report to the Director of Graduate Studies. Undergraduate and graduate specialists report to the Director of Undergraduate Studies in technical communication. Graduate students in technical communication and rhetoric report to the Director of Graduate Studies in Technical Communication-Rhetoric.

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, technical communication, comparative literature, etc.) may do so by taking their three advanced courses in the appropriate area. For electives, students who have completed their degree requirements in English may select any 3000- or 4000-level course. 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 English courses that they may be required to take.

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 SPCE 0302 or the TASP test before they take ENGL 1301. Although SPCE 0302 is recorded 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 computed in the student's grade point average. This course counts for TASP writing skills development provided the student has met with an advisor in the TASP Skills Development Office in Holden Hall 72. TASP students who have not passed the writing portion of the TASP Test may not enroll in ENGL 1301 or 1302 until they have successfully completed their prescribed program of TASP writing skills development.

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 lan-

guage. 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 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. Two additional 3000-level courses

II. 4000 level

- A. ENGL 4301
- B. One genre course: ENGL 4311, 4312, 4313, 4314, or 4315
- C. ENGL 4374
- D. One additional 4000-level course

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.

Required courses:

- I. ENGL 1301, 1302, and a 2000-level literature course (ENGL 2305, 2306, 2307, or 2308)
- II. Technical communication core courses: ENGL 2311, 3365, 4366, 4367, and 3367 or 3368
- III. One course from these options so long as it is not taken to satisfy other requirements: ENGL 3366, 3367, 3368, 4365, 4378
- IV. One course selected from these three: ENGL 3366, 3371, or 3373
- V. One additional advanced English elective (3000 level or above)
- VI. Oral communication: COMS 3332, 3355, 3358, or 3359

Creative Writing Specialization

The major in English with a specialization in creative writing is designed for students wishing to write fiction 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 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. Undergraduates must obtain permission to specialize

in creative writing after they have completed ENGL 3351, Creative Writing. 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

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 the Web site 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 spe-

cialization 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 on-line. 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 the program Web site at english.ttu.edu/tc/DL for details of degree requirements and the course schedule.

Department of Environmental Toxicology

Ronald J. Kendall, Chairperson

Professor and Director of the Institute of Environmental and Human Health, 1997. B.S., South Carolina, 1974; M.S., Clemson, 1976; Ph.D., Virginia Polytech. Inst. and State U., 1980.

Faculty

Anderson, Todd A., Associate Professor, 1997. B.S., Peru State, 1986; M.S., Tennessee, 1988; Ph.D., 1991

Cobb, George P., Associate Professor, 1997. B.S., Coll. Charleston, 1982; Ph.D., South Florida, 1989.

Cox, Stephan B., Assistant Professor, 2002. B.S., Texas Tech, 1993; Ph.D., 1999.

Dixon, Kenneth R., Professor, 1997. B.S.F., Florida, 1964; M.S.F., 1968; Ph.D., Michigan, 1974.

Hooper, Michael J., Associate Professor, 1997. B.S., California Polytechnic, 1980; Ph.D., California (Davis), 1988.

McMurry, Scott T., Assistant Professor, 1997. B.S., Oklahoma State, 1982; M.S., 1989; Ph.D., 1993.

Presley, Steven M., Associate Professor and Research Coordinator, ADM Zumwalt National Program for Countermeasures to Biological and Chemical Threats, 2002. B.S., Texas Tech, 1982; M.S., Oklahoma State, 1984; M.M.S., USMC U., 1996; Ph.D., Oklahoma State, 1987.

Ramkumar, Seshadri, Research Associate, 2002. B.Tech., Anna Univ. (India), 1992; M.Tech., 1994; P.G.D.B.A., Annamalai Univ. (India), 1994; Ph.D., Leeds (England), 1998; Chartered Physicist, Inst. Of Physics (London), 2000.

Smith, Ernest E., Assistant Professor, 1997. B.S., Prairie View A&M, 1983; Ph.D., Texas A&M, 1989.

Smith, Phillip N., Assistant Professor, 2002. B.S., Murray State, 1989; Ph.D., Texas Tech, 2000.

Theodorakis, Christopher W., Assistant Professor, 1999. B.S., Illinois, 1984; M.S., Ohio State, 1988; Ph.D., Tennessee, 1994.

Wang, Jia-Sheng, Associate Professor, 2000. M.B., Shanghai First Medical College, 1978; M.D., 1982; Ph.D., Boston, 1994.

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, strong background in the natural, physical, or health sciences will provide the necessary preparation. Students interested in pursuing a degree must complete applications to the Graduate School at www.ttu.edu/gradschool and 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.

About the Program

This department offers study in the following graduate degree programs: ENVIRONMENTAL TOXICOLOGY, *Master of Science* and *Doctor of Philosophy*. 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 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 preparatory work for completion of these courses. Interested students should contact faculty within the department.

Department of Geosciences

Richard Emil Peterson, Chairperson

Professor, 1973. B.S., California Inst. of Technology, 1963; M.S., Chicago, 1964; Ph.D., Missouri, 1971.

Faculty

Asquith, George B., Professor and Pevehouse Chair of Petroleum Geology, 1988. B.S., Texas Tech, 1961; M.S. Wisconsin-Madison, 1963; Ph.D., 1966.

Barnes, Calvin Glenn, Professor of Geosciences, 1982. B.S., Nebraska (Lincoln), 1975; M.S., Oregon, 1978; Ph.D., 1982.

Barrick, James E., Professor of Geosciences, 1980. B.S., Ohio State, 1973; M.S., Iowa, 1975; Ph.D., 1978.

Chang, Chia-Bo, Associate Professor of Atmospheric Science, 1984. B.S., National Taiwan, 1966; M.S., South Dakota School of Mines, 1970; Ph.D., Florida State, 1980.

Chatterjee, Sankar, Horn Professor of Geology and Museum Science and Curator of Vertebrate Paleontology, 1979. B.S., Jadavpur (Calcutta), 1962; M.S., 1964; Ph.D., Calcutta U., 1970.

Doggett, Arthur L. IV, Assistant Professor of Atmospheric Science, 1997. B.A., Lyndon State, 1990; M.S., Texas Tech, 1992; Ph.D., 1996.

Gill, Thomas E., Research Assistant Professor of Geosciences and Civil Engineering, 1996. B.S., California (Davis), 1984; Ph.D., 1995.

Gurrola, Harold, Associate Professor of Geosciences, 1995. B.S., Texas (El Paso), 1983; M.S., 1987; Ph.D., Scripps Inst., 1995.

Güven, Necip, Professor of Geosciences, 1972. Ph.D., Göttingen, Germany, 1962.

Haragan, Donald R., Professor of Honors and Geosciences and Interim President, 1969. B.S., Texas, 1959; M.S., Texas A&M, 1960; Ph.D., Texas, 1969.

Johnson, Kenneth S., Adjunct Faculty in Geosciences, 1996. B.S., Ohio State, 1987; M.S., Texas Tech, 1991; Ph.D., 1995.

Karlsson, Haraldur Runar, Associate Professor of Geosciences, 1991. B.S., Iceland, 1978; Ph.D., Chicago, 1988.

Leary, Colleen Ann, Professor of Atmospheric Science, 1978. S.B., Massachusetts Inst. of Technology, 1970; S.M., 1973; Ph.D., Washington, 1978.

Lehman, Thomas M., Professor of Geosciences, 1985. B.S., New Mexico, 1978; M.A., Texas (Austin), 1982; Ph.D., 1985.

Nagihara, Seiichi, Assistant Professor of Geosciences, 2000. B.S., Chiba, 1985; M.S., 1987; Ph.D., Texas, 1992.

Ridley, Moira, Assistant Professor of Geosciences, 1998. B.S., Capetown, 1987; M.S., 1992; Ph.D., Nebraska, 1997.

Schroeder, John L., Assistant Professor of Atmospheric Science, 2001. B.S., Missouri (Rolla), 1994; M.S., Texas Tech, 1997; Ph.D., 1999.

Yoshinobu, Aaron, Assistant Professor of Geosciences, 1999. B.S., San Diego State, 1992; M.S., 1994; Ph.D., Southern California, 1999.

Emeritus Faculty

Cebull, Stanley Edward, Professor, Emeritus, 1969-1999.

Jacka, Alonzo D., Professor, Emeritus, 1959-1997.

Mattox, Richard Benjamin, Professor, Emeritus, 1954-1982.

Murray, Grover Elmer, Professor and President, Emeritus, 1966-1988.

Reeves, Corwin C. Jr., Professor, Emeritus, 1957-1995.

Shurbet, Deskin Hunt Jr., Professor, Emeritus, 1956-1994.

About the Program

This department supervises the following degree programs: GEOSCIENCES, *Bachelor of Arts, Bachelor of Science, Master of Science, Doctor of Philosophy*; ATMOSPHERIC SCIENCE, *Master of Science*. 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. The specialization requires GEOL 1303, 1101, 1304, 1102, 2305, 3310, 3402, 3421; G PH (two of the following) 4300, 4322, 4323; CHEM 1307, 1107; PHYS 1308, 1105, 2301, 1106, 4304; MATH 1351, 1352, 2350; an additional 12 hours of approved electives (at least 6 hours must be in physics, engineering, or mathematics); and a senior research project, GEOL 4312. The minor must be in a field of science, mathematics, engineering, or an approved composite of courses from these fields.

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 4 hours of junior-senior level geosciences electives, and a senior research project, GEOL 4312. Adjunct requirements include MATH 1321; CHEM 1307, 1107, 1308, 1108; PHYS 1306, 1103, 1307, 1104. 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 | | | |
|------------------------------------|-------------|------------|-------------------------------------|--------|----|
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| 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 | | | |
|-----------------------------------|-------------|-------------|-------------------------------|--------|----|
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| GEOL 2305, Intro. Crystal. & Min. | | 3 | GEOL 3421, Petrology | | 4 |
| †Oral Communication | | 3 | GEOL 4320, Optical Mineralogy | | 3 |
| Physics | | 3 | Physics | | 3 |
| Physics Lab. | | 1 | Physics Lab. | | 1 |
| Foreign Language | | 5 | Foreign Language | | 5 |
| TOTAL | | 15 | TOTAL | | 16 |

| | | THIRD YEAR | | | |
|--|-------------|------------|----------------------|--------|-------|
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| 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 | | | |
|--------------------------------------|-------------|-------------|-----------------------------------|--------|-------|
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| Geosciences Elective | | 3-4 | Geosciences Elective | | 3-4 |
| +Minor | | 3-4 | GEOL 4312, Undergraduate Research | | 3 |
| +Minor | | 3-4 | +Minor | | 3-4 |
| POLS 1301, Amer. Govt. Org. | | 3 | POLS 2302, Amer. Pub. Policy | | 3 |
| †Social or Behavioral Science 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 1308, 1105, 2301, 1106; OR PHYS 1306, 1103, 1307, 1104

+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.

Department of Health, Exercise, and Sport Sciences

T. Gilmour Reeve, Chairperson

Professor, 1999. B.S., Texas Tech, 1969; M.Ed., 1972; Ph.D., Texas A&M, 1976.

Faculty

Arterburn, Joyce A. Davis, Assistant Professor,

1959. B.S. in Ed., Texas Tech, 1954; M.Ed., 1966.

Bixby, Walter R., Assistant Professor, 2002.

B.S., Bridgewater State, 1995; M.S., Maryland, 1999; Ph.D., 2002.

Dickin, D. Clark, Assistant Professor, 2001.

B.P.E., Calgary, 1993; M.S., Nevada (Las Vegas), 1996.

Dornier, Lanie A., Associate Professor, 1990.

B.S., Louisiana State, 1984; M.S., Auburn, 1986; Ph.D., 1990.

Griffin, Kent, Instructor, 2000. B.A., Lubbock

Christian, 1984; M.S., Texas Tech, 1999.

Hall, Elizabeth Ray, Associate Professor of

Health, Exercise, and Sport Sciences and Vice

Provost, 1981. B.S., North Texas State, 1972;

M.A., 1979; Ph.D., Texas Woman's, 1981.

James, C. Roger, Associate Professor, 1995.

B.S., Southwest Missouri State, 1988; M.S.,

Oregon, 1991; Ph.D., 1996.

Lochbaum, Marc R., Assistant Professor, 2000.

B.S., Illinois, 1991; M.S., North Carolina

(Greensboro), 1993; Ph.D., Arizona State, 1998.

Massey-Stokes, Marilyn, Associate Professor,

1995. B.S., Southwestern Oklahoma State, 1980;

M.Ed., 1987; Ed.D., Oklahoma State, 1991.

McComb, Jacalyn J., Associate Professor, 1989.

B.S., Southeast Missouri State, 1977; B.S.,

Florida Southern, 1982; M.A.T., Southeast

Missouri State, 1984; Ph.D., Mississippi, 1989.

Meaney, Karen S., Associate Professor, 1991.

B.S., Dayton, 1979; M.Ed., Houston, 1988;

Ed.D., 1991.

Miller, John J., Assistant Professor, 2000. B.A.,

Wisconsin (Oshkosh), 1980; M.A., Minnesota,

1983; Ph.D., New Mexico, 1994.

Reeve, Sandra W., Instructor, 2000. B.S., Kent

State, 1975; M.Ed., Auburn, 1991.

Roncesvalles, Maria Nida, Assistant Professors,

2001. B.S., Philippines, 1983; D.P.E., 1985; M.S.,

1990; M.S., Oregon, 1993; Ph.D., 1997.

Scheuermann, Barry W., Assistant Professor,

2001. B.A., Western Ontario, 1992; Ph.D., 1998.

Smucker, Michael K., Assistant Professor,

2001. B.S., Dayton, 1991; M.S.S., U.S. Sports

Academy, 1995; Ph.D., Florida State, 2001.

Tacón, Anna M., Assistant Professor, 1999.

B.S., Florida State, 1988; M.S., 1991; Ph.D.,

Texas Tech, 1998.

Williams, James S., Assistant Professor, 2000.

B.S., Lamar, 1979; M.S., Texas (Tyler), 1983;

Ph.D., Texas A&M, 1997.

Emeritus Faculty

Mason, Danny Raymond, Associate Professor, Emeritus, 1964-2000.
Philbrick, George Rex, Professor, Emeritus, 1941-1979.
McNally, James Faber, Associate Professor, Emeritus, 1952-1989.
Cobb, John William, Professor, Emeritus, 1977-1993.
Wilson, Margaret Eileen, Professor, Emeritus, 1965-1990.
McIntyre, Martin Hugh, Professor, Emeritus, 1976-1994.
Owens, Mary Lydia Seymour, Professor, Emeritus, 1969-1999.
Knipping, Paul Arthur, Associate Professor, Emeritus, 1976-1993.
Kireilis, Ramon Walter, Professor, Emeritus, 1950-1979.
Rogers, Ruth Marie, Professor, Emeritus, 1971-1989.
Williams, Peggy Jean, Associate Professor, Emeritus, 1962-1993.

About the Program

This department supervises the following degree programs: EXERCISE AND SPORT SCIENCES, *Bachelor of Arts* and *Bachelor of Science*; HEALTH, *Bachelor of Science*; EXERCISE AND SPORT SCIENCES and SPORTS HEALTH, *Master of Science*. 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, 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.

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, American 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 1303/110 | 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 | COMS 2300, COMS 3358 or HDFS 2320 | 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 Tchng 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, Student Teaching Sec. | 3 |
| ESS 4345, Assess. of Phys.I Per. | 3 | EDEL 4000, Student 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.

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, 3358, or HDFS 2320 | 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 Psyc. | 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.

Exercise Science Track

The exercise science track provides students an opportunity for concentrated study in the scientific foundations of exercise and physical activity. Students are prepared for advanced graduate study in biomechanical, physiological, and psychological aspects of exercise. Students pursuing entry into allied health programs (e.g., physical therapy, occupational therapy, medical school) may select this track. Students interested in admission to allied health programs must consult with the departmental advisor regarding prerequisites for those programs.

| FIRST YEAR | | | |
|------------------------------------|----|-----------------------------------|----|
| Fall | | Spring | |
| ENGL 1301, Ess. 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, COMS 3358, or HDF5 2320 | 3 | ZOOL 2403 Human An. & Phys. I | 4 |
| TOTAL | 16 | TOTAL | 16 |
| SECOND YEAR | | | |
| Fall | | Spring | |
| 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 | | | |
| Fall | | Spring | |
| ESS 3303, Motor Learning | 3 | ESS 3314, Life Span Motor Dev. | 3 |
| ESS 3305, Exercise Physiology | 3 | ESS 4392, Res. Methods in ESS | 3 |
| ESS 3318, Exercise & Sport Psyc. | 3 | Major, minor, or electives | 9 |
| Major, minor, or electives | 8 | TOTAL | 15 |
| TOTAL | 17 | TOTAL | 17 |
| FOURTH YEAR | | | |
| Fall | | Spring | |
| ESS major | 6 | ESS major | 6 |
| Major, minor, or electives | 9 | Major, minor, or electives | 9 |
| TOTAL | 15 | TOTAL | 15 |

Exercise Science 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 & 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.

Minor in Exercise and Sport Sciences

The minor in Exercise and Sport Sciences requires a minimum of 18 hours in ESS courses with at least 12 hours from 3000-level or above ESS courses. No more than 3 hours from ESS 4000 may be counted. Six credit hours of ESS courses required in residency. See departmental advisor for additional information and completion of minor on degree plan.

Sport Studies Track

The sport studies track provides for the study of interdisciplinary ideas, concepts, and issues related to sport and physical activity from social and cultural perspectives. Upon graduation, students may pursue management and/or coaching opportunities in youth, intercollegiate, or professional sports. Additionally, students may pursue the advanced study of sport at the graduate level. Students interested in coaching interscholastic (junior/high school) sports should pursue teacher certification through the PETE track.

| FIRST YEAR | | | |
|-----------------------------------|----|-----------------------------------|----|
| Fall | | Spring | |
| ENGL 1301, Ess. 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 or HDF5 2320 | 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 | TOTAL | 16 |
| SECOND YEAR | | | |
| Fall | | Spring | |
| 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 | | | |
| Fall | | Spring | |
| ESS 3303, Motor Learning | 3 | ESS 3314, Life Span Motor Dev. | 3 |
| ESS 3305, Exercise Physiology | 3 | Major, minor, or electives | 12 |
| ESS 3318, Exercise & Sport Psyc. | 3 | TOTAL | 15 |
| Major, minor, or elective | 8 | TOTAL | 15 |
| TOTAL | 17 | TOTAL | 17 |
| FOURTH YEAR | | | |
| Fall | | Spring | |
| ESS Major | 6 | ESS Major | 6 |
| Major, minor, or electives | 9 | Major, minor, or electives | 9 |
| TOTAL | 15 | TOTAL | 15 |

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.

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: ZOOL 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.

Bachelor of Science, Health

Students interested in careers in community or school health should choose to major in health. The major in health requires 48 hours. The two tracks in this major are the community health track and the school health track.

School Health Track

The school health track prepares students for careers in teaching health in EC-12 schools. A 2.5 GPA is required to enroll in teacher education courses. Also, students must meet other requirements outlined by the College of Education.

| FIRST YEAR | | | |
|--|----|--------------------------------------|----|
| Fall | | Spring | |
| ENGL 1301, Ess. 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 or HDFS 2320 | 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. in 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, Literacy 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, Student Teaching Sec. | 3 |
| HLTH 4330, Coord. School Hlth Prog | 3 | EDEL 4000, Student Teaching in 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, HLTH 2307, HLTH 3301, HLTH 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 and Sciences degree requirements must be satisfied.

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.

Community Health Track

The community health track prepares students for careers in public and private agencies that provide health information and interventions to a variety of individuals and groups.

| FIRST YEAR | | | |
|--|----|---------------------------------|----|
| Fall | | Spring | |
| ENGL 1301, Ess. of Coll. Rhetoric | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| MATH 1320, 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 | HLTH 1302, Foun. of Health | 3 |
| | | TOTAL | 17 |
| SECOND YEAR | | | |
| Fall | | Spring | |
| ENGL 23— | 3 | ENGL 23— | 3 |
| Foreign Language | 3 | Foreign Language | 3 |
| COMS 2300 or HDFS 2320 | 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 | | | |
| Fall | | Spring | |
| 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 | | | |
| Fall | | Spring | |
| HLTH 4307, Prog Plan and Eval. | 3 | HLTH 4475, Inter. in Com Health | 4 |
| HLTH 4312, Psychosocial Health | 3 | Minor | 3 |
| ESS 3314 or PSY 4330 | 3 | Elective | 3 |
| Elective | 3 | TOTAL | 10 |
| Minor | 6 | | |
| TOTAL | 18 | | |

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.

Graduate Program

The M.S. degree 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 M.S. degree in sports health is an interdisciplinary program offered in conjunction with the Health Sciences Center. Students in the sports health program may specialize in clinical exercise physiology or preventive and rehabilitative sports health. The program requires at least 42 hours of graduate work. Thesis and nonthesis options are available. A complete description of the sports health program appears in the section of this catalog entitled "Opportunities for Interdisciplinary Study."

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.

Department of History

Bruce C. Daniels, Chairperson

Professor and Chairperson, Department of History, 2001. A.B., Syracuse, 1964; M.A., Connecticut, 1967; Ph.D., 1970.

Faculty

Adams, Gretchen, Assistant Professor, 2002. B.A., Oregon, 1994; M.A., 1996; Ph.D., New Hampshire, 2001.

Alford, Kwamé, Assistant Professor, 2000. B.S., Morgan State, 1979; M.A., 1994; Ph.D., Missouri (Columbia), 1998.

Ashby-Martin, Christina M., Lecturer, 2000. B.F.A., New Mexico, 1984; M.A., California (Riverside), 1987; Ph.D., Bowling Green State, 1998.

Barr, C. Alwyn, Professor, 1969. B.A., Texas (Austin), 1959; M.A., 1961; Ph.D., 1966.

Bell, Gary M., Professor of History; Dean, Honors College; and Associate Vice Provost, 1993. B.A., Brigham Young, 1966; M.A., 1968; Ph.D., California (Los Angeles), 1974.

Brink, James Eastgate, Associate Professor of History and Honors and Vice Provost, 1976. B.A., Kansas, 1967; M.A., Washington, 1970; Ph.D., 1974.

Carlson, Paul H., Professor, 1985. B.A., Dakota Wesleyan, 1962; M.S., Minnesota State (Mankato), 1967; Ph.D., Texas Tech, 1973.

D'Amico, Stefano, Assistant Professor, 1999. M.A., Università degli Studi di Milano, Istituto di Studi di Storia Medievale e Moderna, 1988; Ph.D., 1993.

Deslandes, Paul R., Assistant Professor, 1999. B.A., Trinity Coll., 1987; M.A., Toronto, 1989; Ph.D., 1996.

Forsythe, Gary, Assistant Professor, 2000. B.A., Illinois, 1975; M.A., 1979; Ph.D., Pennsylvania, 1984.

Gray, William Glenn, Assistant Professor, 2000. B.A., Princeton, 1992; Ph.D., Yale, 1999.

Howe, John McDonald, Professor, 1981. B.A., San Francisco, 1969; M.A., California (Los Angeles), 1971; Ph.D., 1979.

Iber, Jorge, Associate Professor of History and Director, Ethnic Studies Program, 1997. B.A., St. Thomas of Villanova (Florida), 1984; M.A., Utah, 1995; Ph.D., 1997.

King, Joseph E., Professor of History; Chairperson, Department of Economics and Geography; and Director, Center For Historic Preservation and Technology, 1970. B.A., Fordham, 1964; M.A., Illinois (Urbana-Champaign), 1965; Ph.D., 1971.

Kuethe, Allan James, Horn Professor, 1967. B.A., Iowa, 1962; M.A., Florida, 1963; Ph.D., 1967.

Lorcin, Patricia M. E., Assistant Professor, 2000. B.A., SUNY College, 1982; M.A., 1984; Ph.D., Columbia, 1992.

McBee, Randy D., Assistant Professor, 1998. A.B., Missouri (Columbia), 1989; M.A., 1991; Ph.D., 1996.

Miller, M. Catherine, Associate Professor, 1984. B.A., California (San Diego), 1971; M.A., San Diego State, 1974; Ph.D., California (San Diego), 1982.

Mosher, Jeffrey Carl, Assistant Professor, 1998. B.A., Emory, 1981; M.A., Georgetown, 1987; Ph.D., Florida, 1996.

Pelley, Patricia M., Associate Professor, 1995. B.A., Cornell, 1985; M.A., 1989; Ph.D., 1993.

Rainger, Ronald, Professor, 1984. B.A., Willamette, 1971; M.A., Utah, 1976; M.A., Indiana, 1977; Ph.D., 1982.

Reckner, James R., Associate Professor of History and Director, Vietnam Center, 1988. B.A., Auckland (New Zealand), 1981; M.A., 1982; Ph.D., 1985.

Snead, David Lindsey, Assistant Professor, 1999. B.A., Virginia Tech, 1990; M.A., 1991; Ph.D., Virginia, 1997.

Steinhart, Edward I., Associate Professor, 1984. B.A., City Coll. of New York, 1963; M.A., California (Los Angeles), 1965; Ph.D., Northwestern, 1971.

Stoll, Mark R., Associate Professor, 1997. B.A., Rice, 1977; Ph.D., Texas (Austin), 1993.

Troyansky, David G., Associate Professor, 1984. B.A., Carleton, 1976; M.A., Brandeis, 1978; Ph.D., 1983.

Walker, Donald Roy, Associate Professor, 1987. B.A., Texas (Austin), 1969; M.A., Lamar, 1974; Ph.D., Texas Tech, 1983.

Willett, Julie A., Associate Professor, 1997. A.B., Missouri (Columbia), 1989; M.A., 1992; Ph.D., 1996.

Wong, Aliza S., Assistant Professor, 2001. B.A., Amherst College, 1994; M.A., Colorado, 1997; Ph.D., 2001.

Emeritus Faculty

Blaisdell, Lowell Lawrence, Professor of History, Emeritus, 1957-1990.

Blakeley, Brian Layton, Professor of History, Emeritus, 1970-1999.

Chong, Key Ray, Associate Professor of History, Emeritus, 1970-1995.

Flynn, George Quitman, Professor of History, Emeritus, 1974-1999.

Harper, James William, Associate Professor of History, Emeritus, 1967-2002.

Hayes, Robert Ames, Professor of History, Emeritus, 1968-1998.

Manning, Thomas Green, Professor of History, Emeritus, 1956-1979.

Nelson, Otto Millard, Associate Professor of History and Associate Dean, College of Arts & Sciences, Emeritus, 1965-2000.

Newcomb, Benjamin Havelock, Professor of History, Emeritus, 1964-2000.

Twyman, Briggs L., Associate Professor, Emeritus, 1973-2003.

About the Program

This department supervises the following degree programs: HISTORY, *Bachelor of Arts*, *Master of Arts*, *Doctor of Philosophy*. The department also participates in the LATIN AMERICAN 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 3328, 3340, 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 2321 (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. Other required courses are undergoing revision and students should contact the graduate advisor for details. 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 from HIST 5304, 5305, or 5306. Other required courses are undergoing revision and students should contact the graduate advisor for details. Students must also take two 6000-level courses 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 ap-

proved 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.

School of Mass Communications

Jerry C. Hudson, Chairperson

Professor and Director of the School of Mass Communications, 1978. B.S., West Texas State, 1971; M.A., 1972; Ph.D., North Texas, 1980.

Faculty

Bichard, Shannon, Assistant Professor, 2002. B.A., Central Florida, 1995; M.A., 1997; Ph.D., Florida, 2001.

Callison, Coy, Assistant Professor, 2001. B.A., Southwest Texas State, 1995; M.A., Alabama, 1998; Ph.D., 2000.

Chambers, Leslie Todd, Assistant Professor, 1999. B.A., Texas Tech, 1988; M.A., 1994; Ph.D., Tennessee, 2000.

Dean, William Frank, Associate Professor, 1971. B.B.A., Texas Tech, 1961; M.Ed., 1965; Ed.D., 1971.

Harp, Dennis Andrew, Professor, 1973. B.S., Southwest Texas State, 1965; M.S., Texas A&M Commerce, 1966; Ed.D., 1972.

Miller, Gary, Assistant Professor, 2002. B.A., LaSalle., 1984; M.S., Lehigh, 1988; M.A., Acad. Of Art Coll., 2000.

Moretti, Anthony, Assistant Professor, 2003. B.A., Southern California, 1989; M.A., Ohio State, 1996; Ph.D., Ohio, 2003.

Ortiz, Alex, Assistant Professor, 2003. B.S., Florida, 1991; M.A., 2001; Ph.D., South Florida, 2003.

Oskam, Judy Barnes, Associate Professor, 1994. B.A., North Texas, 1980; M.S., Oklahoma State, 1993; Ed.D., 1994.

Parkinson, Michael, Associate Professor, 1999. B.S., U.S. Air Force Academy, 1968; M.A., Oklahoma, 1973; Ph.D., 1977; J.D., Southern Illinois, 1987.

Patwardhan, Padmini, Assistant Professor, 2002. B.A., Pune (India), 1978; B.J., 1979; M.A., 1981; Ph.D., Southern Illinois, 2003.

Price, Leighanna, Lecturer, 2002. B.A., Texas (Permian Basin), 2000; M.A., Texas Tech, 2002.

Reddick, Randolph, Professor, 2003. A.B., Southern California, 1966; Ph.D., Ohio, 1991.

Reeves, Jimmie L., Associate Professor, 1995. B.S., Virginia Military Inst., 1973; B.A., Texas, 1978; M.A., 1980; Ph.D., 1984.

Saathoff, Roger C., Associate Professor, 1984. B.A., Trinity, 1972; M.A., Texas (San Antonio), 1976; Ph.D., Tennessee, (Knoxville), 1984.

Thornhill, Ashton G., Associate Professor, 1979. B.B.A., Texas Tech, 1971; M.A., 1974.

Watts, Elizabeth A., Associate Professor, 1992. B.A., Adams State College, 1970; Ed.S., Northern Colorado, 1976; Ph.D., Ohio, 1992.

Wernsman, Marijane, Instructor, 1999. B.A., Texas A&M, 1975; M.A., 1977; Ph.D., Tennessee (Knoxville), 1986.

Wernsman, Robert, Instructor, 1999. B.S., Peru State (Nebraska), 1974; M.A., Northern Arizona, 1982.

West, Joel, Instructor, 2002. B.A., Texas Tech, 1989; M.A., 1992.

Youngblood, Ed, Assistant Professor, 2002. B.A., Southwestern, 1987; M.A., Southwest Texas, 1990; Ph.D., Texas Tech, 2002.

Emeritus Faculty

Allen, Louise Crawford, Associate Professor of Journalism, Emeritus, 1928-1963.

Hsia, Hower J., Professor of Mass Communications, Emeritus, 1970-1992.

Morgan, Harmon Loyd, Associate Professor of Mass Communications, Emeritus, 1968-1992.

Rooker, Robert Alan, Associate Professor of Mass Communications, Emeritus, 1963-1990.

Ross, Billy Irvan, Professor of Mass Communications, Emeritus, 1970-1988.

About the Program

This school supervises the following degree programs: JOURNALISM, PUBLIC RELATIONS, ADVERTISING, TELECOMMUNICATIONS, and PHOTOCOMMUNICATIONS, *Bachelor of Arts*; MASS COMMUNICATIONS, *Master of Arts*.

Undergraduate Program

The School of Mass Communications is accredited by the Accrediting Council on Education in Journalism and Mass Communications (ACEJMC). The school operates under the general policy of the ACEJMC, which requires students to take a minimum of 90 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 new writing, the minimum number of semester hours required by the school for the Bachelor of Arts degree has been set at 132 hours. The minimum number of hours that can be taken within the School of Mass Communications is 39-42.

Students enrolling in or transferring into the school for the first time will be designated as general mass communications students. First semester freshmen enrolling in the school must have scored 25 on the ACT or 1140 on the SAT1 and/or finished high school in the upper one-fourth of the graduating class. Continued enrollment would require a 2.5 cumulative GPA in the first 15 hours taken at Texas Tech. Freshmen enrolled in other departments and colleges at Texas Tech may transfer into the school after completing at least 15 semester hours, not including CLEP courses, with a minimum 2.5 cumulative GPA, including repeated courses.

All transfer students, whether from other disciplines at Texas Tech or other two-year and four-year colleges and universities, must have a cumulative 2.5 GPA to be admitted into Mass Communications. Continued enrollment would require a 2.5 cumulative GPA in the first 15 hours taken at Texas Tech as a mass communications major.

All transfer students will enter under the catalog in force at the time of transfer. Freshmen and transfer students must present ACT or SAT1 scores when entering the school. Transfer students must present transcripts for all courses previously completed. No more than 12 hours of Journalism or Mass Communications courses will be accepted in transfer.

The change from the general mass communications status, which is not a major, to a specific major will be accomplished after the following requirements are met:

1. Completed the ACT or SAT1 examination with scores submitted to the school.
2. Made at least a C in ENGL 0301 (if required), 1301, and 1302.
3. Completed the school's economics requirement with a grade or grades of C or better.
4. Completed the school'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 telecommunications, EM&C 3310; for photocommunications, PHOT 3310.)
6. Students must pass the school's grammar, spelling, and punctuation exam.

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 a cumulative 2.5 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, JOUR 3314 for broadcast journalism, ADV 3312 for advertising, TELE 3340 for telecommunications, P R 3312 for public relations, and PHOT 3316 for photocommunications.
6. Students must pass the school'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 school 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 school 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 school if prerequisites are not stated.
12. Junior standing (at least 60 hours) is required for all 4000-level courses in the school if prerequisites are not stated.
13. All students in majors and sequences are required to select a minor outside the school 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 school 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 school 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 school's grammar, spelling, and punctuation exam prior to enrolling in the first writing course in the School of Mass Communications (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, photocommunications, 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, 3312, 3380, 4370, and 6 hours of electives from journalism courses.
Advertising: ADV 2310, 3312, 3351, 3361, 4312, JOUR 2310, MCOM 3380.

Telecommunications: EM&C 3300, 3310, 3340, 4320; JOUR 2310; one course from EM&C 3360, 3370, 4370, 4375; and 3 hours of electives from telecommunications or EM&C courses.

Photocommunications: PHOT 3310, 3315, 3316, 3335, 4300 or 4303; and 6 hours of electives from JOUR 2300, P R 2310, EM&C 3300, 3310, ADV 2310.

Public Relations: JOUR 2310, P R 2310, 3312, 4312, MCOM 3380, ADV 2310, ADPR 3341.

Graduate Program

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 comprehensive 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 school or the school's graduate coordinator before enrolling in any courses.

Upon entering the school's program, graduate majors without prior academic or professional experience in one of the fields of mass communications may be required to take up to 9 hours of graduate leveling work. Such courses must be in addition to the graduate-hour requirements noted in the program options above. Students should consult the graduate coordinator regarding how to fulfill these requirements.

Journalism Curriculum

News-Editorial Specialization

| First Year | Second Year | Third Year | Fourth Year |
|--|---|---|--|
| MCOM 1300 JOUR 2300 ECO 2305 or 2301 and 2302 MATH 2300 or 2345 | JOUR 2310, 3312 MCOM 3300 MCOM 3320 | PHOT 2310 Mass Comm. elect. JOUR 3350 | JOUR 3380 JOUR 4370 Mass Comm. elect. JOUR 3390 |

Broadcast Specialization

| First Year | Second Year | Third Year | Fourth Year |
|--|--|---|------------------------------|
| MCOM 1300 JOUR 2300 MATH 2300 or 2345 ECO 2305 or 2301 and 2302 | JOUR 2310, 3312 EM&C 3310 or JOUR 3350 MCOM 3300 MCOM 3320 | JOUR 3314 EM&C 3350 Mass Comm. elect. | JOUR 4370 EM&C 4380, 4390 |

Journalism Major. Students majoring in news-editorial (journalism) are required to complete 39-42 semester hours within the school, including the following courses: JOUR 2300, 2310, 3312, 3350, 3380, 3390, 4370, MCOM 1300 3300, 3320, and PHOT 2310. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Broadcast Journalism Sequence. Students in this sequence are enrolled as journalism majors and are required to complete 39-42 semester hours within the school, including the following courses: JOUR 2300, 2310, 3312, 3314, 4370, JOUR 3350 or EM&C 3310, EM&C 3350, 4380, 4390, MCOM 1300, 3300, and 3320. Also required are ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Advertising Curriculum

| First Year | Second Year | Third Year | Fourth Year |
|---|---|--|--|
| MCOM 1300 ECO 2305 or 2301 and 2302 MATH 2300, or 1330 and 1331, or 2345 | JOUR 2310 ADV 2310 MCOM 3300 ADV 3312 MCOM 3320 | ADV 3351, 3361 MCOM 3380 MKT 3350 Mass Comm. elect. | ADV 4312 Mass Comm. elect. Mass Comm. elect. MKT 3352 |

Students majoring in advertising are required to complete 39-42 semester hours within the school, 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.

Telecommunications Curriculum

| First Year | Second Year | Third Year | Fourth Year |
|---|--|---|---|
| MCOM 1300 MATH 2300 or 2345 ECO 2305 or 2301 and 2302 | EM&C 3310 MCOM 3300 MCOM 3320 JOUR 2310 | EM&C 3340 EM&C 3300 EM&C writing course EM&C elective Mass Comm. elect. | EM&C 4320 EM&C elective EM&C writing course |

Students majoring in telecommunications are required to complete 39-42 semester hours within the school, including the following courses: MCOM 1300, 3300, 3320; JOUR 2310; EM&C 3310, 3300, 3340, 4320; two courses from EM&C 3360, 3370, 4370 or 4375; at least 6 hours from electronic media and communications courses. Also required are ECO 2305 or 2301 and 2302; and MATH 2300 or 2345.

Photocommunications Curriculum

| First Year | Second Year | Third Year | Fourth Year |
|---|--|---|------------------------|
| ECO 2305 or 2301 & 2302 MCOM 1300 MATH 2300 or 2345 | PHOT 3310, 3315 MCOM 3300, 3320 JOUR 2310 Mass Comm. elect. | PHOT 3316, 3335 JOUR 3312 or 3316 PHOT 4303 or 4300 | PHOT 4303 PHOT 4300 |

Students majoring in photocommunications are required to complete 39-42 semester hours within the school, including the following courses: PHOT 3310, 3315, 3316, 3335, 4300, 4303 4300 (different area of study), 4312; JOUR 2310; MCOM 1300, 3300, and 3320; and one course from JOUR 3312 and 3316. Also required are ART 1320 or 1324, ECO 2305 or 2301 and 2302, and MATH 2300 or 2345.

Public Relations Curriculum

| First Year | Second Year | Third Year | Fourth Year |
|---|--|--|--|
| ECO 2305 or 2301 & 2302 MATH 2300, or 1330 and 1331, or 2345 MCOM 1300 | ADV 2310 P R 2310 JOUR 2310 MCOM 3300, 3320 | ADPR 3341 P R 3312 MKT 3350 COMS 3358 Mass Comm. elect. MCOM 3380 | MKT 3352 MGT 3370 P R 4312 Mass Comm. elect. Mass Comm. elect. |

Students majoring in public relations are required to complete 39-42 semester hours within the school, including the following courses: P R 2310, 3312, 4312ADPR 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.

Department of Mathematics and Statistics

Lawrence E. Schovanec, Chairperson

Professor, 1982. B.S., Phillips, 1975; M.S., Texas A&M, 1977; Ph.D., Indiana, 1982.

Faculty

- Allen, Edward J.**, Professor, 1985. B.S., Wisconsin-Madison, 1971; M.S., 1972; Ph.D., Tennessee, 1983.
- Allen, Linda Joy Svoboda**, Professor, 1985. B.A., Coll. of St. Scholastica, 1975; M.S., 1978; Ph.D., Tennessee At Knoxville, 1981.
- Anderson, Ronald Myles**, Professor and Dean, Graduate School, 1965. B.A., Luther Coll., 1957; M.S., Iowa State, 1959; Ph.D., 1962.
- Barnard, Roger W.**, Professor, 1973. B.S., Kent State, 1965; M.S., 1968; Ph.D., Maryland, 1971.
- Bennett, Harold R.**, Professor, 1968. B.S., Idaho State, 1963; M.A., Arizona State, 1965; Ph.D., 1968.
- Byerly, Robert E.**, Associate Professor, 1980. S.B., Massachusetts Inst. of Technology, 1973; M.A., State U. of New York (Buffalo), 1975; Ph.D., 1979.
- Chanda, Kamal C.**, Professor, 1973. B.Sc., Calcutta, 1948; M.Sc., 1950; Ph.D., Manchester, 1958.
- Dayawansa, Wijesuriya P.**, Horn Professor, 1996. B.Sc., Peradeniya (Sri Lanka), 1978; M.Sc., Clarkson, 1982; D.Sc., Washington (St. Louis), 1986.
- Drager, Lance D.**, Associate Professor, 1983. B.A., Minnesota, 1972; M.A., Brandeis, 1973; Ph.D., 1978.
- Gelca, Razvan**, Assistant Professor, 2000. M.S., Bucharest (Romania), 1990; Ph.D., Iowa, 1997.
- Gilliam, David S.**, Professor, 1977. B.S., Idaho State, 1969; M.S., 1971; Ph.D., Utah, 1977.
- Gornet, Ruth**, Associate Professor, 1993. B.A., Drake, 1987; B.S.B.A., 1987; A.M., Washington, 1989; Ph.D., 1993.
- Gustafson, William Howard**, Professor, 1976. B.A., Wesleyan, 1966; M.A., Illinois, 1967; Ph.D., 1970.
- Hadjicostas, Petros**, Assistant Professor, 2001. B.S., Carnegie-Mellon, 1990; M.S., 1991; Ph.D., 1995.
- Harris, Gary A.**, Professor, 1977. B.S., Carson-Newman, 1969; M.S., Kentucky, 1971; Ph.D., 1977.
- Juan, Lourdes**, Assistant Professor, 2001. B.S., Havana, 1991; M.A., Oklahoma, 1997; Ph.D., 2000.
- Kellogg, Charles N.**, Associate Professor, 1970. B.S., New Mexico Inst. of Mining and Technology, 1960; Ph.D., Louisiana State, 1964.
- Korchagin, Anatoly**, Assistant Professor, 1997. M.S., Lobachevsky U. Nizny Novorod (Russia), 1976; Ph.D., St. Petersburg U. (Russia), 1988.
- Ledet, Arne**, Assistant Professor, 2002. B.S., Copenhagen, 1985; M.S., 1991; Ph.D., 1996.
- Lee, Jeffrey M.**, Associate Professor, 1990. B.S., Brigham Young, 1982; M.A., California (Los Angeles), 1984; Ph.D., 1987.
- Lewis, Ira Wayne**, Professor, 1977. B.S., Houston, 1972; M.S., Texas A&M, 1974; Ph.D., Texas (Austin), 1977.
- Mansouri, Hossein**, Professor, 1985. B.S., Inst. of Statistics and Informatics (Iran), 1974; M.S., Ohio State, 1977; Ph.D., Kentucky, 1983.
- Martin, Clyde F.**, Alumni Association Distinguished Professor and Horn Professor, 1983. B.S., Kansas State Teachers, 1965; M.A., Wyoming, 1967; Ph.D., 1971.
- Neusel, Mara D.**, Associate Professor, 2002. Dipl.Math., Georg-August U., Göttingen (Germany), 1988; Ph.D., 1992.
- Paige, Robert**, Assistant Professor, 2001. B.S., Colorado State, 1992; M.S., 1995; Ph.D., 1999.

Pearce, Kent, Professor, 1980. B.S., Brigham Young, 1972; M.S., 1975; Ph.D., State U. of New York (Albany), 1980.

Ruymgaart, Frits, Horn Professor, 1990. M.A., Leiden (Holland), 1967; Ph.D., 1973.

Seaquist, Carl R., Associate Professor, 1995. B.A., Alabama, 1973; M.S., Massachusetts Inst. Tech., 1980; Ph.D., Auburn, 1995.

Seshaiyer, Padmanabhan, Assistant Professor, 2000. B.Eng., Birla Institute of Technology and Science, (India), 1994; M.Sc., 1994; Ph.D., Maryland, 1998.

Shubov, Marianna, Professor, 1989. B.S., Leningrad (USSR), 1978; Ph.D., 1985.

Shubov, Victor, Professor, 1989. M.S., St. Petersburg (Russia), 1972; Ph.D., Steklov Mathematical Inst. (Russia), 1982.

Smith, Philip, Professor, 1999. B.A., Virginia, 1968; M.S., Purdue, 1970; Ph.D., 1972.

Strauss, Monty Joseph, Professor, 1971. B.A., Rice, 1967; Ph.D., Courant Inst. of Mathematical Sciences (New York U.), 1971.

Sun, Shan, Associate Professor, 1994. B.S., Tongji Univ. (China), 1982; Ph.D., Indiana, 1992.

Surles, James, Assistant Professor, 1999. B.S., McNeese State, 1995; M.S., South Carolina, 1997; Ph.D., 1999.

Temple, Jo Anne, Instructor, 1999. B.S., Texas Tech, 1976; M.Ed., 1989; M.A., 1997.

Toda, Magdalena, Assistant Professor, 2001. B.S., Bucharest, 1989; M.S., 1991; Ph.D., Kansas, 2000.

Venkataraman, Ram, Assistant Professor, 2000. B.Tech., Indian Institute of Technology (India), 1990; M.S., Maryland, 1995; Ph.D., 1999.

Victory, Harold Dean Jr., Professor, 1974. B.A., Rice, 1968; M.S., Purdue, 1970; Ph.D., 1974.

Wang, Alex, Associate Professor, 1989. B.S., Northwest Telecommunication Engineering Inst. (China), 1982; M.S., 1984; Ph.D., Arizona State, 1989.

Weinberg, David A., Associate Professor, 1980. S.B., Chicago, 1974; Ph.D., Wisconsin (Madison), 1980.

Williams, George Brock, Assistant Professor, 2001. B.S., Mississippi State, 1993; Ph.D., Tennessee, 1999.

Yang, Song, Professor, 1988. B.S., Sichuan, 1982; Ph.D., Michigan State, 1988.

Emeritus Faculty

Amir-Moez, Ali Reza, Professor, Emeritus, 1965-1988.

Duran, Benjamin Sanchez, Professor, Emeritus, 1971-2002.

Hildebrand, Shelby Keith, Professor, Emeritus, 1963-1997.

Lewis, Truman Orville, Professor, Emeritus, 1966-1994.

McLaughlin, Thomas Graham, Professor, Emeritus, 1973-2002.

Miller, John David, Associate Professor, Emeritus, 1968-1996.

Mitra, Arunkumar, Associate Professor, Emeritus, 1967-2000.

Shurbet, Gerald Lynn, Associate Professor, Emeritus, 1956-1987.

Tarwater, J. Dalton, Professor, Emeritus, 1968-2002

White, John Thomas, Associate Professor, Emeritus, 1965-2002.

About the Program

This department supervises the following degree programs: MATHEMATICS, *Bachelor of Arts* or *Bachelor of Science*, *Master of Arts* or *Master of Science*, *Doctor of Philosophy*; STATISTICS, *Master of Science*. 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 a 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, 3360, or 4350

Mathematics Placement. Placement for students into entry-level mathematics courses (0301-2322) 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 development. See course listings for descriptions and prerequisites for the courses listed above.

Graduate Program

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.

Department of Philosophy

Peder George Christiansen, Chairperson

Professor of Classics and Chairperson, Department of Philosophy, 1963. B.A., Carroll, 1956; M.A., Wisconsin, 1957; Ph.D., 1963.

Faculty

Curzer, Howard J., Professor, 1983. B.A., Wesleyan, 1974; M.A., 1975; Ph.D., Texas (Austin), 1985.

Kim, Sungsu, Assistant Professor, 2001. B.S., Seoul Nat'l., 1989; M.A., 1992; Ph.D., Wisconsin (Madison), 2001.

Kutach, Douglas, Assistant Professor, 2002. B.A., Texas A&M, 1990; B.S., 1990; M.A., 1992; Ph.D., Rutgers, 2001.

Meskin, Aaron Robert, Assistant Professor, 1999. A.B., Brown, 1989; Ph.D., Rutgers, 2000.

Nathan, Daniel O., Associate Professor, 1973. A.B., Michigan, 1969; M.A., Illinois (Chicago), 1970; Ph.D., 1977.

Rupert, Robert D., Assistant Professor, 2000. B.A., Washington, 1987; M.A., Illinois, 1990; Ph.D., 1996.

Schaller, Walter E., Associate Professor, 1986. B.A., Albion, 1971; M.A., California (Berkeley), 1975; M.A., Wisconsin, 1982; Ph.D., 1984.

Sowaal, Alice, Assistant Professor, 2001. B.A., California (Santa Barbara), 1993; Ph.D., California (Irvine), 2001.

Suppe, Frederick, Professor of Philosophy and Chairperson, Department of Classical and Modern Languages and Literatures, 2000. A.B., California (Riverside), 1962; A.M., Michigan, 1964; Ph.D., 1967.

Webb, Mark O., Assistant Professor, 1994. B.A., Texas Tech, 1982; M.A., 1985; M.A., 1986; Ph.D., Syracuse, 1991.

Emeritus Faculty

Averill, Edward Wilson, Professor, Emeritus, 1980-2002.

Jobe, Evan Kermit, Associate Professor, Emeritus, 1976-1991.

Ransdell, Joseph Morton, Associate Professor, Emeritus, 1974-2000.

About the Program

This department supervises the following degree programs: PHILOSOPHY, *Bachelor of Arts*, *Master of Arts*. 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 abilities in critical thinking, 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 count toward major or minor requirements. Many students combine a philosophy major with a second major.

Graduate Program

The master's degree program is aimed at providing a broad background in philosophy while encouraging complementary work in an approved minor field of study.

The student may choose to complete 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.

Department of Physics

Lynn Lamar Hatfield, Chairperson

Professor of Physics and Engineering Physics, 1968. B.S., Arkansas Polytechnic, 1960; M.S., Arkansas, 1964; Ph.D., 1966.

Faculty

Akchurin, Nural, Associate Professor of Physics and Engineering Physics, 2000. B.A., Vassar College, 1982; Ph.D., Iowa, 1990.

Borst, Walter L., Professor, 1984. B.S., Tübingen (Germany), 1960; M.S., 1964; Ph.D., California (Berkeley), 1968.

Cheng, Kwan Hon, Professor, 1988. B.Sc., Chinese U. of Hong Kong, 1978; M.Phil., 1980; Ph.D., Waterloo (Canada), 1983

Estreicher, Stefan K., Horn Professor, 1986. M.S., Geneva (Switzerland), 1978; Ph.D., Zurich (Switzerland), 1982.

Gangopadhyay, Shubhra, Professor of Physics and Engineering Physics, 1986. B.S., Jabalpur, 1975; M.S., 1977; Ph.D., Indian Inst. of Technology (Kharagpur), 1982.

Gibson, Thomas L., Associate Professor of Physics and Engineering Physics, 1985. B.S., Cameron, 1977; Ph.D., Oklahoma, 1982.

Glab, Wallace L., Associate Professor, 1990. B.S., Illinois (Urbana-Champaign), 1977; Ph.D., 1984.

Holtz, Mark W., Professor of Physics and Engineering Physics, 1991. B.S., Bradley, 1980; Ph.D., Virginia Polytechnic Inst. and State U., 1987.

Huang, Juyang, Associate Professor, 1999. B.S., Zhejiang, (China), 1981; M.S., 1986, Ph.D., State U. of New York (Buffalo), 1987.

Lamp, David, Associate Professor of Physics and Engineering Physics, 1988. B.G.S., Missouri, 1979; Ph.D., 1984.

Lichti, Roger L., Professor of Physics and Engineering Physics, 1979. B.S., Ottawa (Kansas), 1967; M.S., Illinois, 1969; Ph.D., 1972.

Lodhi, Mohammad Arfin Khan, Professor, 1963. B.Sc., Hons. Karachi (Pakistan), 1952; M.Sc., 1956; D.I.C., Imperial Coll. (London, England), 1960; Ph.D., London, 1963.

Menon, Latika, Assistant Professor, 2002. B.Sc., Calcutta, 1988; M.Sc., India Inst. Tech., 1991; Ph.D., Tata Inst. Fund. Res., 1997.

Menzel, E. Roland, Horn Professor of Physics, Chemistry, and Engineering Physics, 1979. B.S., Washington State, 1967; Ph.D., 1970.

Myles, Charles W., Professor of Physics and Director, Engineering Physics, 1978. B.S., Missouri (Rolla), 1969; M.S., Washington (St. Louis), 1971; Ph.D., 1973.

Papadimitriou, Vaia, Associate Professor, 1994. B.S., Greece, 1982; M.S., Chicago, 1985; Ph.D., 1990.

Quade, Charles Richard, Professor, 1965. B.S., Oklahoma, 1958; M.S., 1960; Ph.D., 1962.

Scully, Marlan O., Adjunct Faculty, 1990. B.S., Wyoming, 1961; M.S., Yale, 1963; Ph.D., 1966.

Thacker, Bethann, Assistant Professor of Physics and Engineering Physics, 1999. B.S., Davidson Coll., 1980; M.S., Cornell, 1986; Ph.D., 1990.

Wigmans, Richard, Professor and Bucy Chair of Physics, 1992. Ph.D. Vrije Universiteit Amsterdam, 1975.

Wilhelm, Ronald Joseph, Assistant Professor of Honors and Physics, 2002. B.S., Bowling Green State, 1985; M.S., 1989; Ph.D., Michigan State, 1995.

Emeritus Faculty

Das Gupta, Kamalaksha, Professor, Emeritus, 1966-1985.

Kim, Young Nok, Professor, Emeritus, 1964-1991.

Mires, Raymond William, Professor, Emeritus, 1957-1991.

Sandlin, Billy Joe, Associate Professor, Emeritus, 1955-1990.

Thomas, Henry Coffman, Professor, Emeritus, 1958-1984.

About the Program

This department supervises the following degree programs: PHYSICS, *Bachelor of Science*, *Master of Science*, *Doctor of Philosophy*. 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, 1308 and 1105, 2301 and 1106, 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 1308, 1105, 2301, 1106, 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.

Physics Curriculum

| Fall | |
|----------------------------------|----|
| PHYS 1305, Engr. Phys. Anal. I | 3 |
| PHYS 1308, Prin. of Phys. I | 3 |
| PHYS 1105, Prin. of Phys. Lab. I | 1 |
| MATH 1351, Calculus I | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 |
| Health and Physical Fitness | 1 |
| TOTAL | 14 |

| Fall | |
|--------------------------------|----|
| PHYS 2402, Prin. of Phys. III | 4 |
| MATH 2350, Calculus III | 3 |
| CHEM 1308, Prin. of Chem. II | 3 |
| CHEM 1108, Prin. Chem. II Lab. | 1 |
| POLS 1301, Am. Govt. | 3 |
| Foreign Lang. | 3 |
| TOTAL | 17 |

| Fall | |
|------------------------------------|----|
| †PHYS 3305, Elect. & Magnet. | 3 |
| PHYS 3301, Optics | 3 |
| MATH 3351, High. Math. Eng. & Sci. | 3 |
| HIST 2300, Hist. of U. S. to 1877 | 3 |
| Elective | 3 |
| English | 3 |
| TOTAL | 18 |

| Fall | |
|-----------------------------|----|
| PHYS 4307, Quant. Mechanics | 3 |
| Adv. Physics Elective | 3 |
| +Adv. Electives | 12 |
| TOTAL | 18 |

FIRST YEAR

| Spring | |
|-----------------------------------|----|
| PHYS 2301, Prin. of Phys. II | 3 |
| PHYS 1106, Prin. of Phys. II Lab. | 1 |
| CHEM 1307, Prin. of Chem. I | 3 |
| CHEM 1107, Prin. of Chem. I Lab. | 1 |
| MATH 1352, Calculus II | 3 |
| ENGL 1302, Adv. Coll. Rhetoric | 3 |
| Health and Physical Fitness | 1 |
| TOTAL | 15 |

SECOND YEAR

| Spring | |
|------------------------------------|----|
| PHYS 3204, Intermed. Lab. | 2 |
| MATH 3350, High. Math. Eng. & Sci. | 3 |
| POLS 2302, Am. Pub. Pol. | 3 |
| English | 3 |
| Foreign Language | 3 |
| Social or Behavioral Science | 3 |
| TOTAL | 17 |

THIRD YEAR

| Spring | |
|-------------------------------------|----|
| ††PHYS 3204, Intermed. Lab. | 2 |
| †PHYS 3306, Elect. & Magnet. | 3 |
| HIST 2301 Hist. of U. S. Since 1877 | 3 |
| Electives | 6 |
| TOTAL | 14 |

FOURTH YEAR

| Spring | |
|------------------------------|----|
| †PHYS 4301, Comp. Phys. | 3 |
| †PHYS 4302, Stat. and Therm. | 3 |
| †PHYS 4304, Mechanics | 3 |
| 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.

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 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.

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 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.

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. After completing the research, the candidate prepares the dissertation and makes a public oral defense before the dissertation committee.

Department of Political Science

Philip Howard Marshall, Chairperson

Professor of Psychology and Chairperson, Department of Political Science, 1971. B.A., Rhode Island, 1967; M.A., 1970; Ph.D., Illinois, 1972.

Faculty

Barkdull, John, Associate Professor, 1993. B.A., Alaska, 1984; M.A., Wisconsin, 1986; Ph.D., 1993.

Cochran, Clarke, Professor, 1970. B.A., Brown, 1967; M.A., Duke, 1969; Ph.D., 1971.

Collins, Brian K., Assistant Professor, 2001. B.A., Transylvania, 1989; Ph.D., Indiana, 2000.

Dicke, Lisa A., Assistant Professor and Program Director, Public Administration, 2000. B.A., Drake, 1992; M.P.A., 1993; Ph.D., Utah, 2000.

Dometrius, Nelson Charles, Professor, 1978. A.B., Redlands, 1969; M.A., San Diego State, 1974; Ph.D., North Carolina, 1979.

Edwards, Martin, Assistant Professor, 2002. B.A., Michigan, 1990; M.A., Columbia, 1992; Ph.D., Rutgers, 2002.

Emmert, Craig F., Associate Professor, 1992. B.S., Oklahoma State, 1982; M.A., Purdue, 1984; Ph.D., Florida State, 1989.

Fox, Charles J., Professor, 1985. B.A., California (Santa Barbara), 1965; Ph.D., Claremont Graduate School, 1977.

Gerber, Brian J., Assistant Professor, 2000. B.A., Wisconsin (Oshkosh), 1990; M.A., New Mexico, 1993; Ph.D., New York (Stony Brook), 2000.

Khan, Aman, Associate Professor, 1989. M.Sc., Toronto, 1976; M.A., Pittsburgh, 1979; Ph.D., 1982.

Lee, Aie-Rie, Professor, 1989. B.A., Ewha Woman's U. (Korea), 1978; M.A., 1982; Ph.D., Florida State, 1989.

Maestas, Cherie Drake, Assistant Professor, 1999. B.S., Texas (Dallas), 1991; M.A., Colorado, 1996; Ph.D., 2000.

Mayer, Lawrence Clark, Professor, 1969. A.B., Florida, 1958; M.A., California (Berkeley), 1963; Ph.D., Texas (Austin), 1969.

Patterson, Dennis, Assistant Professor, 2002. B.A., Providence Coll., 1975; M.A., California (Los Angeles), 1986; Ph.D., 1995.

Scott, Kevin, Assistant Professor, 2002. B.A., Oklahoma, 1997; M.A., Ohio State, 2000; Ph.D., 2002.

Thames, Frank C., Assistant Professor, 2002. A.B., William and Mary, 1991; M.A., Texas, 1994; Ph.D., 2001.

Van Wart, Montgomery R., Associate Professor and Director, Center For Public Service, 2000. B.A., Franklin and Marshall, 1973; M.A.T., Lewis and Clark, 1981; D.P.A., Arizona State, 1990.

Emeritus Faculty

Baird, Frank Lorenzo, Associate Professor, Emeritus, 1968-1981.

Havens, Murray Clark, Professor, Emeritus, 1973-1997.

Kyre, Martin Theodore Jr., Associate Professor, Emeritus, 1963-1990.

Pearson, Neale J., Professor, Emeritus, 1969-1996.

Schaefer, Roger Carl, Associate Professor, Emeritus, 1975-2002.

Smith, Roland Edgar, Professor, Emeritus, 1968-1986.

Tamkoc, Metin, Professor, Emeritus, 1966-1994.

About the Program

This department supervises the following degree programs: POLITICAL SCIENCE, *Bachelor of Arts*, *Master of Arts*, *Doctor of Philosophy*; and PUBLIC ADMINISTRATION, *Master of Public Administration* (NASPAA accredited). See the section on "Opportunities for Interdisciplinary Study" in this catalog for further description of this program. 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.

Graduate Program

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. 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 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. M.P.A. students must develop their courses of study in consultation with the department's M.P.A. director.

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.

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 equivalents) plus POLS 5383. Additional language or tool requirements may be imposed at the time of the student's preliminary examination and will be tailored to the student's field of specialization. Students may be admitted directly into the doctoral program without first having completing a master's degree.

Students are required to complete 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 polsgrad@ttu.edu for the M.A. and Ph.D. programs and to mpa@ttu.edu for the M.P.A. program. A brochure providing additional information may also be obtained by writing to the department.

Department of Psychology

Ruth Hipple Maki, Chairperson

Professor, 1997. B.A., Ohio Wesleyan, 1969; Ph.D., California (Berkeley), 1974.

Faculty

Bleckley, M. Kathryn, Assistant Professor, 2001. B.S., Oklahoma, 1994; M.S., 1996; Ph.D., Georgia Institute of Technology, 2001.

Borrego, Joaquin Jr., Assistant Professor, 2001. B.A., Texas Tech, 1992; M.A., Nevada (Reno), 1999; Ph.D., Nevada (Reno), 2001.

Clopton, James R., Professor, 1976. B.A., Kansas, 1968; M.A., 1970; Ph.D., 1974; Licensed Psychologist (Texas).

Cogan, Dennis Clark, Professor, 1966. B.S., Wisconsin (Milwaukee), 1959; M.A., Missouri, 1964; Ph.D., 1966.

Cogan, Rosemary, Professor, 1966. B.A., Missouri, 1964; M.A., 1966; Ph.D., 1971; Licensed Psychologist (Texas), ABPP.

Cohen, Lee Michael, Assistant Professor, 2000. B.A., California (San Diego), 1994; M.S., Oklahoma State, 1996; Ph.D., 1999; Licensed Psychologist (Texas).

Cook, Stephen W., Associate Professor, 1992. B.S., Texas A&M, 1986; M.A., Missouri (Columbia), 1989; Ph.D., 1992; Licensed Psychologist (Texas).

Delucia, Patricia R., Associate Professor, 1991. B.A., Adelphi, 1983; M.A., Columbia, 1986; Ph.D., 1989.

Durso, Francis T., Professor, 2001. B.S., Carnegie-Mellon, 1975; Ph.D., State U. New York (Stony Brook), 1980.

Epkins, Catherine C., Associate Professor, 1994. B.A., Indiana, 1983; M.S., Illinois State, 1987; Ph.D., Memphis, 1991.

Fireman, Gary D., Associate Professor, 1990. B.A., Michigan, 1980; M.A., Long Island, 1983; Ph.D., 1987; Licensed Psychologist (Texas).

Garos, Sheila, Assistant Professor, 1998. B.S.W., Arizona State, 1981; M.C., 1995; Ph.D., 1998; Licensed Psychologist (Texas).

Hardin, Erin E., Assistant Professor, 2002. B.A., Grinnell Coll., 1994; M.A., Ohio State, 1998; Ph.D., 2002.

Harter, Stephanie, Associate Professor, 1993. B.A., Abilene Christian, 1975; M.A., 1977; M.S., Memphis, 1986; Ph.D., 1989; Licensed Psychologist (Texas, Iowa, and Arkansas).

Hendrick, Clyde, Horn Professor, 1984. B.A., Humboldt State, 1963; M.A., Missouri, 1965; Ph.D., 1967.

Hendrick, Susan S., Professor, 1984. B.A., Minnesota, 1966; M.Ed., Kent State, 1975; Ph.D., 1978; Licensed Psychologist (Florida).

Larsen, Jeff T., Assistant Professor, 2002. B.A., California (San Diego), 1995; M.A., Ohio State, 1999; Ph.D., 2001.

Maki, William S., Professor, 1997. B.S., North Dakota State, 1968, M.S., 1970; Ph.D., California (Berkeley), 1974.

Marshall, Philip Howard, Professor of Psychology and Chairperson, Department of Political Science, 1971. B.A., Rhode Island, 1967; M.A., 1970; Ph.D., Illinois, 1972.

McGlynn, Richard Patrick, Professor, 1969. B.S., Loyola (Chicago), 1965; M.A., 1967; Ph.D., 1970.

Morgan, Robert Dean, Assistant Professor, 2001. B.S., Nebraska (Kearney), 1991; M.S., Fort Hays State, 1993; Ph.D., Oklahoma State, 1999; Licensed Psychologist (Texas).

Mumma, Gregory H., Associate Professor, 1988. B.A., Yale, 1974; M.S., American Intl., 1977; M.S., Pennsylvania State, 1984; Ph.D., 1986; Licensed Psychologist (Texas).

Reich, Darcy A., Assistant Professor, 2000. B.A., Carroll College, 1993; M.A., Ohio State, 1996; Ph.D., 2000.

Richards, C. Steven, Professor, 1990. B.A., Minnesota, 1969; Ph.D., State U. of New York (Stony Brook), 1973.

Robitschek, Christine, Associate Professor, 1993. B.A., Macalester Coll., 1982; M.A., Minnesota-Minneapolis, 1988; Ph.D., 1993.

Taraban, Roman M., Associate Professor, 1989. B.A., Illinois, 1975; M.A., Chicago, 1981; Ph.D., Carnegie Mellon, 1988.

Winer, Jane Louise, Professor of 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.

Emeritus Faculty

Anderson, Robert Paul, Professor, Emeritus, 1955-1986.

Locke, Bill J., Professor, Emeritus, 1969-1996.

Ray, Joseph Bland Bob, Professor, Emeritus, 1963-1990.

About the Program

This department supervises the following degree programs: PSYCHOLOGY, *Bachelor of Arts, Master of Arts, Doctor of Philosophy*; GENERAL EXPERIMENTAL PSYCHOLOGY, *Master of Arts*; CLINICAL PSYCHOLOGY, COUNSELING PSYCHOLOGY, and GENERAL EXPERIMENTAL PSYCHOLOGY, *Doctor of Philosophy*.

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. 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. The Human Factors program is accredited by the Human Factors and Ergonomics Society.

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 combined B.A./M.A. program leading to a B.A. in Psychology and an M.A. in Experimental Psychology with a specialization in Human Factors is available from the department. The program is designed to train human factors professionals for positions in industry and government. The combined program places a strong emphasis on research methodology and data analysis skills.

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 fall semester. Application instructions may be obtained from 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.

Applicants for the master's degree may specialize in general experimental psychology. Doctoral students may specialize in clinical, counseling, or general experimental psychology. Students in general experimental psychology pursue research in human factors, cognition, applied cognition, or social psychology. The human factors program is accredited by the Human Factors and Ergonomics Society. Doctoral students who specialize in counseling or clinical psychology are required to complete a year of internship at an approved facility. The clinical and counseling doctoral programs are fully accredited by the American Psychological Association.

Psychology Curriculum

| FIRST YEAR | | | |
|----------------------------|----|------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| PSY 1300 | 3 | ENGL 1302 | 3 |
| ENGL 1301 | 3 | Oral Communication | 3 |
| MATH 1320 (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 | Fine Arts | 3 |
| Fine 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.

Department of Sociology, Anthropology, and Social Work

Doyle Paul Johnson, Chairperson

Professor of Sociology, 1990. B.A., Illinois, 1965; M.A., 1967; Ph.D., 1969.

Faculty

Cannon, Julie Harms, Assistant Professor of Sociology, 2000. B.A., Western Washington, 1991; M.A., Nebraska, 1994; Ph.D., 1997.

Curry, Evans W., Professor of Sociology, 1976. B.A., Louisiana Coll., 1965; M.A., Louisiana State, 1970; Ph.D., 1973.

Dennis, Philip A., Professor of Anthropology, 1974. B.A., Arizona, 1967; M.A., Cornell, 1969; Ph.D., 1973.

Dunham, Charlotte, Associate Professor of Sociology, 1989. B.S., Wyoming, 1981; M.A., 1983; Ph.D., Southern California, 1989.

Elbow, Margaret, Associate Professor of Social Work, 1980. B.A., Willamette, 1963; M.S.W., Pittsburgh, 1967; D.S.W., Columbia, 1993.

Hall, Grant D., Associate Professor of Anthropology, 1990. B.A., Texas (Austin), 1975; M.A., Texas (San Antonio), 1983; A.M., Harvard, 1987; Ph.D., 1989.

Hickerson, Nancy Parrott, Professor of Anthropology and Linguistics, 1972. B.A., Barnard, 1948; M.A., Indiana, 1950; Ph.D., 1957.

House, Deborah, Assistant Professor of Cultural Anthropology and Linguistics, 1999. B.A., Arkansas, 1974; M.A., 1976; M.A., Northern Arizona, 1985; Ph.D., Arizona, 1997.

Johnson, Eileen, Professor of Museum Science, Heritage Management, and Curator of Anthropology, 1981. B.A., California (Berkeley), 1968; M.A., Kansas, 1972; Ph.D., Texas Tech, 1976.

Koch, Jerome R., Associate Professor of Sociology, 1994. B.A., Wisconsin, 1975; M.Div., Lutheran School of Theology, 1982; M.A., Western Illinois, 1991; Ph.D., Purdue, 1994.

Lowe, George Deane II, Professor of Sociology, 1975. B.A., Georgia, 1958; M.S., Pennsylvania State, 1961; Ph.D., Cornell, 1966.

Marshall-Gray, Paula, Visiting Instructor in Anthropology, 1997. B.G.S., Texas Tech, 1993; M.A., 1996.

Matthews, Jerry B., Associate Professor of Social Work, 1971. B.A., Texas Tech, 1961; M.S.W., Denver, 1966; Ph.D., Texas Tech, 1993.

Nisbett, Richard, Assistant Professor of Anthropology, 2000. B.G.S., Texas Christian, 1976; M.A., San Diego State, 1988; Ph.D., Iowa, 1993.

Paine, Robert R., Associate Professor of Anthropology, 1994. B.A., Massachusetts, 1982; M.A., Missouri (Columbia), 1985; Ph.D., Massachusetts, 1994.

Peek, Charles W., Professor of Sociology and Adjunct Faculty in Human Development and Family Studies, 1975. A.B., Georgia, 1960; M.A., 1963; Ph.D., Duke, 1971.

Phelps, Cynthia, Visiting Assistant Professor of Social Work, 1997. B.S., Louisiana State, 1985; M.S.W., Southern Mississippi, 1991; Ph.D., Tulane, 2001.

Rafalovich, Adam, Assistant Professor of Sociology, 2002. B.S., Southern Oregon, 1993; M.A., Northern Arizona, 1995; Ph.D., British Columbia, 2002.

Ramirez, Ignacio Luis, Assistant Professor of Sociology, 2003. B.A., Texas (El Paso), 1995; M.A., 1997; Ph.D., New Hampshire, 2001.

Roberts, Alden E., Associate Professor of Sociology, 1981. B.S., Moorhead State, 1968; M.A., State U. of New York At Binghamton, 1970; Ph.D., Washington, 1975.

Schneider, Andreas, Associate Professor of Sociology, 1997. Vordiplom, Mannheim (Germany), 1988; Dipl. Soz., 1991; Ph.D., Indiana (Bloomington), 1997.

Stein, William, Adjunct Professor of Anthropology, 1997. A.B., Buffalo, 1949; Ph.D., Cornell, 1955.

Tsai, Yung-Mei, Professor of Sociology and Statistics, 1973. B.L., Tunghai U. (Taiwan), 1963; M.A., Hawaii, 1967; M.A., Pittsburgh, 1970; Ph.D., Colorado, 1973.

Walter, Tamra, Assistant Professor of Anthropology, 2000. B.A., Austin, 1991; M.A., Montana, 1997; Ph.D., Texas, 2000.

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.

Emeritus Faculty

Campbell, Robert Gordon, Associate Professor of Anthropology, Emeritus, 1969-1993.

Cartwright, Walter Joseph, Professor of Sociology, Anthropology, and Social Work, Emeritus, 1962-1995

Chandler, Charles Ray, Associate Professor of Sociology, Anthropology and Social Work, Emeritus, 1966-2000.

Davies, Lewis James Sr., Associate Professor of Sociology, Emeritus, 1962-1986.

Dunn, Roy Sylvan, Associate Professor of Sociology, Emeritus, 1956-1977.

Goss, James A., Professor of Anthropology, Emeritus, 1978-2000.

Hickerson, Nancy Parrott, Professor of Anthropology, Emeritus, 1972-1999.

Mayer-Oakes, William James, Professor of Anthropology, Emeritus, 1971-1989.

Montgomery, Evelyn Ina, Professor of Anthropology, Emeritus, 1964-1979.

About the Program

This department supervises the following degree programs: SOCIOLOGY and ANTHROPOLOGY, *Bachelor of Arts and Master of Arts*; SOCIAL WORK, *Bachelor of Arts*. 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 by completing the criminology concentration are required to take 15 hours from the following courses: SOC 3329, 3368, 3383, 4325, 4327, and ANTH 4343. Students who choose the criminology concentration must also fulfill the sociology major requirements as listed above plus take 6 hours of additional sociology electives. Total hours required for sociology majors who select the criminology concentration are 36. The criminology concentration will be noted on the students' transcripts.

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. See the "Teacher Education" section (p. 51) of this catalog and consult the College of Education for current 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 331 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).

Graduate Program

This department offers the following graduate degree programs: SOCIOLOGY and ANTHROPOLOGY, *Master of Arts*. Both programs are designed to provide broad training for students who wish to enter a Ph.D. program, prepare for undergraduate or community college teaching, or pursue a nonteaching career for which M.A. level training in sociology or anthropology is appropriate and useful. Both programs emphasize training in basic theory and methods. 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 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.

In addition to the above requirements, a student must:

- Have satisfactorily completed SOC 1301.
- Have completed S W 2301 and 331 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

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.

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 necessary: S W 2301 (Introduction to the Social Welfare Institution); S W 331 (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 431 (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.

Rawls College of Business

Dr. Allen McInnes Dean

101 Business Administration
Box 42101
Lubbock, TX, 79409-2101
(806) 742-3188
www.ba.ttu.edu



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 degrees of Bachelor of Business Administration, Master of Business Administration, Master of Science, Master of Science in Accounting, and Doctor of Philosophy. At the undergraduate level, students may major in Accounting, Economics, Finance, General Business, International Business, Management, Management Information Systems, Marketing, and Petroleum Land Management.

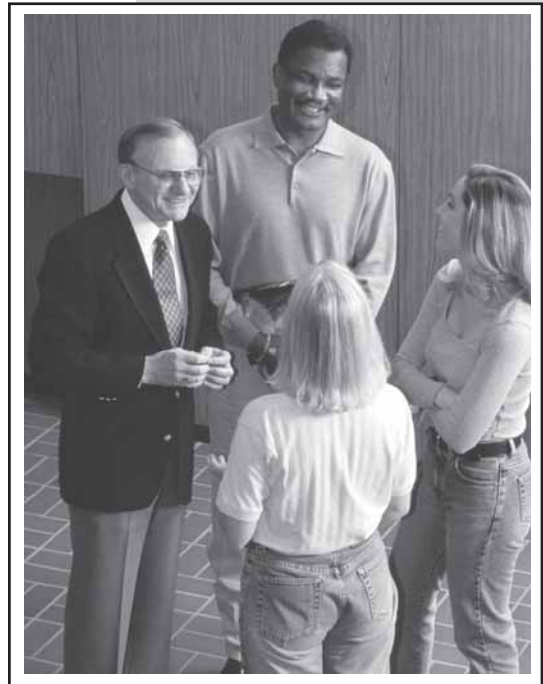
150-Hour Program: Joint B.B.A.—Master's. This program is a 150-hour track leading to a bachelor's in business administration and a master's in business administration or accounting. The B.B.A. is comprised of a minimum of 120 hours. The program is designed for academically outstanding undergraduate students who wish to complete a master's degree at Texas Tech. Completion of this program can enhance starting salaries and career advancement.

Students should apply to the graduate component of the program during the first semester of their junior year. Graduate course work cannot be taken prior to acceptance. Application materials are available in the Rawls College of Business Administration's Graduate Services Center. Admitted students will combine undergraduate and graduate courses during the final semester of their undergraduate work, thus allowing a student to obtain both bachelor's and master's degrees.

Joint Program: B.B.A. and Master of Architecture. This 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 world-wide career opportunities. See the College of Architecture section of this catalog for a full program outline of this joint program.

Joint Program: B.B.A. and B.S. in Agricultural and Applied Economics. This joint 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 joint 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 program outline of this joint program.

Joint Program: B.S. in Agribusiness. This distinctive Bachelor of Science 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 College of Business Administration. See the College of Agricultural Sciences and Natural Resources section of this catalog for a full program outline of this joint program.



Faculty

- Allen, Roberta S.**, Lecturer in Accounting, 1999. B.S., Coll. of Charleston, 1991; M.S.A., Texas Tech, 1996.
- Anderson, Dianne**, Lecturer in Managerial Communications, 1998. B.S., Brigham Young, 1963; M.S., 1964.
- Anderson, Lane Kent**, Professor of Accounting, 1978. B.S., Brigham Young, 1965; M. Accy., 1966; M.B.A., Wisconsin (Madison), 1970; Ph.D., 1970; CPA, CMA.
- Antony, Solomon R.**, Assistant Professor of Management Information Systems, 1998. B.E., Bits (Pilani India), Ph.D., Florida Int'l., 1997.
- Arnett, Dennis B.**, Assistant Professor of Marketing, 2000. B.A., Occidental Coll., 1986; M.A., United States Int'l, 1992; Ph.D., Texas Tech, 1998.
- Blair, John D.**, Professor of Management and Holder of the Trinity Company Professorship in Management and Health Care Strategy, 1981. B.A., Gustavus Adolphus, 1966; M.A., Michigan, 1972; Ph.D., 1975.
- Boal, Kimberly B.**, Professor and Area Coordinator of Management, 1989. B.S., California State (Los Angeles), 1970; M.B.A., Wisconsin-Madison, 1977; Ph.D., 1980.
- Bowlin, Oswald Doniece**, Professor of Finance, 1965. B.A., Texas A&M, 1951; M.S., 1954; Ph.D., Illinois, 1959.
- Bravoco, Ralph R.**, Associate Professor of Information Systems and Quantitative Sciences, 1982. B.A., Northeastern, 1966; M.A., 1969; Ph.D., Massachusetts, 1971.
- Bremer, Ronald H.**, Associate Professor of Business Administration, 1988. B.S., Mankato State, 1979; M.A., 1981; Ph.D., Texas A&M, 1987.
- Brigham, Keith**, Assistant Professor of Management, 2001. B.S., Oklahoma, 1990; M.B.A., Oklahoma City, 1996; Ph.D., Colorado (Boulder), 2002.
- Brown, Patricia M.**, Lecturer in Management Information Systems, 1998. B.S., California (Davis), 1982.
- Browne, Glenn J.**, Associate Professor of Management Information Systems, 1997. A.B., Michigan, 1979; J.D., M.A., Ohio State, 1982; Ph.D., Minnesota, 1993.
- Buchheit, Steve**, Assistant Professor of Accounting, 2001. B.S., Ohio State, 1990; Ph.D., Texas, 1997.
- Burkman, James R.**, Assistant Professor of Information Systems and Quantitative Sciences, 2001. B.A., Western State Coll., 1989; M.A., Indiana, 1999; Ph.D., 2002.
- Burns, James R.**, Professor of Operations Management and Management Information Systems, 1973. B.S.A.E., Colorado, 1966; M.S.A.E., Purdue, 1967; Ph.D., 1973; Reg. Prof. Engr. (Texas); C.I.R.M.
- Busby, Colleen**, Lecturer in Business Administration, 2002. B.A., Brigham Young, 1983.
- Clancy, Donald K.**, Professor of Accounting and Associate Dean, Rawls College of Business, 1982. B.S., Pennsylvania State, 1970; M.B.A., 1971; Ph.D., 1976.
- Conover, William Jay**, Horn Professor of Statistics, Information Systems and Quantitative Sciences, 1973. B.S., Iowa State, 1958; M.A., Catholic U. of America, 1962; Ph.D., 1964.
- Cooney, Jack**, Assistant Professor of Finance, 2003. B.S., Florida, 1979; M.B.A., 1982; J.D., 1982; Ph.D., Utah, 1992.
- Cyree, Ken**, Assistant Professor of Finance, 2003. B.B.A., West Georgia Coll., 1991; M.B.A., 1993; Ph.D., Tennessee, 1996.
- Davis, Donna F.**, Assistant Professor of Marketing, 2003. B.A., Maryville Coll., 1983; M.B.A., Tennessee, 1993; Ph.D., 2003.
- Debord, Grace**, Lecturer in Managerial Communications, 1990. B.A., Texas Tech, 1986; M.A., 1989.
- Dowell, C. Dwayne**, Price Waterhouse Coopers Professor of Accounting, 1991. B.S., Oklahoma State, 1967; M.S., 1968; Ph.D., Michigan State, 1974.
- Duhan, Dale F.**, Professor of Marketing, 1990. B.B.A., Kansas State, 1973; M.B.A., 1975; Ph.D., Oregon, 1984.
- Dukes, William Parks**, Professor of Finance, 1968. B.S., Maryland, 1953; M.B.A., Michigan, 1958; Ph.D., Cornell, 1968.
- Dunne, Patrick M.**, Associate Professor of Business Administration, 1975. B.S.B.A., Xavier, 1966; M.B.A., Michigan State, 1968; Ph.D., 1972.
- Durrett, John R.**, Assistant Professor of Information Systems and Quantitative Sciences, 1997. B.B.A., West Texas A&M, 1991; M.B.A., 1993; Ph.D., Texas (Austin), 1999.
- English, Philip C. II**, Assistant Professor of Finance, 2001. B.S., Virginia Tech, 1989; B.S., 1990; M.B.A., 1991; Ph.D., South Carolina, 1998.
- Faver, Dudley**, Lecturer in Business Administration, 1980. B.A., Abilene Christian, 1937; M.S.A., George Washington, 1973.
- Freeman, Robert J.**, Distinguished Professor of Accounting, 1979. B.S., Louisiana Tech, 1961; M.B.A., Arkansas, 1962; Ph.D., 1966; CPA.
- Giambatista, Robert**, Assistant Professor of Management, 2000. B.S., Pennsylvania State, 1985, 1987; Ph.D., Wisconsin, 1999.
- Goebel, Paul R.**, Professor of Business Administration, 1980. B.B.A., Augusta, 1975; M.B.A., Georgia, 1976; Ph.D., 1980.
- Hein, Scott E.**, Professor of Finance, 1983. B.A., New Mexico, 1973; M.A., 1975; Ph.D., Purdue, 1979.
- Hoffman, James J.**, Professor of Management, 2000. B.S., Nebraska Wesleyan, 1983; MBA, Nebraska, 1984; Ph.D., 1988.
- Howell, Roy D.**, Professor of Business Administration, 1982. B.B.A., Eastern New Mexico, 1973; M.B.A., 1974; Ph.D., Arkansas, 1979.
- Hughes, John C.**, Lecturer in Business Administration, 1984. B.B.A., Texas Tech, 1965; M.B.A., 1970; Ph.D., 1974.
- Hunt, James Gerald**, Horn Professor of Management and Trinity Company Professor in Leadership, 1981. B.S., Michigan Technological, 1954; M.A., Illinois, 1958; Ph.D., 1966.
- Hunt, Shelby D.**, J. B. Hoskins and P. W. Horn Professor of Marketing, 1980. B.S.M.E., Ohio, 1962; Ph.D., Michigan State, 1968.
- Janamanchi, Balaji**, Lecturer in Business Administration, 2002. B.Com., Osmania (India), 1980; F.C.A., Inst. Chartered Accountants of India, 1984; LL.B., Osmania, 1988; M.S., Texas Tech, 2001.
- Jones, Donald R.**, Associate Professor of Business Administration, 2001. B.A., Texas, 1972; M.B.A., 1975; Ph.D., 1988.
- Kelley, Dawn E.**, Lecturer in Business Administration, 1988. B.A., Texas Tech, 1984; M.B.A., 1987.
- Koch, Eric C.**, Assistant Professor of Marketing, 2001. B.S.B.A., Rockhurst Coll., 1994; M.B.A., Oregon, 1998; Ph.D., 2001.
- Krefting, Linda A.**, Associate Professor of Management, 1981. B.A., Minnesota, 1968; M.A., 1971; Ph.D., 1974.
- Kuipers, David R.**, Assistant Professor of Finance, 1999. B.S., Iowa State, 1990; M.S., Houston, 1992; Ph.D., Missouri, 1996.
- Lampe, James C.**, Professor of Accounting, 1989. B.S.B.A., Denver, 1965; M.B.A., 1966; Ph.D., Michigan, 1970.
- Laverie, Debra**, Associate Professor of Marketing, 1995. B.A., St. Mary's Coll., M.B.A., Notre Dame, 1987; Ph.D., Arizona State, 1995.
- Lin, Zhangxi**, Assistant Professor of Management Information Systems, 1999. M.Eng., Tsinghua, 1982; M.S., Texas (Austin), 1996; Ph.D., 1999.
- Lynn, Quepha**, Lecturer in Business Administration, 2002. B.S., North Texas, 1988; M.S., 1988.
- Macy, Barry A.**, Professor of Organizational Design, 1979. B.B.A., Ohio U., 1966; M.B.A., 1968; Ph.D., Ohio State, 1975.
- Malone, David**, Associate Professor of Accounting, 1997. B.B.A., Southwest Texas State, 1979; MBA, Arkansas, 1981; Ph.D., 1987.
- Mann, Herschel**, KPMG Professor of Accounting, 1972. B.B.A., Arkansas (Monticello), 1964; M.A., Alabama, 1966; Ph.D., 1971; CPA.
- Masselli, John J.**, Assistant Professor of Accounting, 1998. B.S., Fairfield, 1987; M.S., Hartford, 1991; Ph.D., Georgia State, 1998.
- McDonald, Robert E.**, Assistant Professor of Marketing, 2002. B.S.C.E., Columbia, 1976; M.C.E., Houston, 1981; M.B.A., 1985; Ph.D., Connecticut, 2001.
- McInnes, Allen T.**, Dean, Rawls College of Business, 2001. B.B.A., Texas, 1959; M.B.A., 1960; Ph.D., 1966; A.M.P., Harvard, 1973.
- Mercer, Jeffrey**, Associate Professor of Finance, 2003. B.S., Wyoming, 1986; M.S., Texas Tech, 1987; Ph.D., 1992.
- Moore, Eric**, Assistant Professor of Business Administration, 1999. B.A., Michigan, 1991; M.B.A., 1993; M.A., 1996; Ph.D., 1999.
- Nichols, Linda M.**, Professor of Accounting, 1989. B.S., New Orleans, 1980; Ph.D., Louisiana State, 1989.
- Nix, Timothy W.**, Visiting Professor of Management and Director of M.B.A. Health Organization Management Program, 1999. B.S., Texas Tech, 1987; M.B.A., 1989; Ph.D., 1998.
- Pasewark, William R.**, Professor of Business Administration, 2000. B.B.A., Texas, 1979; M.B.A., Texas A&M, 1981; Ph.D., 1986; CPA.
- Phillips, Robert L.**, Associate Professor of Management, 1986. B.S., United States Military Academy, 1962; Ph.D., Ohio State, 1972.
- Ramirez, Ida C.**, Lecturer in Business Administration, 1985. B.S., Texas Tech, 1982; M.A., 1984.
- Randolph, Paul H.**, Professor of Business Administration, 1981. B.S., Minnesota, 1948; M.S., 1949; Ph.D., 1955.
- Ricketts, Robert Carlton**, Frank M. Burke Chairperson of Accounting, 1988. B.S., North Texas State, 1983; M.S., 1983; Ph.D., North Texas, 1988.
- Ritchey, Robert J.**, Associate Professor of Finance, 1982. B.S., Pennsylvania State, 1970; M.B.A., Arizona, 1976; Ph.D., 1981.
- Robinson, David F.**, Assistant Professor of Management and Director, Latin American Studies For the Center For Health Care Strategy, 1998. B.B.A., Wisconsin, 1982; M.B.A., Indiana, 1991; Ph.D., Wisconsin, 1999.
- Schuetzeberg, Jerome H.**, Lecturer in Business Administration, 1968. B.S., Texas Tech, 1962; J.D., Texas (Austin), 1965.
- Sears, R. Stephen**, Lubbock Bankers' Association Professor of Finance and Senior Executive Associate Dean, Rawls College of Business, 1988. B.A., Texas Tech, 1973; M.S., 1976; Ph.D., North Carolina-Chapel Hill, 1980.
- Sellers, Keith**, Visiting Associate Professor of Business Administration, 2000. B.S., Tennessee, 1980; M.T., Denver, 1981; D.B.A., Memphis, 1988.
- Sherif, Karma**, Assistant Professor of Management Information Systems, 1998. B.A., American U. in Cairo, 1986; M.S., 1994; Ph.D., Texas A&M, 1998.

Song, Jaeki, Assistant Professor of Information Systems and Quantitative Sciences, 2003. M.A., Yonsei U. (Seoul, Korea), 1993; Ph.D., Wisconsin, 2001.

Sorenson, Paula, Lecturer in Managerial Communications, 2000. B.S., Brigham Young, 1971; M.A., Texas Tech, 1993.

Sorenson, Ritch L., Professor of Management, 1986. Brigham Young, 1973; M.A., 1975; Ph.D., Purdue, 1979.

Szyliowicz, Dara M., Assistant Professor of Management, 1997. B.A., Barnard Coll., 1988; M.A., California (Berkeley), 1990; Ph.D., Illinois, 1997.

Trotter, Ben B., Lecturer in Accounting, 1982. B.B.A., Texas A&M, 1959; M.B.A., Harvard, 1963; CPA.

Viator, Ralph E., Professor of Business Administration, 2000. B.S., Houston, 1973; M.B.A., Lamar, 1976; Ph.D., Texas A&M, 1986.

Walden, Eric, Assistant Professor of Information Systems and Quantitative Sciences, 2003. B.A., New Mexico State, 1993; M.S., Louisiana State, 1997; Ph.D., Minnesota, 2002.

Washington, Marvin, Assistant Professor of Management, 2002. B.S., Northwestern, 1989; Ph.D., 1999.

Westfall, Peter, Horn Professor of Statistics, 1983. B.S., California (Davis), 1979; M.S., 1981; Ph.D., 1983.

Wetherbe, James C., Professor and Stevenson Chairperson of Information Technology. B.B.A., New Mexico State, 1971; M.B.A., Texas Tech, 1974; Ph.D., 1976.

Whitehead, Carlton J., Professor of Management, 1965. B.S., Southeastern Louisiana, 1959; M.B.A., Louisiana State, 1962; Ph.D., 1964.

Wilcox, James B., Professor of Business Administration, 1975. B.S., Pennsylvania State, 1967; M.B.A., Indiana, 1970; D.B.A., 1972.

Wilkes, Robert Edward, Professor of Business Administration, 1976. B.S.B.A., Samford, 1963; M.B.A., Alabama, 1969; Ph.D., 1971.

Yadav, Surya B., Area Coordinator and James and Elizabeth Sowell Professor of 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.

Emeritus Faculty

Abel, Burl Monroe, Associate Professor of Business Administration, Emeritus, 1955-1973.

Austin, Larry Morton, Professor of Business Administration, Emeritus, 1976-1996.

Barton, Richard Fleming, Professor of Management, Emeritus, 1967-1990.

Blackwell, Lotus Berry, Associate Professor of Business Administration, Emeritus, 1948-1981.

Burns, Jane Offutt, Professor of Accounting, Emeritus, 1986-1997.

Chisholm, Sam Whiten, Professor of Business Administration, Emeritus, 1941-1981.

Dale, Charles Edwin, Professor of Business Administration, Emeritus, 1956-1983.

Gately, Mary Sue, Professor of Accounting, Emeritus, 1981-1998.

Peterson, Richard Lewis, Professor of Finance, Emeritus, 1982-1999.

Rouse, Robert Lyle, Professor of Economics and Business Administration, Emeritus, 1950-1985.

Stem, Carl Herbert, Dean of Business Administration, Emeritus, 1975-1997.

Wade, Charles Ernest, Associate Professor of Finance, Emeritus, 1971-1999.

White, Gary Elbert, Professor of Accounting, Emeritus, 1979-1999.

Whittington, William Elmer, Professor of Business Administration, Emeritus, 1947-1975.

Undergraduate Program

Honors College for Business Majors. Students from all areas of the Rawls College of Business Administration 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 2440, and ECO 2301, 2302) with grades of C or higher and attainment of a minimum 2.75 cumulative or higher adjusted 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 College of Business Administration. 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.

Multicultural Requirement. The college is committed to a globally oriented curriculum that includes international and multicultural issues throughout a student's course work. The university's multicultural requirement will be satisfied by completion of the B.B.A. degree requirements for all students except 150-hour accounting majors.

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 colleges other than the College of Business Administration are as follows:

- Must have a minimum 2.75 Texas Tech GPA to declare a minor.
- All prerequisites must be met prior to taking each course.
- A minimum grade of C is needed to complete minor requirements.
- All junior and senior level business courses 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 2.75 GPA) |
| ACCT 2301 | Managerial Accounting. (Prerequisite: ACCT 2300 and 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 2.75 GPA) |
| FIN 3321 | Financial Statement Analysis. (Prerequisite: FIN 3320 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) |

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 2.75 GPA) |
| ACCT 2301 | Managerial Accounting. (Prerequisite: ACCT 2300 and 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 2.75 GPA) |
| FIN 3321 | Financial Statement Analysis. (Prerequisite: FIN 3320 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) |

General Business Minor-18 Hours

| | |
|-----------|---|
| ACCT 2300 | Financial Accounting. (Prerequisite: Sophomore standing, C or better in any college level mathematics course, and 2.75 GPA) |
| ACCT 2301 | Managerial Accounting. (Prerequisite: ACCT 2300 and 2.75 GPA) |
| MATH 2345 | Introduction to Business Statistics. (Prerequisite: At least a C in college-level mathematics) |
| FIN 3320 | Corporation Finance I. (Prerequisite: ECO 2301, 2302, ACCT 2301, MATH 2345, and a minimum 2.75 GPA) |
| MKT 3350 | Introduction to Marketing. (Prerequisite: ECO 2301 or AAEC 2305 or ECO 2305 and a minimum 2.75 GPA) |
| MGT 3370 | Organization and Management. (Prerequisite: A minimum 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 2.75 GPA) |
| ACCT 2301 | Managerial Accounting. (Prerequisite: ACCT 2300 and 2.75GPA) |
| BLAW 3391 | Business Law I. (Prerequisite: A minimum 2.5 GPA) |
| FIN 3320 | Corporation Finance I. (Prerequisite: ECO 2301, 2302, ACCT 2301, MATH 2345, and a minimum 2.75 GPA) |
| MKT 3350 | Introduction to Marketing. (Prerequisite: ECO 2301 or AAEC 2305 or ECO 2305 and a minimum 2.75 GPA) |
| MGT 3370 | Organization and Management. (Prerequisite: A minimum 2.75 GPA) |

Management Minor—18 Hours

| | |
|----------|--|
| MGT 3370 | Organization and Management. (Prerequisite: A minimum 2.5 GPA) |
|----------|--|

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 2440 or an approved course on introduction to computers and a minimum 2.5 GPA) |
| 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 2.75 GPA) |
|----------|---|

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 Administration.

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 our 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 our 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 Administration.

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 Administration 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 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 Administration. A student is officially admitted to the college by a formal transfer completed by the Undergraduate Services Center. Upper division business and economics courses will be used in the degree program if the student had a 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 Administration.

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 Administration 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 Administration. 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 16 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. 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 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.

Study Abroad. Students requesting permission to study abroad must have a minimum 2.5 adjusted Texas Tech GPA. Please check with the International Business office for specific program requirements.

Summer Work. Course work to be taken at other institutions must be approved by a COBA 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. COBA 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. The freshman course “Professional Enterprise” assists students in career planning, and aptitude tests are available in the University Counseling Center.

Upper division students should maintain contact with a COBA advisor in the Undergraduate Services Center concerning degree requirements and with faculty advisors for help in selecting courses to achieve career objectives.

Graduate Program

Admission to graduate degree programs offered through the Jerry S. Rawls College of Business Administration 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.

Generally, the M.B.A. student 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 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 is designed to produce a specialist in one of the following areas of business: finance, marketing, management information systems,

telecommunication technology and network management, 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 roughly four years of full-time academic work. A student with an undergraduate business background may complete both degrees with 104 hours of law and business courses respectively, a net saving of 24 credit hours from the total hours necessary if the degree programs were pursued separately. A student without a business background may complete both degrees with 112 hours of law and business courses. 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 College of Business Administration.

Joint Doctor of Medicine—Master of Business Administration. The college, in association with the Texas Tech Health Sciences Center School of Medicine, 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

(Continued on next page)

Graduate Program... (Continued from previous page)

program. The program is designed for academically outstanding undergraduate students who wish to complete a master's degree while at Texas Tech.

Students should apply and be accepted to the graduate component of the program before the first semester of their senior year. Application materials are available in the Graduate Services Center (BA 252) of the college. Upon successful completion of the required undergraduate courses plus 6-9 hours of designated graduate work, the B.B.A. degree will be granted (except for the B.B.A. and M.S.A. program which grants both degrees simultaneously). The final portion of graduate work will be completed during the student's 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. There are such joint programs with the Texas Tech Health Sciences Center School of Nursing (M.S. in Nursing), 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 22-24 fewer hours than if both degrees are pursued separately, depending on the program.

Master of Architecture—Master of Business Administration. Students pursuing a M.Arch. degree may begin taking selected business courses in the senior year. These courses become part of the Master of Architecture degree and are prerequisites for the Master of Business Administration degree.

Students should apply and be accepted to the graduate component of this program *before* the first semester of their senior year. Graduate course work begins in the final semester of their undergraduate work. 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 Jerry S. Rawls College of Business Administration.

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. Early in the program each student must satisfy requirements—through course work with a minimum grade of B—in advanced statistics and micro- and macro-economics. There is no requirement 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 Jerry S. Rawls College of Business Administration requires that its master's program students maintain at least a 3.00 cumulative grade-point average. Doctoral students must maintain a 3.20 cumulative average. The grade-point average is computed on all graduate courses included on the degree program. Students falling below these averages will be subject to probationary action. In order to graduate, master's students must make at least three hours credit with a grade of A above a 3.00 cumulative grade-point average 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 |
| I S 1300, Professional Enterprise | 3 | *HIST 2301, Hist. of U.S. Since 1877 | 3 |
| *†Laboratory Science | 4 | *†Laboratory Science | 4 |
| *HIST 2300, Hist. of U.S. to 1877 | 3 | *†Humanities (Foreign Lang. for Int'l. Business majors) | 3 |
| TOTAL | 16 | TOTAL | 16 |
| SECOND YEAR | | | |
| Fall | | Spring | |
| ACCT 2300, Fin. Acct. | 3 | ACCT 2301, Man. Acct. | 3 |
| ISQS 2440, Intro. Comp. Sys. Bus. | 4 | MATH 2345, Intro. Stats. Bus. | 3 |
| ECO 2301, Prin. Economics I | 3 | ECO 2302, Prin. Economics II | 3 |
| *POL 1301, Amer. Govt., Org. | 3 | *POL 2302, Amer. Pub. Pol. | 3 |
| *†Visual and Performing Arts Plus Foreign Language for Int'l. Business majors | 3 | *Elective (Non B A or Non Eco.) or ISQS 2341 with a grade of A or B for MIS majors or Foreign Language for Int'l. Business majors | 3 |
| TOTAL | 16 | TOTAL | 15 |

*These are the only courses not requiring a grade of C or higher.
 †Choose from Core Curriculum requirements.
 Minimum hours required for Lower Division—63.

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 College of Business Administration. 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 or higher cumulative Texas Tech GPA is required to declare accounting as a major and to take ACCT 3305 and 3306. The requirements to take the CPA examination in Texas include a bachelor's degree, 30 hours of accounting beyond introductory courses, and a minimum of 150 total hours. 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 M.S.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 |
| 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 or 4302 | 3 | | |
| ***Nonaccounting Elective | 3 | | |
| TOTAL | 15 | | |

*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 must take both courses.
 ††Students going into the 150-hour program will have 21 hours of major courses and only 9 hours of nonaccounting electives.
 Minimum hours required for graduation—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. This program is recommended for students intending to become certified public accountants. Upon admission to the 150-Hour Program, a concentration must be selected from Auditing-Financial Reporting or Taxation. The program may differ if the student elects to participate in an internship. The appropriate graduate faculty accounting advisor should be consulted for approval of the graduate program prior to the seventh semester. Upon completion of all requirements for the M.S.A. degree, the B.B.A. degree will be granted. Students may also consider the 150 M.B.A. program. Please see your advisor.

| 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 | |
| ACCT 4301, Prin. of Auditing | 3 | ENGL 3365, Prof. Rept. Writing | 3 |
| BLAW 3391, Business Law I | 3 | Graduate Courses | 6 |
| ACCT 3306, Prin. Cost & Mgr. Acct. | 3 | ACCT 4302 | 3 |
| *Nonaccounting electives | 9 | TOTAL | 12 |
| TOTAL | 18 | | |

The following courses apply to the Auditing-Financial Reporting and Taxation concentrations:
 *These are the only courses not requiring a grade of C or higher. These courses may be business (except accounting) or nonbusiness and are eligible for the pass/fail option. If not already fulfilled, the multicultural requirement should be completed with an elective.
 **Any upper level economics course except ECO 3323 and 4332.
 Minimum hours required for graduation—150.

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. | 3 |
| MKT 3350, Intro. to Marketing | 3 | or FIN 3323 | |
| ISQS 3344, Intro. Prod. Oper. Mgt. | 3 | MGT 3373, Managerial Comm. | 3 |
| TOTAL | 15 | **Group A | 3 |
| | | TOTAL | 15 |

| FOURTH YEAR | | | |
|---------------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| ECO 4323, Monetary Theory | 3 | MGT 4380, Strategic Management | 3 |
| **Group A | 3 | *Free Electives | 9 |
| †Group B | 6 | TOTAL | 12 |
| *Elective (Non B A or Non Eco.) | 3 | | |
| 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 two courses from ECO 3322, 3324, 3326, 3330, 3333, 3334, 3336, 4305, 4314, 4331, 4333, 4334, MGT 4372, and remaining Group A courses.
 Minimum hours required for graduation—120.

150-Hour Economics Major

Upon admission to the 150-Hour 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 30 hours of 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. | 3 |
| MKT 3350, Intro. to Marketing | 3 | or FIN 3323 | |
| ISQS 3344, Intro. Prod. & Oper. | 3 | MGT 3373, Managerial Comm. | 3 |
| TOTAL | 15 | **Group A | 3 |
| | | TOTAL | 15 |

| FOURTH YEAR | | | |
|---------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| ECO 4323, Monetary Theory | 3 | MGT 4380, Strategic Management | 3 |
| **Group A | 3 | Graduate Courses | 9 |
| †Group B (3 hours) | 3 | TOTAL | 12 |
| *Free Elective | 6 | | |
| TOTAL | 15 | | |

*These are the only courses not requiring a grade of C or higher.
 **Group A—Choose two courses from ECO 3320, 4332 (or FIN 4328), FIN 4323, 4325, 4326, and 4329.
 †Group B—Choose one course from ECO 3322, 3324, 3326, 3330, 3333, 3334, 3336, 4305, 4314, 4331, 4333, 4334, MGT 4372, or remaining Group A courses.
 Minimum hours required for undergraduate degree—120.

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 |

*This is the only course not requiring a grade of C or higher.
 **Group A—Choose three courses from FIN 3332, 3334, 4323, 4325, 4326, 4328, 4329, 4333, 4336, 4381, and 4383.
 †Group B—Choose one course from ACCT 3305, 3306, 3307, 3315, BLAW 3393, ISQS 3343, ECO 3312, 3322, 3324, 3330, 3333, 4323, 4331, FIN 4382, MKT 3356, or remaining Group A courses.
 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.
 Minimum hours required for graduation—120.

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, Intro. 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 |

*This is the only course not requiring a grade of C or higher.
 **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.
 Minimum hours required for graduation—120.

150-Hour Finance Major

Upon admission to the 150-Hour 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 30 hours of graduate courses.

| 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, Intro. 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 | MGT 4380, Strategic Management | 3 |
| FIN 4324, Investments | 3 | Graduate Courses | 6 |
| **Group A | 3 | 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, 4328, 4329, 4333, 4336, 4381, and 4383.
 Minimum hours required for undergraduate degree—120.

General Business Major

| THIRD YEAR | | | |
|-------------------------------|----|----------------------------|----|
| Fall | | Spring | |
| **Economics Course | 3 | BLAW 3391, Business Law I | 3 |
| FIN 3320, Corp. Fin. | 3 | MGT 3373, Managerial Comm. | 3 |
| ISQS 3344, Prod. & Oper. Mgt. | 3 | †Advanced Courses | 9 |
| MGT 3370, Organiz. & Mgt. | 3 | TOTAL | 15 |
| MKT 3350, Intro. to Marketing | 3 | | |
| TOTAL | 15 | | |

| FOURTH YEAR | | | |
|---------------------------------|----|--------------------------|----|
| Fall | | Spring | |
| †Advanced Courses | 9 | MGT 4380, Strategic Mgt. | 3 |
| *Elective (Non B A or Non Eco.) | 3 | †Advanced Course | 3 |
| *Free Elective | 3 | *Free Electives | 6 |
| 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 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.
 Minimum hours required for graduation—120.

General Business Major—International Emphasis

| THIRD YEAR | | | |
|-------------------------------|----|------------------------------------|----|
| Fall | | Spring | |
| **Economics Course | 3 | BLAW 3391, Business Law I | 3 |
| FIN 3320, Corp. Fin. | 3 | FIN 3323, Prin. Money, Bank. & Cr. | 3 |
| ISQS 3344, Prod. & Oper. Mgt. | 3 | MGT 3373, Managerial Comm. | 3 |
| MGT 3370, Organiz. & Mgt. | 3 | *Elective (Non B A or Non Eco.) | 3 |
| MKT 3350, Intro. to Marketing | 3 | ***Group A | 3 |
| TOTAL | 15 | TOTAL | 15 |

| FOURTH YEAR | | | |
|-----------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| FIN 4328, Internat. Finance | 3 | MGT 4380, Strategic Management | 3 |
| MGT 4375, Int'l Management | 3 | ***Group A | 3 |
| MKT 4358, Int'l Marketing | 3 | †Group B | 3 |
| *Free Electives | 6 | *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 two courses from ECO 3333, 3334, 4331, GEOG 3358, 3363, 3364, 4305, HIST 3353, 3354, 3374, 3382, 3384, 3392, 4383, 4394, POLS 3361, 3363, 3366, 3373, 3374, 3375, 3376, and 4364.
 †Group B—Choose one additional junior or senior level course in ACCT, B A, FIN, ISQS, MGT, or MKT.
 Minimum hours required for graduation—120.

150-Hour General Business Major

Upon admission to the 150-Hour 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 30 hours of graduate courses.

| THIRD YEAR | | | |
|-------------------------------|----|----------------------------|----|
| Fall | | Spring | |
| **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 | | | |
|-------------------|----|--------------------------------|----|
| Fall | | Spring | |
| †Advanced 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.
 Minimum hours required for undergraduate degree—120.

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 | | | |
|--|----|-------------------------------|----|
| Fall | | Spring | |
| Study Abroad Semester (May also be done in spring of 3rd year or fall of 4th year) | 12 | BLAW 3391, Business Law I | 3 |
| | | FIN 3320, Corp. Fin. | 3 |
| | | MGT 3370, Org. & Management | 3 |
| | | MGT 3373, Managerial Comm. | 3 |
| | | MKT 3350, Intro. to Marketing | 3 |
| | | ***Directed Elective | 1 |
| | | TOTAL | 16 |

| FOURTH YEAR | | | |
|-------------------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| FIN 3323, Prin. Money, Bank., & Cr. | 3 | FIN 4328, Int'l. Finance | 3 |
| ISQS 3344, Prod. & Oper. Mgt. | 3 | MGT 4380, Strategic Management | 3 |
| MGT 4375, Int'l Management | 3 | MKT 4358, Int'l. Marketing | 3 |
| *Group A | 6 | **Group B | 3 |
| ***Directed Elective | 1 | ***Directed Elective | 1 |
| TOTAL | 16 | TOTAL | 13 |

*Group A—Choose two courses from ACCT 4314, GEOG 3358, 3363, 3364, 4305, HIST 3353, 3354, 3374, 3382, 3384, 4383, 4393, 4394, I B 4383, POLS 3361, 3363, 3366, 3373, 3374, 3375, 3376, and 4364.
 **Group B—Choose one course from ECO 3333, 3334, and 4331.
 ***Directed Electives—One-hour semesters of International Business Language labs.
 Minimum hours required for graduation—125.
 Students interested in the International Business major are required to complete the equivalent of three semesters of a single foreign language while in the lower division and then make application for the major. The humanities requirement will be satisfied with completion of the foreign language.

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 cumulative Texas Tech GPA is required to declare management as a major.

| THIRD YEAR | | | |
|-------------------------------|----|--------------------------------------|----|
| Fall | | Spring | |
| **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 | | | |
|----------------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| †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 | | |

*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 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.
 Minimum hours required for graduation—120.

Honors Program in Management (HPM)

The HPM 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.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 3.0 adjusted Texas Tech GPA is required to declare HPM.

| THIRD YEAR | | | |
|-------------------------------|----|--------------------------------------|----|
| Fall | | Spring | |
| **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 | | | |
|---------------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| ††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 |

*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 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.
 Minimum hours required for graduation—120.

150-Hour Honors Program in Management (HPM)

The HPM specialization is a joint program of the Honors College and the area of management in the College of Business Administration. It is a “pre-M.B.A.” program and prepares students for pursuing a master’s degree within the College of Business Administration 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 150-Hour 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 30 hours of graduate courses.

| THIRD YEAR | | | |
|-------------------------------|----|--------------------------------------|----|
| Fall | | Spring | |
| **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 | | | |
|---------------------------------|----|--------------------------------|----|
| Fall | | Spring | |
| ††Group B | 6 | MGT 4380, Strategic Management | 3 |
| †††Group C | 6 | Graduate Courses | 9 |
| *Elective (Non B A or Non Eco.) | 3 | TOTAL | 12 |
| TOTAL | 15 | | |

*This is the only course not requiring a grade of C or higher.
 **Any upper level economics course except ECO 3323 and 4332.
 †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 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.
 Minimum hours required for undergraduate degree—120.

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 2.5 Texas Tech GPA is required to enroll in ISQS 2341. An A or B in ISQS 2341 and a 2.75 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, Intro. 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 | |
| **Economics or Computer Science | 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 | | |

*These are the only courses not requiring a grade of C or higher.
 **Any upper level economics course except ECO 3323 and 4332 or any upper level computer science course.
 †Restricted Elective—Any junior or senior level course in B A or computer science or any other upper level courses as approved by a faculty advisor. (Some approved and recommended courses are ENGL 3365, COMS 3358, ISQS 3343, MGT 4370, ISQS 4382, and ACCT 3315.)
 Minimum hours required for graduation—120.

150-Hour Management Information Systems (MIS) Major

Upon admission to the 150-Hour 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 30 hours of 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 | |
| **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.
 Minimum hours required for undergraduate degree—120.

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 | | | |
|-------------------------------|----|--------------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| 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 | | | |
|---------------------------------|----|--------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| **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.

150-Hour Marketing Major

Upon admission to the 150-Hour 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 30 hours of graduate courses.

| THIRD YEAR | | | |
|-------------------------------|----|--------------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| 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 | | | |
|-----------------|----|--------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| †Group A | 6 | MGT 4380, Strategic Management | 3 |
| *Free Electives | 9 | Graduate Courses | 6 |
| 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.
 Minimum hours required for undergraduate degree—120.

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 or GEOG 1402 to fulfill one of their lower division laboratory science requirements.

| THIRD YEAR | | | |
|-------------------------------|----|-------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| **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 | | | |
|----------------------------------|----|--------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| 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 | | |

*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.
 Minimum hours required for graduation—120.

College of Education

Dr. Sheryl Santos Dean

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Lubbock, TX, 79409-1071
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About the College

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.

The primary function of the College of Education is to provide degree and certification programs for both undergraduate and graduate students who plan careers in education. For many individuals, this means a future in teaching. However, a variety of other degrees and certificates are available in such areas as educational leadership, counselor education, curriculum and instruction, educational psychology, higher education, and instructional technology. Furthermore, the College of Education prepares individuals to work with a variety of special populations and at a variety of levels—early childhood, middle level, secondary, two-year colleges, and senior colleges and universities.

Undergraduate Program

The general curricula for undergraduate degree and certification programs are outlined in this section; graduate degree programs leading to the Master of Education degree, the Doctor of Education degree, and professional certificates are detailed in the Graduate Program section. Any deviation from the approved curriculum for a particular degree must be approved by the student's advisor and by the office of the Dean of the College of Education.

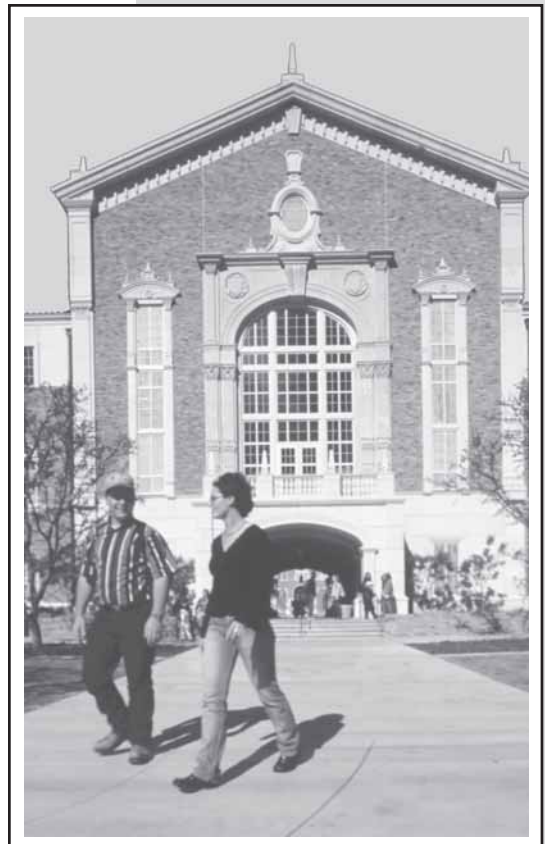
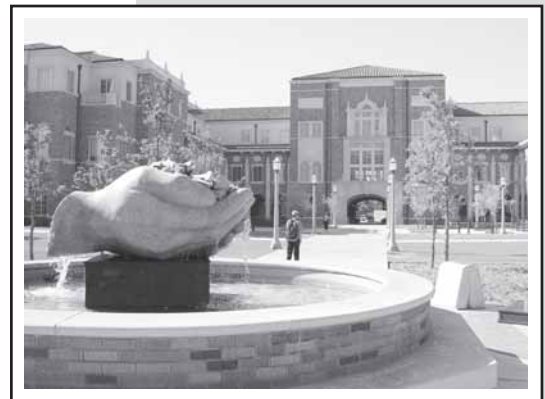
Because of state law, majors using the term "Education" (e.g., Secondary Education, Art Education) are not offered at Texas Tech University. Individuals will be certified to teach in elementary and secondary schools, but must complete noneducation majors.

Students preparing to teach in secondary schools will generally complete an academic major in Agricultural Sciences and Natural Resources, Arts and Sciences, Human Sciences, or Visual and Performing Arts, with additional courses in professional education required for certification. Students interested in teaching composite science (certified to teach in secondary schools) may complete a Multidisciplinary Science major in the College of Education, or an academic major in one of the teaching fields.

Students preparing to teach in grades 4 through 8 will complete a Multidisciplinary Studies major in the College of Education. Students seeking early childhood certification may do so through a degree in the College of Human Sciences. Certification guidelines are determined by the state and may be subject to change.

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 Academic Information section of the catalog.



Advisory Program. The advisory program in the College of Education is designed to provide aid to each student in planning and completing the appropriate degree and teacher certification program. *Each student is expected to have at least one individual conference each semester with an advisor during which the current semester's work will be evaluated and the next semester's plan will be developed.*

The academic advisor is responsible for (1) assisting the student in planning a program and in selecting courses to be taken each semester prior to registration, (2) helping the student in selecting the proper areas of specialization and/or teaching fields, and (3) advising the student in meeting admission and retention standards of teacher education and student teaching. Either advisor or advisee may ask the Dean of the College of Education for a change in assignment.

Degree and Teacher Certification Programs.

Degree and teacher certification programs are two distinct programs. Freshman or transfer students are admitted to a degree program in the College of Education 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 culminates with the state mandated TEXES exams. Students must pass all appropriate certification exams by 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 of Education seeks to maintain rigorous academic programs to produce outstanding educators for Texas and the nation. Admission to College of Education 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 Early Childhood, Middle-Level Education, All-Level, Secondary, and Career and Technology Education 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 a twice per year admission process. Application forms from the College of Education should be completed during the second semester of the sophomore 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 (through a degree in Human Sciences) 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. A satisfactory level of performance on the Texas Academic Skills Program (TASP).
3. Good character and high ethical standards. All applicants for Texas certification are screened for a record of felony or misdemeanor convictions through the Texas Department of Public Safety. All potential certificate applicants with criminal felony or misdemeanor convictions should immediately contact the Texas Tech Certification Office to seek clarification of their certification status.
4. Possess the ability to speak and understand the English language sufficiently to use it easily and readily in conversation and teaching.
5. Possess such personal and social qualities, and physical and mental health to indicate a fitness for the education profession.
6. Evidence of critical thinking.
7. 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 or have not passed the TASP examination due to extenuating circumstances may also apply for admission to teacher education. The Admission Committee will review each such request.

Students in other colleges may complete the requirements for teacher certification when these are taken together with an appropriate teaching major. Generally, all persons seeking early childhood certification to grade 4 will enroll in the College of Human Sciences; students seeking certification at the middle level (grades 4 to 8) will enroll in the College of Education; those interested in secondary school level may enroll in the College of Education or in the College of Arts and Sciences, the College of Agricultural Sciences and Natural Resources, the College of Human Sciences, or the College of Visual and Performing Arts, depending upon the teaching field desired. Students planning to teach agricultural science or family and consumer sciences will enroll in the appropriate respective college.

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 special-

izations or teaching fields are usually taken in the junior and senior years.

Professional Education. The standards for admission to a program leading to teacher certification are described in the section of the catalog entitled "Admission to the Teacher Certification Program."

Methods courses for initial certification programs include field experience in schools and are offered only when the elementary and secondary schools are in session.

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 division 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 required corequisite education course. Requests to take more than 12 hours must be approved by the certification officer.

Length of Degree Program. The Bachelor of Science degree can be completed in approximately eight semesters. The Multidisciplinary Studies major requires 133 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 found in the office of the Dean of the College of Education. An Intent to Graduate form should be filed in the office of the Dean of the College of Education 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. No student on probation is 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 "D" grades may or may not transfer depending on Coordinating Board, university, and College of Education guidelines.

Please see the university Teacher Education section of this catalog for information on recommendations for teacher certification and admission to student teaching.

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 4380. 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 4380. The minimum number of hours for a minor in secondary education is 18.

Graduate Program

Programs are available through the College of Education leading to the following graduate degrees: *Master of Education* and *Doctor of Education*. Students may select from a number of majors or support areas while working toward these degrees. The Office of Graduate Education and Research in the College of Education should be consulted for general information and referral to appropriate program advisors.

The Doctor of Education degree is offered in these areas: Counselor education, curriculum and instruction, educational leadership, educational psychology, higher education, instructional technology, and special education. The Doctor of Philosophy degree is offered in Higher Education. See the Division of Educational Psychology and Leadership for more information on this degree. Master of Education degrees are offered in bilingual education, counselor education, curriculum and instruction, educational leadership, educational psychology, elementary education, higher education, instructional technology, language literacy education, secondary education, and special education.

Initial and Professional Certification (Public Schools). Post baccalaureate programs designed to meet initial certification requirements for teaching in early childhood, middle level, and secondary schools are available. 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 an advisor or the university certification officer and the chairpersons of the various programs. Professional certification programs are offered in these areas: principal, superintendent, counselor, educational diagnostician, master reading teacher, reading specialist, and special education

counselor. Professional teacher's certificates are awarded in approved fields in early childhood, middle level, and secondary education. Graduate program endorsements are available for bilingual education, early childhood, English as a second language, gifted and talented, information processing technologies, generic special education, and visual impairment.

Doctor of Education Degree. Doctoral study consists of the mastery of a field of knowledge and successful pursuit of research. Consequently, doctoral programs are more flexible and varied than those leading to other graduate degrees. The Graduate School does not specify a course of study for the Doctor of Education degree. The general requirement is that the program should be unified in relation to a clear objective, that it should have the considered approval of the student's advisory committee, and that it should have a strong research component. The Doctor of Education degree is not granted for a program of miscellaneous study. The program as a whole must be rationally unified, and all courses must contribute to an organized program of study and research. The major field must be from one of the following doctoral programs in the College of Education: (1) counselor education, (2) curriculum and instruction, (3) educational leadership, (4) educational psychology, (5) higher education, (6) instructional technology, or (7) special education. If a minor is taken, it must include at least 15 graduate hours in a program outside the student's major. Students majoring in curriculum and instruction may select a support area, such as bilingual, elementary, language literacy, or secondary education.

In addition to the major, every Doctor of Education degree program must include a foundations core (9 semester-hours minimum) and a research core (12 semester-hours minimum). The doctoral degree is never conferred solely as a result of any prescribed period of study. Rather, it is granted on evidence of general proficiency and distinctive attainment in a special field. The distinguishing feature of the

degree is its focus on the student's mastery of independent investigation as demonstrated in a dissertation presenting original research or creative scholarship with a high degree of literary skill.

A period of residency is required for doctoral candidates to ensure that each has a time of concentrated study as a full-time student with minimal outside distractions. Such a period of course work, reading, reflection, study, research, and interaction with peers and faculty without the distractions 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 each 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; or
- For students holding half-time graduate assistantships, or students involved for no more than half-time in other work closely related to doctoral study, 9 semester hours in each of the regular semesters and at least 6 hours in the preceding or subsequent summer.

The proposal for doctoral study, including the plan for meeting the residency requirements, should be submitted to the Graduate School well in advance of the proposed residency period.

Division of Curriculum and Instruction

Margaret Johnson, Chairperson

Associate Professor, 1992. B.A., Adelphi, 1964; M.L.S., Alabama, 1974; M.A., Virginia Tech, 1977; Ph.D., Florida, 1993.

Faculty

Akrofi, Amma K., Visiting Assistant Professor, 2002. B.A., Ghana, 1972; Ed.D., Texas Tech, 2002.
Anderson, Connie A., Assistant Professor, 2001. B.S., Northeastern State, 1973; M.Ed., 1975; Ed.D., Oklahoma State, 1998.
Atcheson, Judith Rae, Visiting Assistant Professor, 2002. B.A., Denver, 1966; M.Ed., Missouri; Ed.S., 1988; Ed.D., Texas Tech, 1992.
Benavides, Alfredo, Associate Professor, 2002. B.A., Texas A&I, 1970; M.A., Michigan State, 1972; Ph.D., 1978.
Button, Kathryn A., Associate Professor, 1991. B.S., Ashland, 1973; M.A., Michigan State, 1986; Ph.D., Ohio State, 1992.
Cooper, Sandra B., Associate Professor, 1995. B.A., Louisiana Tech, 1985; M.A., 1988; Ph.D., Texas A&M, 1994.
Geer, Charles P., Associate Professor, 1979. B.A., San Francisco State, 1965; M.A., 1967; Ph.D., Arizona State, 1978.
Halsey, Pamela A., Assistant Professor, 2001. B.S., Howard Payne, 1986; M.Ed., Tarleton State, 1995; Ed.D., Texas Tech, 2001.
Hamman, Doug, Assistant Professor, 2002. B.A., St. Mary's, 1984; M.A., Pontifical College Josephinum, 1987; Ph.D., Texas, 1995.
Hovey, Larry M., Associate Professor, 1970. B.S., Illinois, 1964; M.Ed., 1965; Ph.D., California (Berkeley), 1970.
Janisch, Carole, Associate Professor, 1995. B.S., Wisconsin (Madison), 1964; M.Ed., Idaho State, 1986; Ph.D., Illinois (Urbana-Champaign), 1998.
Johnson, Holly A., Assistant Professor, 1997. B.A., California (Santa Barbara), 1986; M.A.T., Louisville, 1991; Ph.D., Arizona, 1997.
Lesley, Melinee, Assistant Professor, 2002. B.A., Iowa, 1988; M.A., New Mexico State, 1990; Ph.D., Pennsylvania, 1998.
Lupton, Jan E., Instructor, 2002. B.S., Texas Tech, 1969; M.Ed., 1987.
Midobuche, Eva, Associate Professor, 2002. B.S., Texas A&M, 1976; M.A., 1978; Ed.D., 1984.
Morgan-Fleming, Barbara, Associate Professor, 1994. B.A., Kansas, 1977; M.Ed., Arizona, 1989; Ph.D., 1994.
Myers, Susan, Assistant Professor, 2002. B.S., George Peabody College, 1979; M.Ed., Texas Christian, 1982; Ed.D., West Florida, 2000.
Pratt, Bobbi H., Instructor, 2002. B.S., Texas Tech, 1991; M.Ed., 1999.
Price, Margaret A., Assistant Professor, 1998. B.S., Texas A&M, 1974; M.A., Texas (Permian Basin), 1977; Ph.D., Texas A&M, 1998.
Santos, Sheryl, Professor and Dean, College of Education, 2003. B.A., Queens Coll., 1966; M.A., 1972; Ph.D., Kansas State, 1979.
Sheets, Rosa Hernandez, Associate Professor, 2002. B.A., New Mexico, 1967; M.A., Washington, 1977; Ph.D., Washington, 1995.
Simpson, Douglas J., Professor, 2002. B.A., Free Will Baptist Bible College, 1962; M.Ed., Middle Tennessee State, 1967; Ph.D., Oklahoma, 1970.

Skoog, Gerald Duane, Horn Professor, 1969. B.S., Nebraska, 1958; M.A., Northern Iowa, 1963; Ed.D., Nebraska, 1969.

Spears, Karen McNamara, Assistant Professor, 2002. B.A., Boston College, 1988; M.Ed., 1994; Ph.D., Arizona, 2002.

Talkmitt, Susan, Instructor, 1996. B.S., Texas Tech, 1983; M.S., 1985.

Thomas, Julie, Associate Professor, 1995. B.A., Nebraska (Kearney), 1973; M.A., 1983; Ph.D., Nebraska (Lincoln), 1995.

Wilhelm, Jennifer A., Assistant Professor, 2001. B.S., Bowling Green State, 1988; M.S., Michigan State, 1991; Ph.D., Texas, 2002.

Emeritus Faculty

Askins, Billy Earl, Professor and Chairperson, Emeritus, 1967-2002.

Butler, Lester G., Associate Professor, Emeritus, 1974-2002.

Christian, Aubry Duane, Associate Professor, Emeritus, 1971-1994.

Koeller, Shirley Ann, Associate Professor, Emeritus, 1978-1996.

Platten, Marvin Roger, Associate Professor, Emeritus, 1971-1993.

Rooze, Gene Edward, Professor, Emeritus, 1969-1996.

About the Program

This division supervises two degree programs: MULTIDISCIPLINARY STUDIES and MULTIDISCIPLINARY SCIENCE, *Bachelor of Science*. Graduate programs in this division are described in the Graduate Program section.

Middle-Level Education. This degree is designed primarily for individuals seeking teacher certification in grades 4 to 8. The State Board for Educator Certification recently approved the following certificates for middle-level (grades 4 to 8) certification: Generalist, Bilingual Generalist, English Language Arts, Social Studies, Mathematics, Science, and English Language Arts-Social Studies. Students should consult with an advisor in the College of Education to determine which certificates are available and 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 pedagogy (including the student teaching semester) in the College of Education. Education courses in middle level education include field experiences scheduled outside of class time. A minimum of 133 hours is required.

The following certificates have been approved by the State Board for Educator Certification for Secondary Education (grades 8 to 12): English Language Arts, Speech, Journalism, Social Studies, History, Science, Life Science, Physical Science, Mathematics, Technology Applications, and Computer Science. In addition, three all-level certificates have been approved: All-Level Physical Education, All-Level Art, and All-Level Music. Secondary and all-level certificates include three semesters of professional education courses (including student teaching) from the College of Education. Students will consult with advisors in their program areas

regarding a degree plan. Students must see an advisor in the College of Education to complete a certification plan.

Secondary Science Education—Bachelor of Science in Multidisciplinary Science.

The Multidisciplinary Science major is administered in this division. Individuals completing this major, the baccalaureate requirements, and the certification requirements are eligible for certification to teach all sciences grades 8 to 12 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. In addition, an emphasis in biology (20 to 22 semester hours), chemistry (18 to 20 semester hours), geosciences (20 to 22 semester hours), physics (18 to 21 semester hours), or life and earth science (29 semester hours) is required. 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.

Graduate Program

The division offers study in the following graduate degree programs: BILINGUAL EDUCATION, ELEMENTARY EDUCATION, LANGUAGE LITERACY EDUCATION, and SECONDARY EDUCATION, *Master of Education*; CURRICULUM AND INSTRUCTION, *Master of Education* and *Doctor of Education*. Within the curriculum and instruction major several support areas are possible including bilingual, elementary, language literacy, and secondary education.

Programs leading to alternative teacher certification and associated endorsements are available.

Individuals seeking initial certification to teach in elementary or secondary schools must complete specified courses in education and meet other general education and teaching field requirements. Information on the post baccalaureate program is available in the division office. Information on teacher certification is included in this catalog and the division office.

Information on admission standards, program requirements, and other matters concerning graduate programs in the division may be obtained from the division office or the Office of Graduate Education and Research in the College of Education.

Division of Educational Psychology and Leadership

Gerald Parr, Chairperson

Professor and Chairperson, Division of Educational Psychology and Leadership, 1974. B.S., Nebraska, 1965; M.A., Colorado, 1971; Ph.D., 1974.

Faculty

Ahern, Terence C., Associate Professor, 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.

Bowes, Greg, Professor, 2000. B.A., Augustana College, 1967; M.S., Northern Illinois, 1973; Ed.D., 1978.

Bradley, Loretta J., Horn Professor, 1987. B.S., Kentucky, 1965; M.A., 1968; Ph.D., Purdue, 1975.

Burley, Hansel, Associate Professor, 1995. B.A., St. Mary's, 1982; M.A., Stephen F. Austin, 1985; Ph.D., Texas A&M, 1993.

Butner, Bonita, Associate Professor, 1996. B.S., Central Missouri State, 1972; M.A., Missouri (Kansas City), 1979; Ph.D., Missouri (Columbia), 1996.

Cejda, Brent D., Associate Professor, 1998. B.M.E., Wichita State, 1973; M.M.E., 1982; Ph.D., Bowling Green State, 1990.

Claudet, Joseph G., Associate Professor, 1993. B.M.E., Nicholls State (Thibodaux, La.), 1978; M.Ed., 1987; Ph.D., Louisiana State, 1993.

Crooks, Steven, Assistant Professor, 1999. B.A., Brigham Young, 1986; M.H.A., 1988; Ph.D., Arizona State, 1995.

Davidson, Roseanna, Research Associate Professor, 1988. B.S., Abilene Christian, 1969; M.S., Texas Tech, 1971; Ed.D., 1988.

Duemer, Lee S., Assistant Professor, 2000. B.A., Rockford Coll., 1990; M.A., Pittsburgh, 1993; Ph.D., 1996.

Eckert, Stephen P., Assistant Professor, 2000. B.S., Texas A&M, 1983; M.Ed., North Texas, 1994; Ph.D., New Mexico, 1999.

Griffin-Shirley, Nora, Associate Professor, 1993. B.S., Maine, 1976; M.Ed., Boston College, 1979; Ph.D., Georgia State, 1993.

Hartmeister, Fred, Professor of Education and Law, 1993. B.S., Valparaiso, 1973; M.B.A., Denver, 1979; Ed.D., Wyoming, 1986; J.D., 1990. Admitted To Practice in Colorado and Wyoming.

Kelley, Patricia, Research Associate Professor, 1996. B.A., Southwest Texas, 1973; M.Ed., Texas Tech, 1980; Ed.D., 1988.

Koenig, Alan J., Professor and Associate Dean, College of Education, 1988. B.S., Illinois State, 1976; M.S., 1981; Ed.D., Vanderbilt, 1987.

Lan, William Yun, Associate Professor and Associate Dean, College of Education, 1990. B.Ed., Shanghai Normal (China), 1982; M.A., Iowa, 1988; Ph.D., 1990.

Layton, Carol Ann, Assistant Professor, 1996. B.S., Hardin-Simmons, 1975; M.Ed., Texas Woman's, 1978; Ed.D., Texas Tech, 1993.

Lock, Robin H., Associate Professor, 1996. B.S., Texas (Austin), 1976; M.Ed., 1981; Ph.D., 1985.

Marbley, Aretha F., Assistant Professor, 1997. B.A., Illinois, 1980; M.A., Northeastern Illinois, 1990; Ph.D., Arkansas, 1998.

Maushak, Nancy J., Assistant Professor, 1998. B.S., South Dakota, 1979; B.S., Chadron, 1985; M.S., 1990; Ph.D., Iowa State, 1997.

Mendez-Morse, Sylvia E., Assistant Professor, 1999. B.S., Southwest Texas State, 1974; M.A., Texas (San Antonio), 1983; Ph.D., Texas (Austin), 1997.

Murray, John P., Associate Professor, 1998. B.A., State U. of New York (Potsdam), 1969; M.A., Arizona State, 1988; Ph.D., Ohio State, 1990.

Olivarez, Arturo Jr., Associate Professor, 1991. B.S., Texas (Pan-American), 1979; M.S., 1983; Ph.D., Texas A&M, 1989.

Price, Robert V., Associate Professor, 1982. B.S., East Texas State, 1967; M.Ed., 1969; Ph.D., Texas (Austin), 1975.

Runnels, Mary K. Tallent, Associate Professor, 1985. B.S., Houston, 1971; M.S., Southern Illinois, 1974; Ph.D., Texas A&M, 1985.

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

Skoog, Gerald Duane, Horn Professor and Dean, College of Education, 1969. B.S., Nebraska, 1958; M.A., Northern Iowa, 1963; Ed.D., Nebraska, 1969.

Emeritus Faculty

Ainsworth, Charles Leonard, Professor and Vice Provost For Academic Affairs, Emeritus, 1967-1995.

Anderson, Robert Henry, Professor and Dean of Education, Emeritus, 1973-1983.

Beckner, Weldon Earnest, Professor, Emeritus, 1965-1992.

Bensberg, Gerard Joseph, Professor, Emeritus, 1971-1990.

Biggers, Julian Lawson Jr., Professor, Emeritus, 1966-1992.

Carter, Ralph Marlin, Associate Professor, Emeritus, 1971-1991.

Caskey, Owen Laverne, Professor, Emeritus, 1947-1983.

Cluff, E. Dale, Professor of Education and Dean of Libraries, Emeritus, 1982-2001.

Cornett, Joe D., Professor, Emeritus, 1968-1997.

Ewalt, Robert H., Associate Professor of Education and Vice President for Student Affairs, Emeritus, 1973-2000.

Filgo, Dorothy Jane, Associate Professor, Emeritus, 1960-1986.

Fleming, Patrice Margaret Catlin, Professor, Emeritus, 1967-1978.

Freeman, Kenneth Howard, Professor, Emeritus, 1969-1980.

Kelsey, Clyde E. Jr., Professor, Emeritus, 1972-1987.

Little Soldier, Leona Mitchell, Professor, Emeritus, 1969-1998.

Manley, Max Wayland, Associate Professor, Emeritus, 1970-1992.

Mattson, Bruce Douglas, Professor, Emeritus, 1965-1983.

Mehaffie, Shamus, Professor, Emeritus, 1971-1990.

Mezack Michael III, Associate Professor, Emeritus, 1975-1996.

Nagle, Levi Marshall Jr., Professor, Emeritus, 1959-1978.

Neivius, John R. Professor, Emeritus, 1974-1995.

Pasewark, William Robert, Professor, Emeritus, 1956-1982.

Peterson, Arlin, Professor, Emeritus, 1972-2001.

Pillow, Fannie Ernestine, Associate Professor, Emeritus, 1965-1976.

Purkerson, Ray Abiff, Associate Professor, Emeritus, 1972-1991.

Reavis, Charles Augustus, Professor, Emeritus, 1976-2002.

Rebstock, Charles Wesley, Associate Professor, Emeritus, 1966-1982.

Reid, Maryanne, Associate Professor, Emeritus, 1963-1995.

Roberts, Dayton Young, Professor, Emeritus, 1973-1990.

Rogers, John Robert, Professor, Emeritus, 1970-1980.

Ronshausen, Nina Lorraine, Associate Professor, Emeritus, 1975-1996.

Webb, Holmes Andrew, Professor, Emeritus, 1960-1970.

Willingham, Welborn Kiefer, Professor, Emeritus, 1961-1993.

Zintgraff, Paul Edward, Professor, Emeritus, 1974-1984.

About the Program

The Division of Educational Psychology and Leadership offers course work at the undergraduate level in educational psychology and special education. The division offers study in the following graduate degree programs: COUNSELOR EDUCATION, EDUCATIONAL LEADERSHIP, EDUCATIONAL PSYCHOLOGY, INSTRUCTIONAL TECHNOLOGY, SPECIAL EDUCATION, *Master of Education* and *Doctor of Education*; HIGHER EDUCATION, *Master of Education*, *Doctor of Education*, and *Doctor of Philosophy*.

Graduate Program

Programs leading to the professional certificates and associated endorsements are available. Information on admission standards, program requirements, and other matters concerning graduate programs in the division may be obtained from the division office or the Office of Graduate Education and Research in the College of Education.

Counselor Education. The college offers both a master's and doctoral level 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. Applicants must complete the Counselor Education Application Packet available in 105 Education.

The professional certificate in school counseling is available. Students desiring to obtain the school counseling certification only 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 they are equivalent to courses taught at Texas Tech. No transfer hours will be allowed for practica (EPCE 5360, 5362, or 5363) or techniques (EPCE 5357). In addition to successfully completing the program, the applicant must have 3 years teaching experience, a valid

(Continued on next page)

Graduate Program... (Continued from previous page)

teaching certificate, and pass a TExES examination administered by the State Board for Educator Certification. Additional information and application forms are available in 214 Education.

Educational Leadership. Students in this program may choose to emphasize educational leadership or supervision at the elementary, secondary, or system level in the public schools. Work in related fields outside of the College of Education is encouraged.

Graduate work is offered in preparation for these professional certificate programs: Principal and superintendent.

Degree programs and certification programs have different requirements, but many courses will apply to both.

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 admission to a doctoral program later. Applicants without a strong background in psychology may be required to complete leveling courses before unconditional admission to the program. Additional information and applications forms are available in 105 Education.

Higher Education. The Higher Education program is committed to excellence in preparing and supporting instructional and administrative leaders for higher education, generating and supporting research, and delivering public service to the field of higher education.

Higher education students come from a variety of fields and types of higher education institutions. Our primary role is to prepare leaders for the higher education enterprise. The program delivers teaching,

research, and professional development services to students, institutions of higher education, and other academic disciplines.

Students working on a master's degree may pursue either nonthesis or thesis options. The master's program consists of two tracks or majors: Higher education administration (36 semester hours) and student affairs (48 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. There are three tracks or majors in the Ed.D.: University administration, community college leadership and teaching, and 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; and 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 courses are offered via the World Wide Web.

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.

A cooperative program in library information systems is also offered in conjunction with the University of North Texas. This program prepares library and information specialists for public schools and for public and academic libraries.

The instructional technology program offers three certification programs which may be taken in conjunction with a graduate degree program or independently. Information processing technology (IPT) is a state teaching certificate endorsement, which certifies the holder to teach certain technology related courses in public schools. Computer information systems is a secondary school teaching field program for teachers of computer science. A distance education certificate program is a university issued certificate, which certifies competency in distance education teaching and instructional design.

For more information, see the program Web site at www.educ.ttu.edu/edit.

Special Education. The special education program emphasizes generic special education at both the master's and the doctor's level. Graduate work at the master's level may include sufficient course work in one area of exceptionality to produce an endorsement on the basic provisional elementary or secondary certificate. The course offerings also apply to preparing the special education teacher, educational diagnosticians, teachers of students with visual impairments, teachers of students with deaf-blindness, and orientation and mobility specialists.

For specific information and advisement, students should consult appropriate program advisors.

College of Engineering

Dr. James L. Smith Interim Dean

100 Engineering Center
Box 3103
Lubbock, TX, 79409-3103
(806) 742-3451
www.coe.ttu.edu



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.

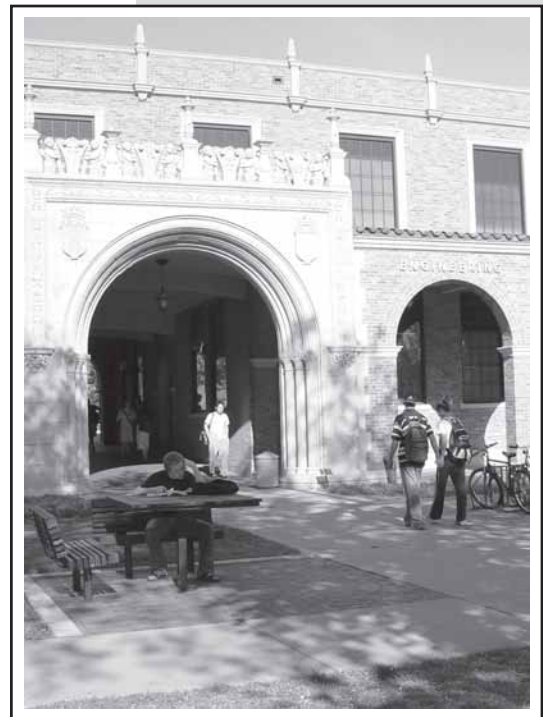
Undergraduate Program

The College of Engineering 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 \$175. The optional mathematics review is \$25. The students are retested for mathematics placement. Many students improve on their placement test by one course, which more than pays for the cost of the BRIDGE.

The College of Engineering 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 of Engineering 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 sum-

mer 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, McMurray 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 1308,2301,1105,1106 | 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.

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.

Advanced Degrees in Engineering. Programs are available through the College of Engineering leading to Master of Science and Doctor of Philosophy degrees in the fields of computer science and chemical, civil, electrical, industrial, mechanical, and petroleum engineering. In addition to these programs, the College of Engineering offers a Master of Engineering degree designed especially for practicing engineers desiring to continue their professional education.

Admission to the Graduate School is based upon an above average undergraduate record and satisfactory standing on the Graduate Record Examinations.

Admission and Enrollment

Freshman Programs. The College of Engineering expects entering students to meet certain admission requirements. Students who qualify, as evidenced by their high school records and placement tests, will be assigned to the freshman program shown in the departmental curriculum.

Entering students with inadequate preparation in mathematics or deficiencies in College of Engineering entrance requirements will be required to complete College Algebra, MATH 1320, and/or Trigonometry, MATH 1321, or precalculus MATH 1550, introductory chemistry or physics, in addition to the courses shown in the departmental curriculum. To remove such deficiencies, the student should attend summer school before the first long session. Engineering students who need algebra, trigonometry, or science but who are unable to take advantage of summer school should arrange an appropriate schedule with their faculty advisor. A typical schedule includes the following:

Typical Alternate Freshman Year for Engineering Students

| Fall | | Spring | |
|-----------------------------|----|----------------------------------|----|
| MATH 1321, Trigonometry | 3 | MATH 1350, Anal. Geom. | 3 |
| MATH 1320, Coll. Alg. | 3 | ENGL 1302, Adv. Coll. Rhct | 3 |
| E GR 1306, EngrGraphics | 3 | ENGR 1305, Engr. Anal. I | 3 |
| ENGL 1301, Ess. Coll. Rhct | 3 | PHYS 1304, Basic Ideas and Meth. | 3 |
| CHEM 1301, Intro. Chemistry | 3 | HIST 2300, Hist. of U.S. to 1877 | 3 |
| TOTAL | 15 | TOTAL | 15 |

| SUMMER SESSION | | | |
|--------------------|---|---------------------|---|
| First Term | | Second Term | |
| MATH 1351, Calc. I | 3 | MATH 1352, Calc. II | 3 |

Similar adjustment to compensate for deficiencies in recommended admission requirements can be made in the freshman programs in engineering technology and computer science. Special consideration will be given to applicants with strong high school backgrounds, even though they may not meet some of the specific entrance requirements. It should be noted, however, that most students who are admitted with fewer than the recommended qualifications should anticipate its requiring more than two semesters for completion of the freshman program.

Dynamic Enrollment Management Plan.

Each department administers a Dynamic Enrollment Management Plan (DEMP). With minor procedural differences between departments, the DEMP consists of the following phases: general admission, preliminary admission to a degree program, and the degree program. The initial phase consists of approximately the first three full semesters of a degree program. The second phase is different for each department and is usually the fourth semester of the degree program. The final phase consists of the last four semesters of a degree program. The student moves from the initial phase by earning grades of C or better in all courses and successfully petitioning the department of choice. A student enters the third phase by successfully completing the second phase, petitioning for entry into the third phase, and meeting the department's GPA requirements. The minimum cumulative GPA for graduation is 2.0. Detailed guidelines and other limitations related to the Dynamic Enrollment Management Plan are available in each departmental office and from the Dean's Office.

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.

Foreign Students. Because of the large number of foreign students seeking admission to programs in the College of Engineering, it has become necessary to establish special admission requirements. Foreign students entering the college from their countries' high schools must have grades that are equivalent to an average grade of B on the U.S. scale. High school grades in mathematics and science courses must also average B, and all entering foreign students must achieve scores of 550 or higher on the Test of English as a Foreign Language. Foreign students seeking to transfer to the College of Engineering from other colleges or universities should contact the Director of Foreign Student Admissions for information about specific transfer requirements.

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 Academic Information section of the 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 3312, 3322, 3331, and 3370. The designated engineering technology science courses are GTEC 2321, 2351, and 2411.

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 and selecting E-COACH. 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.

Graduate Program

The College of Engineering offers programs of instruction and research leading to the *Master of Science* and the *Doctor of Philosophy* degrees with majors in Chemical, Civil, Computer Science, Electrical, Industrial, Mechanical, and Petroleum Engineering. A *Master of Science in Environmental Technology Management* degree and a *Master of Environmental Engineering* degree are offered in the Department of Civil 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

Gregory B. McKenna, Chairperson

Professor, 1999. B.S., U.S. Air Force Acad., 1970; S.M., Massachusetts Inst. Tech., 1971; Ph.D., Utah, 1976.

Faculty

Abbott, James R., Associate Professor, 1999. B.S., California (Davis), 1986; Ph.D., Massachusetts Inst. Tech., 1993.

Dai, Lenore, Assistant Professor, 2002. B.S., Beijing U. of Chemical Tech. (China), 1990; Ph.D., Illinois, 1997.

Graham, Alan L., Professor, 1998. B.S., Texas Tech, 1974; M.S., 1975; Ph.D., Wisconsin (Madison), 1980.

Heichelheim, Hubert R., Associate Professor, Emeritus, 1961. B.S. in Ch.E., Notre Dame, 1953; M.S. in Ch.E., 1956; Ph.D., Texas (Austin), 1962; Reg. Prof. Engr. (Texas).

Hoo, Karlene A., Associate Professor, 1999. B.S., Pennsylvania, 1981; H.M.S., Notre Dame, 1983; Ph.D., 1986

Leggoe, Jeremy W., Assistant Professor, 1999. B.E., Western Australia, 1988; Ph.D., 1997.

Mann, Uzi, Professor, 1978. B.Sc., Technion-Israel Inst. of Technology, 1965; M.Sc., 1967; Ph.D., Wisconsin (Madison), 1972.

Parker, Harry, Professor, 1970. B.S. in Ch.E., Texas Tech, 1953; M.S. in Ch.E., Northwestern, 1954; Ph.D., 1956; Reg. Prof. Engr. (Texas).

Riggs, James B., Professor, 1983. B.S., Texas (Austin), 1969; M.S., 1972; Ph.D., California (Berkeley), 1977.

Simon, Sindee L., Associate Professor of Chemical Engineering and Engineering Physics, 1999. B.S., Yale, 1983; Ph.D., Princeton, 1992.

Tock, Richard W., Professor, 1974. B.S., Iowa (Iowa City), 1963; M.S., 1964; Ph.D., 1967; Reg. Prof. Engr. (Texas).

Vaughn, Mark W., Assistant Professor, 2001. B.S.Ch.E., Arkansas, 1974; Ph.D., Texas A&M, 1995.

Wiesner, Theodore F., Associate Professor, 1996. B.S., Kansas State, 1977; M.S., Houston, 1985; Ph.D., Georgia Inst. Tech., 1994.

Emeritus Faculty

Bethea, Robert Morrison, Professor, Emeritus, 1966-1998.

Bradford, John Ross,

Professor of Chemical Engineering and Dean of Engineering, Emeritus, 1943-1993.

About the Program

This department supervises the following degree programs: CHEMICAL ENGINEERING, *Bachelor of Science in Chemical Engineering*, *Master of Science in Chemical Engineering*, and *Doctor of Philosophy*. The undergraduate degree requirements appear in the accompanying 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. A minor in chemistry or mathematics can 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 B.A. or Economics courses.

An agreement has been reached between the Department of Computer Science and the Department of Chemical Engineering whereby degrees in both fields can be earned. The additional semester hours are specified as follows:

| | <i>Semester hours</i> |
|---|-----------------------|
| MATH 2360 | 3 |
| C S 2371 | 3 |
| C S 1411 | 4 |
| C S 1412 | 4 |
| C S 2350 | 3 |
| C S 2382 | 3 |
| C S 2413 | 4 |
| C S 3352 | 3 |
| C S 3361 | 3 |
| C S 3364 | 3 |
| C S 3365 | 3 |
| C S 3375 | 3 |
| C S 3383 | 3 |
| Total additional specified hours | 48 |

CS 1411 may be substituted for CH E 1305, and in addition, six of the CS hours at the sophomore level or higher may be substituted for the chemical engineering electives in the B.S.Ch.E. curriculum, resulting in an additional 39 hours for the B.S.C.S.

Several substitutions are made in the B.S.C.S. curriculum:

| | <i>Semester hours</i> |
|-----------------------------------|-----------------------|
| CH E 2306 | |
| for ENGL 2311 and COMS 3358 | 3 |
| CH E 3343 for | |
| Math. Prob. & Stat. elect. | 3 |
| CH E 4353, 4153 for | |
| Computer sci. elect. | 4 |
| CH E 4381 for | |
| Computer sci. elect. | 3 |

Technical or professional development electives required for the B.S.C.S. degree may be selected from required CH E courses. Oral communication is included in CH E 2306, 3232, 4232, and 4555. Writing intensive courses include CH E 2306, 3232, 4232, and 4555.

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 Department of Chemical Engineering co-administers the minor in Polymer and Materials with the Department of Mechanical Engineering. The minor 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 2306 | 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 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 of Chemical Engineering 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 MathCAD 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 that include basic civil, electrical, and chemical engineering. 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 take a mock FE exam 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 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 Financial Aids Office and the College of Engineering, the Chemical Engineering Department also offers scholarships to qualified students.

The first table below 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 ten-semester sequence of required courses that must be taken as part of the B.S./M.S. Ch. E. degree plan are shown in the second table below.

Graduate Program

The master's program is a structured program requiring the five core courses denoted below by asterisks. 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 seminars. The

course work for each student must meet the approval of the department's graduate committee. Students must obtain approval of 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 which 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 all 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 for the master's and doctoral programs.

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 1308 & 1105 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 2105 & 2305, 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 2301 & 1106, 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 1308. 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.

Combined B.S. and M.S. 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 1308 & 1105 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 2105 & 2305, 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 2301 & 1106, 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 |
| +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 1308. 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 core graduate courses, CH E 5312, 5321, 5343,

++ One graduate level elective must be a CH E course; the other two may be in any area of engineering, science or math.

Department of Civil Engineering

James R. McDonald, Chairperson

Professor, 1958. B.S., Texas Tech, 1958; M.S., Purdue, 1961; Ph.D., 1969; Reg. Prof. Engr. (Texas).

Faculty

Borrelli, John, Professor and Associate Dean, College of Engineering, 1984. B.S.A.E., Colorado State, 1965; M.S.A.E., 1967; Ph.D., Pennsylvania State, 1973.

Budek, Andrew, Assistant Professor, 2002. B.S.M.E., California (Santa Barbara), 1984; M.S.M.E., 1986; M.S.S.E., California (San Diego), 1995; Ph.D., 1997; Reg. Prof. Engr. (California).

Fedler, Clifford B., Professor, 1985. B.S.A.E., Iowa State, 1979; M.S.A.E., M.S.C.E., 1981; Ph.D., Illinois, 1985.

Gregory, James M., Professor of Civil Engineering, Coordinator, Engineering Physics, and Associate Dean, College of Engineering, 1985. B.S.A.E., Missouri, 1970; M.S.A.E., 1971; Ph.D., Iowa State, 1977; Reg. Prof. Engr. (Texas).

Jackson, Andrew W., Assistant Professor, 1998. B.S., Rhodes College, 1990; M.S., Louisiana State, 1992; Ph.D., 1996.

Jayawickrama, Priyantha W., Associate Professor, 1990. B.Sc., Peradeniya, 1980; M.S., Texas A&M, 1985; Ph.D., 1990.

Kiesling, Ernst W., Professor, 1956. B.S., Texas Tech, 1955; M.S., Michigan State, 1959; Ph.D., 1966; Reg. Prof. Engr. (Texas).

Letchford, Chris W., Professor, 2000. B.E., U. of Queensland (Australia), 1980; D.Phil., Oxford (England), 1987.

Mehta, Kishor C., Horn Professor, 1964. B.S., Michigan, 1957; M.S., 1958; Ph.D., Texas (Austin), 1965; Reg. Prof. Engr. (Texas).

Mollhagen, Tony R., Associate Professor of Environmental Science, 1987. B.S., Fort Hays State, 1965; M.S., 1967; Ph.D., Texas Tech, 1976.

Norville, H. Scott, Professor, 1981. B.S., Toledo, 1974; M.S., Purdue, 1976; Ph.D., 1981; Reg. Prof. Engr. (Texas).

Phelan, R. Scott, Assistant Professor, 1998. B.S., Texas Tech, 1987; M.S., Carnegie Mellon, 1989; Ph.D., Massachusetts Inst. of Tech., 1993; Reg. Prof. Engr. (California).

Rainwater, Kenneth A., Professor, 1985. B.S., Rice, 1979; M.S., Texas (Austin), 1982; Ph.D., 1985; Reg. Prof. Engr. (Texas); Diplomate Environmental Engineer.

Ramsey, Ralph H. III, Associate Professor, 1974. B.S., Clemson, 1957; M.S., 1965; Ph.D., Oklahoma, 1970; Reg. Prof. Engr. (Texas); Diplomate Environmental Engineer.

Senadheera, Sanjaya P., Assistant Professor, 1994. B.Sc., Peradeniya (Sri Lanka), 1981; M.S., Texas A&M, 1990; Ph.D., 1995.

Smith, Douglas A., Associate Professor, 1998. B.S., Texas Tech, 1977; M.S., 1979; Ph.D., 1993; Reg. Prof. Engr. (Texas).

Smith, Jimmy H., Professor of Civil Engineering and Director, National Institute For Engineering Ethics, Murdough Center For Engineering Professionalism, 1963. B.S., Texas Tech, 1962; M.S., 1963; Ph.D., Arizona, 1968; Reg. Prof. Engr. (Texas).

Sweazy, Robert M., Professor of Civil Engineering and Vice President For Research, Graduate Studies, and Technology Transfer 1970. B.A., Wichita State, 1962; M.S., 1966; Ph.D., Oklahoma, 1970; Reg. Prof. Engr. (Texas).

Thompson, David B., Professor, 1993. B.S., Missouri-Rolla, 1980; M.S., 1983; Ph.D., 1989. Reg. Prof. Engr. (Missouri).

Vann, W. Pennington, Associate Professor of 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).

Emeritus Faculty

Claborn, Billy Joe, Professor, Emeritus, 1963-1992.
Dvoracek, Marvin John, Associate Professor, Emeritus, 1962-1994.
Foerster, Eugene Paul, Associate Professor, Emeritus, 1969-1987.
Grub, Walter, Professor, Emeritus, 1966-1985.
Kebo, Cliff Hutchinson, Associate Professor, Emeritus, 1957-1988.
Ulich, Willie Lee, Professor, Emeritus, 1961-1984.
Williams, Ira Lawson, Professor, Emeritus, 1952-1974.

About the Program

This department supervises the following degree programs: CIVIL ENGINEERING, *Bachelor of Science in Civil Engineering*, *Master of Science in Civil Engineering*, and *Doctor of Philosophy*; ENVIRONMENTAL ENGINEERING, *Bachelor of Science in Environmental Engineering* and *Master of Environmental Engineering*; and ENVIRONMENTAL TECHNOLOGY MANAGEMENT, *Master of Science in Environmental Technology Management*. 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.

Graduate Program

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 (which includes 6 hours credit for the master's thesis) and a 36-hour plan (which includes 3 hours credit for the master's report). The decision on 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 disci-

plines. 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 5-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 the departmental Web site at www.ce.ttu.edu.

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, EngrAnal. I | 3 |
| C E 130, Civil Engr. Seminar I | 1 | PHYS 1308, Prin. of Phys. I | 3 |
| E GR 1306, EngrGraphics | 3 | PHYS 1105, Prin. of Phys. I (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 |
| 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 2301, Prin. of Phys. II | 3 | M E 2322, EngThermo. I | 3 |
| PHYS 1106, Prin. of Phys. II (Lab.) | 1 | C E 3303, Mech. of Solids | 3 |
| C E 2301, Statics | 3 | C E 3305, Mech. of Fluids | 3 |
| C TEC 2301, Surveying | 3 | **Statistics | 3 |
| †POLS 1301, Amer. Govt., Org. | 3 | ++Technical Writing | 3 |
| C E 2101, Construction Matls. | 1 | TOTAL | 18 |
| TOTAL | 17 | TOTAL | 17 |

THIRD YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|-----------------------------------|-----------|--------------------------------|-----------|
| C E 3440, StrucAnal. 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, EnvirEngr. I | 3 | C E 3302, Dynamics | 3 |
| C E 3171, EnvirEngr. Lab. | 1 | C E 3130, Civil EngrSeminar II | 1 |
| C E 3105, Mech. of Fluids Lab. | 1 | E E 3302, Elec. SysAnal. | 3 |
| C E 3103, Mech. of Solids Lab. | 1 | †POLS 2302, Amer. Pub. Pol. | 3 |
| C E 3321, Intro. to Geotech. Engr | 3 | TOTAL | 16 |
| C E 3121, Geotech. EngrLab. | 1 | | |
| TOTAL | 17 | TOTAL | 17 |

FOURTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|------------------------------|-----------|-------------------------|-----------|
| C E 4343, Des. ConcrStruct. | 3 | C E 4330, Des. EngrSys. | 3 |
| C E 4292, EngrEthics & Prof. | 2 | C E 4293, EngrLaw | 2 |
| I E 3301, EngrEco. 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—136.

*See Alternate Freshman Year.

**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.

Master of Environmental 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, Ess. of Coll. Rhet. | 3 |
| E GR 1307, Engr. Graphics | 3 | C E 1305, EngrAnal. 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 | TOTAL | 16 |

SECOND YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|------------------------------------|-----------|-------------------------------------|-----------|
| MATH 2350, Calc. III | 3 | PHYS 2301, Prin. of Phys. II | 3 |
| PHYS 1308, Prin. of Phys. I | 3 | PHYS 1106, Prin. of Phys. II (Lab.) | 1 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | CHEM 2306, Org. Chem. II | 3 |
| CHEM 2305, Org. Chemistry I | 3 | C E 3305, Mech. of Fluids | 3 |
| C E 2301, Statics | 3 | BIOL 1404, Biology II | 4 |
| CHEM 1403, Biology I | 4 | HIST 2301, U.S. Hist. Since 1877 | 3 |
| TOTAL | 17 | TOTAL | 17 |

THIRD YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|--------------------------------|-----------|------------------------------------|-----------|
| *Statistics | 3 | MATH 3350, Differential Equations. | 3 |
| ENVE 3314, Chemodynamics I | 3 | ENVE 3315, Chemodynamics II | 3 |
| 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 |
| TOTAL | 16 | TOTAL | 15 |

FOURTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|---------------------------------|-----------|-------------------------------|-----------|
| †Visual-Perf. Art Elective | 3 | †† Env. Science Elective | 3 |
| POLS 2302, Amer. Pub. Policy | 3 | †††Humanities Elective | 3 |
| ENVE 4390, Water-Wastewater | 3 | ENVE 4399, Mun. WW Treat. | 3 |
| ENVE 4391, Adv. Water Treatment | 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 | TOTAL | 15 |

FIFTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|---------------------------------|-----------|---------------------------------|-----------|
| #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, GroundwaterTransp. | 3 |
| #C E 5396, Env. Impact Anal. | 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 an 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, 5383, 5397, 5398, or others with advisor approval.

Department of Computer Science

Daniel E. Cooke, Chairperson

Professor, 1999. B.S., Sam Houston State, 1977; M.S., Texas A&M, 1978; Ph.D., Texas (Arlington), 1986.

Faculty

Barnes, Jack, Professor, 2002. B.S., Hardin-Simmons, 1989; B.A., McMurry Coll., 1960; M.S., Texas A&M, 1963; Ph.D., 1966.

Denton, Jason, Assistant Professor, 2002. B.S., Graceland Coll., 1996; M.S., Colorado State, 1999; Ph.D., 2002.

Desrosiers, Raymond E., Associate Professor, 1981. B.S., Rensselaer Polytechnic Inst., 1970; Ph.D., 1975.

Gelfond, Michael, Professor, 2000. M.S., St. Petersburg, 1968; Ph.D., Steklov Math. Inst., 1974.

Helm, Michael, Lecturer, 2001. B.S., Texas Tech, 1995; M.S., 2001.

Hernández, Héctor J., Associate Professor, 2001. B.E., Instituto Tecnológico De Monterrey (Mexico), 1976; M.Math., Waterloo (Canada), 1979; Ph.D., Alberta (Canada), 1987.

Lakhani, Gopal D., Associate Professor, 1980. M.Sc., Jiwaji (India), 1966; Ph.D., Indian Inst. of Technology (India), 1972; M.S. in C.S., Illinois, 1978.

Leung, Ka-Cheong, Assistant Professor, 2002. B.S., Hong Kong U. of Science and Technology, 1994; M.S., Southern California, 1997; Ph.D., 2000.

Lopez-Benitez, Noe, Associate Professor, 1993. B.S., Guadalajara, 1976; M.S., Kentucky, 1980; Ph.D., Purdue, 1989.

Marcy, William Michael, Professor and Provost, 1975. B.S. in E.E., Texas Tech, 1964; M.S. in E.E., 1966; Ph.D., 1972; Reg. Prof. Engr. (Texas).

Mengel, Susan A., Associate Professor, 1996. B.S., Central Oklahoma, 1982; M.S., Oklahoma State, 1984; Ph.D., Texas A&M, 1990.

Moore, Brett L., Lecturer, 2000. B.S., Texas Tech, 1995; B.A., 1999; M.S., 2002.

Pyeatt, Larry Don, Assistant Professor, 1999. B.S., Texas Tech, 1988; M.S., 1991; Ph.D., Colorado State, 1999.

Rushton, J. Nelson, Assistant Professor, 2002. B.S., Auburn, 1990; M.S., Georgia, 2001; Ph.D., 1997.

Scott-Fleming, Ian C., Lecturer, 1999. B.A., William and Mary, 1977; M.S., Arizona, 1987.

Shin, Eonsuk (Michael), Assistant Professor, 2002. B.S., Korea U., 1985; M.S., Korea Ad. Inst. of Science and Technology, 1988; Ph.D., George Mason, 2002.

Sinzinger, Eric D., Assistant Professor, 1999. B.S., B.A., Texas, 1993; M.S., South Carolina, 1996, 1998; Ph.D., 1999.

Sobolewski, Michael, Professor, 2002. B.S., Gdansk Politechnic Institute, 1967; M.S., St. Petersburg Electrotechnical Institute, 1971; Ph.D., Institute of Computer Science of Polish Academy of Sciences (Warsaw), 1978.

Temkin, Bharti, Associate Professor, 1996. B.S., London, 1968; M.A., City U. of New York, 1970; Ph.D., 1983.

Watson, Richard G., Assistant Professor, 1999. B.S., Texas (El Paso), 1990; M.S., 1994; Ph.D., 1999.

Young, Robert, Professor, 2002. B.S., St. Mary's, 1967; M.S., Dayton, 1976; Ph.D., Texas, 1981.

Yu, Zhuang, Assistant Professor, 2001. B.S., Zhejiang, 1990; M.S., Louisiana State, 1995; M.S., 1998; Ph.D., 2000.

Emeritus Faculty

Archer, James Elson, Professor, Emeritus, 1968-1991.

Gustafson, Donald Lloyd, Professor, Emeritus, 1971-1999.

Oldham, William J. B., Professor, Emeritus, 1987-2002.

Weiner, Leonard Harold, Associate Professor, Emeritus, 1976-1990.

About the Program

This department supervises the following degree programs: COMPUTER SCIENCE, *Bachelor of Science*, *Master of Science*, and *Doctor of Philosophy*; SOFTWARE ENGINEERING, *Master of 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 under-

graduate 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 includes 18 or more hours in computer science with at least 6 of those hours at the 3000 or 4000 level. For more information on minors, please contact a computer science undergraduate advisor.

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.

Graduate Program

For the Doctor of Philosophy 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 regulations established by the Graduate School.

Two general plans are available for the Master of Science degree: A 30-hour plan (which includes 6 hours credit for the master's thesis), and a 36-hour plan which 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.

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.

Computer Science Curriculum

| FIRST YEAR | | | |
|--------------------------------|-----------|-----------------------------------|-----------|
| <i>Fall</i> | | <i>Spring</i> | |
| C S 110, Comp. Sci. Seminar | 1 | C S 1412, Programming Princ. II | 4 |
| C S 141, Programming Princ. I | 4 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | MATH 1352, Calculus II | 3 |
| MATH 1351, Calculus I | 3 | PHYS 1105, Princ. of Physics Lab. | 1 |
| POLS 1301, Amer. Gov. Org. | 3 | PHYS 1308, Princ. of Physics I | 3 |
| *Core Curr. Elective | 3 | *Core Curr. Elective | 3 |
| TOTAL | 17 | 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 1106, Princ. Phys. Lab. II | 1 | ENGL 2311, Technical Writing | 3 |
| PHYS 2301, Princ. Phys. II | 3 | CHEM 1307 & 1107, Princ. Chem. I | 4 |
| *Core Curr. Elective | 3 | or BIOL 1403, Biology I | |
| TOTAL | 17 | TOTAL | 16 |

| THIRD YEAR | | | |
|----------------------------------|-----------|--------------------------------|-----------|
| <i>Fall</i> | | <i>Spring</i> | |
| **Math. Prob. and Stat. Elective | 3 | C S 3352, Intro. Sys. Prog. | 3 |
| C S 3361, Concepts. Prog. Lang. | 3 | C S 3364, Des. & Anal. Alg. | 3 |
| C S 3372 Adv. Digit. Proj. | 3 | C S 3375, CompArch. | 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 431, Sr. Proj. Des. | 3 | C S 4312, SrProj. Impl. Lab. | 3 |
| C S 4352, OperSys. | 3 | ***Computer Sci. Elective | 3 |
| ***Computer sci. Elective | 3 | †Tech. or Prof. Dev. Elective | 3 |
| †Tech. or Prof. Dev. Elective | 3 | *Core Curr. Elective | 3 |
| *Core Curr. Elective | 3 | TOTAL | 12 |
| TOTAL | 15 | | |

Minimum hours for graduation—124.

*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.

**Mathematics Probability and Statistics electives: Choose from MATH 3342, I E 3341, or CH E 3343.

***Computer Science electives: choose from any 3000 or 4000 level computer science courses that are not required for the C S major.

†Technical or Professional Development electives: Choose from AERS 3305, BLAW 3391, E E 3303, 3311 or 3388, ENGL 3365 or 4366, HONS 3302, I E 3301, MGT 3370 or 3376, MILS 3301, MKT 3350, MATH 3350, 3354, or 4310. Also, other 3000-4000 level courses in mathematics, science, engineering, technical writing, business administration, or an approved minor may be used with permission of the department.

Math-Computer Science Dual-Degree Curriculum

| FIRST YEAR | | FIRST YEAR | |
|--------------------------------|----|----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| C S 141, 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 1105, Princ. Physics Lab. I | 1 |
| **Core Curriculum Elective | 3 | PHYS 1308, Princ. Physics I | 3 |
| TOTAL | 13 | *Personal Fitness and Wellness | 2 |
| | | TOTAL | 16 |

| SECOND YEAR | | 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 1106, Princ. of Phys. Lab II | 1 | CHEM 1307 & 1107, Princ. Chem. I | 4 |
| PHYS 2301, Princ. of Phys. II | 3 | or BIOL 1403, Biology I | |
| ENGL 2311, Technical Writing | 3 | **Core Curr. Elective | 3 |
| TOTAL | 16 | TOTAL | 16 |

| THIRD YEAR | | 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 | | FOURTH YEAR | |
|-------------------------------|----|--------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| C S 3375, ComputeArchitecture | 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 | | FIFTH YEAR | |
|-------------------------------|----|----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| C S 431, Sr. Proj. Des. | 3 | C S 4312, SrProj. 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.

Combined B.S. / M.S. in Computer Science Curriculum

| FIRST YEAR | | FIRST YEAR | |
|--------------------------------|----|-----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| C S 110, Comp. Sci. Seminar | 1 | C S 1412, Programming Princ. II | 4 |
| C S 141, Programming Princ. I | 4 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | MATH 1352, Calculus II | 3 |
| MATH 1351, Calculus I | 3 | PHYS 1105, Princ. of Physics Lab. | 1 |
| POLS 1301, Amer. Gov. Org. | 3 | PHYS 1308, Princ. of Physics I | 3 |
| *Core Curr. Elective | 3 | *Core Curr. Elective | 3 |
| TOTAL | 17 | TOTAL | 17 |

| SECOND YEAR | | 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 1106, Princ. Phys. Lab. II | 1 | ENGL 2311, Technical Writing | 3 |
| PHYS 2301, Princ. Phys. II | 3 | CHEM 1307 & 1107, Princ. Chem. I | 4 |
| *Core Curr. Elective | 3 | or BIOL 1403, Biology I | |
| TOTAL | 17 | TOTAL | 16 |

| THIRD YEAR | | THIRD YEAR | |
|----------------------------------|----|--------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| **Math. Prob. and Stat. Elective | 3 | C S 3352, Intro. Sys. Prog. | 3 |
| C S 3361, Concepts. Prog. Lang. | 3 | C S 3364, Des. & Anal. Alg. | 3 |
| C S 3372 Adv. Digit. Proj. | 3 | C S 3375, CompArch. | 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 | | FOURTH YEAR | |
|-------------------------------|----|-------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| C S 431, Sr. Proj. Des. | 3 | C S 4312, SrProj. Impl. Lab. | 3 |
| C S 4352, OperSys. | 3 | ***Computer sci. Elective | 3 |
| †Tech. or Prof. Dev. Elective | 3 | †Tech. or Prof. Dev. Elective | 3 |
| ††Graduate Core Course | 3 | ††Graduate Core Course | 3 |
| *Core Curr. Elective | 3 | *Core Curr. Elective | 3 |
| TOTAL | 15 | TOTAL | 15 |

| FIFTH YEAR | | 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—151.

*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.

**Mathematics Probability and Statistics electives: Choose from MATH 3342, I E 3341, or CH E 3343.

***Computer Science electives: Choose from any 3000 or 4000 level computer science courses that are not required for the C S major.

†Technical or Professional Development electives: Choose from AERS 3305, BLAW 3391, E E 3303, 3311 or 3388, ENGL 3365 or 4366, HONS 3302, I E 3301, MGT 3370 or 3376, MILS 3301, MKT 3350, MATH 3350, 3354, or 4310. Also, other 3000-4000 level courses in mathematics, science, engineering, technical writing, business administration, or an approved minor may be used with permission of the department.

††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.

Combined B.S. in Computer Science and M.S. in Software Engineering Curriculum

| | | FIRST YEAR | | | |
|---|-------------|-------------|-------------------------------------|--------|----|
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| C S 110, Comp. Sci. Seminar | | 1 | C S 1412, Programming Princ. II | | 4 |
| C S 141, Programming Princ. I | | 4 | ENGL 1302, Adv. Coll. Rhetoric | | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | | 3 | MATH 1352, Calculus II | | 3 |
| MATH 1351, Calculus I | | 3 | PHYS 1105, Princ. of Physics Lab. | | 1 |
| POLS 1301, Amer. Gov. Org. | | 3 | PHYS 1308, Princ. of Physics I | | 3 |
| *Core Curr. Elective | | 3 | *Core Curr. Elective | | 3 |
| TOTAL | | 17 | TOTAL | | 17 |
| | | SECOND YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| C S 2413, Data Structures | | 4 | C S 2350, Comp. Org. & Assy. L. or | | 3 |
| C S 2382, Disc. Struct. | | 3 | C S 2371, Intro. Dig. Des. or | | 3 |
| MATH 2350, Calculus III | | 3 | MATH 2360, Linear Algebra | | 3 |
| PHYS 1106, Princ. Phys. Lab. II | | 1 | ENGL 2311, Technical Writing | | 3 |
| PHYS 2301, Princ. Phys. II | | 3 | CHEM 1307 & 1107, Princ. Chem. I or | | 4 |
| *Core Curr. Elective | | 3 | BIOL 1403, Biology I | | 16 |
| TOTAL | | 17 | TOTAL | | 16 |
| | | THIRD YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| **Math. Prob. and Stat. Elective | | 3 | C S 3352, Intro. Sys. Proj. | | 3 |
| C S 3361, Concepts. Prog. Lang. | | 3 | C S 3364, Des. & Anal. Alg. | | 3 |
| C S 3372 Adv. Digit. Proj. | | 3 | C S 3375, CompArch. | | 3 |
| C S 3383, Theory of Automata | | 3 | C S 3365, Software Engineering | | 3 |
| COMS 3358, Bus. & Prof. Comm. or PETR 3308, Engr. Comm. | | 3 | *Core Curr. Elective | | 3 |
| TOTAL | | 15 | TOTAL | | 15 |
| | | FOURTH YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| C S 5362, Soft. Specs. & Des. | | 3 | C S 5363, Soft. Proj. Mgt. | | 3 |
| C S 4352, OperSys. | | 3 | ***Computer Sci. Elective | | 6 |
| †Tech. or Prof. Dev. Elective | | 3 | †Tech. or Prof. Dev. Elective | | 3 |
| ***Computer Science Elective | | 3 | *Core Curr. Elective | | 3 |
| *Core Curr. Elective | | 3 | TOTAL | | 15 |
| TOTAL | | 15 | | | |
| | | FIFTH YEAR | | | |
| | | | | Spring | |
| | <i>Fall</i> | | | | |
| C S 5358, Software Studio I | | 3 | C S 5359, Software Studio II | | 3 |
| CS 5364, Soft. Qual. Assurance & Testing | | 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—151.

*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.

**Mathematics Probability and Statistics electives: Choose from MATH 3342, I E 3341, or CH E 3343.

***Computer Science electives: Choose from any 3000 or 4000 level computer science courses that are not required for the C S major.

†Technical or Professional Development electives: Choose from AERS 3305, BLAW 3391, E E 3303, 3311 or 3388, ENGL 3365 or 4366, HONS 3302, I E 3301, MGT 3370 or 3376, MILS 3301, MKT 3350, MATH 3350, 3354, or 4310. Also, other 3000-4000 level courses in mathematics, science, engineering, technical writing, business administration, or an approved minor may be used with permission of the department.

††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.

Department of Electrical and Computer Engineering

Jon G. Bredeson, Chairperson

Professor, 1996. B.S.E.E., North Dakota State, 1962; M.S.E.E., 1963; Ph.D., Northwestern, 1967.

Faculty

Baker, Mary Catherine, Associate Professor of Electrical Engineering and Engineering Physics, 1989. B.S., Texas Tech, 1983; M.S., 1985; Ph.D., Texas (Arlington), 1988.

Chao, Kwong Shu, Professor, 1968. B.S. in E.E., Cheng Kung, 1962; M.S., 1964; M.S., Rice, 1967; Ph.D., 1968.

Cox, Ronald H., Research Professor, 2001. B.S., Colorado School of Mines, 1959; M.S., Denver, 1961; Ph.D., 1964.

Dallas, Timothy, Assistant Professor of Electrical Engineering and Director, Engineering Physics, 1999. B.A., Chicago, 1991; M.S., Texas Tech, 1993; Ph.D., 1996.

Dickens, James, Associate Professor, 1999. B.S.E.E., Texas Tech, 1991; M.S.E.E., 1993, Ph.D., 1995.

Gale, Richard O., Professor, 2002. B.S., California (Berkeley), 1978; M.S., Lehigh, 1980; Ph.D., 1984.

Giesselmann, Michael G., Professor, 1986. M.Sc., TU-Darmstadt (West Germany), 1981; Ph.D., 1986.

Ishihara, Osamu, Adjunct Faculty, 2001. B.S., Yokohama Nat'l. U., 1972; M.S., 1974; Ph.D., Tennessee, 1977.

Karp, Tanja, Assistant Professor, 2000. Dipl. Engineer, Hamburg U. of Technology (Germany), 1993; Ph.D., 1997.

Krile, Thomas F., Professor, 1979. B.S. in E.E., North Dakota, 1963; M.S. in E.E., 1965; Ph.D., Purdue, 1968; Reg. Prof. Engr. (Texas).

Kristiansen, Magne, Horn and Thornton Professor of Electrical Engineering, Physics, and Engineering Physics, 1966. B.S.E.E., Texas (Austin), 1961; Ph.D., 1967; Reg. Prof. Engr. (Texas).

Krompholz, Hermann G., Professor, 1987. Dipl. Phys., TH-Darmstadt (West Germany), 1973; Dr. Rer. Nat., 1977.

Lu, Keh-Shew, Adjunct Faculty, 2001. B.S., Nat'l. Cheng Kung, 1969; M.S., Texas Tech, 1973; Ph.D., 1977.

Mankowski, John J., Research Assistant Professor, 2002. B.S.E.E., Worcester Polytechnic Inst., 1986; M.S.E.E., Texas Tech, 1995; Ph.D., 1997.

Neuber, Andreas, Associate Professor, 2000. Diplom-Physics, Tech. U. of Darmstadt (Germany), 1990; Ph.D., 1996.

Nikishin, Sergey, Associate Professor, 2000. M.S., St. Petersburg Elec. Eng. Inst. (Russia), 1975; Ph.D., 1982.

Nutter, Brian S., Associate Professor, 2002. B.S.E.E., Texas Tech, 1987; Ph.D., 1990.

Parten, Micheal E., Professor, 1983. B.S., Texas Tech, 1964; M.S., 1967; Ph.D., 1972; Reg. Prof. Engr. (Texas).

Saed, Mohammad A., Associate Professor, 2001. B.S., Middle East Technical U. (Turkey), 1983; M.S., Virginia Polytechnic, 1984; Ph.D., 1987.

Sari-Sarraf, Hamed, Associate Professor, 1999. B.S.E.E., Tennessee, 1984; M.S.E.E., 1986; Ph.D., 1993.

Shkuratov, Sergey I., Adjunct Faculty, 2001. Dipl. E.E., Tomsk Inst. Auto. Control Sys. and Radio., 1979; Ph.D., 1987.

Storrs, Samuel Mark, Adjunct Faculty, 2001. B.S., Texas Tech, 1979; M.S., 1993; Ph.D., 1999.

Temkin, Henryk, Horn and Maddox Professor of Electrical Engineering and Joint Professor of Physics, 1996. B.S., U. Libre De Bruxelles, 1969; M.A., Yeshiva, 1971; Ph.D., Stevens Inst. Techn., 1975.

Trost, Thomas F., Professor of Electrical Engineering and Engineering Physics, 1970. B.S.E.E., Case Inst. of Technology, 1964; M.S.E.E., 1966; Ph.D., 1969; Reg. Prof. Engr. (Texas).

Woolverton, Kevin Scott, Adjunct Faculty, 2001. B.S., Kansas State, 1990; M.S., Oklahoma State, 1994; Ph.D., Texas Tech, 1997.

Zieher, Klaus W., Associate Professor, 1986. Dipl. Phys. Physics, Eberh-Karls U., 1966; M.Sc., Washington (Seattle), 1969; Dr.Rer.Nat., U. Karlsruhe, 1974.

Emeritus Faculty

Craig, John Paul, Professo, Emeritus, 1957-1989.

Hagler, Marion Otho, Horn Professor of Electrical Engineering and Associate Dean, College of Engineering, Emeritus, 1967-2000.

O'Hair, Edgar, Professor, Emeritus, 1981-2002.

Stenis, Tom Basil, Associate Professor, Emeritus, 1947-1987.

Vines, Darrell Lee, Professor, Emeritus, 1962-2000.

Walkup, John Frank, Horn Professor, Emeritus, 1971-1998.

About the Program

This department supervises the following degree programs: ELECTRICAL ENGINEERING, *Bachelor of Science in Electrical Engineering*, *Master of Science in Electrical Engineering*, *Doctor of Philosophy*; COMPUTER ENGINEERING, *Bachelor of Science*.

Undergraduate Program

Educational Objectives. 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:

- A. Students will obtain an ability to analyze and solve electrical engineering problems by applying fundamental knowledge of mathematics, science, and engineering. Modern engineering techniques, skills, and tools will be used, particularly recognizing the role that computers play in engineering.
- B. Students will obtain an ability to identify, formulate, and solve practical electrical engineering and computer engineering problems. The current electrical engineering curriculum includes circuits and systems,

electronics, electromagnetics, communications, digital systems, microcontrollers, programming, control systems, a number of electrical engineering specialty areas, and a number of technical and non-technical support courses. The curriculum specific to the computer engineering program includes the areas of circuits and systems, electronics, software engineering, communications, digital systems, microcontrollers, programming, systems programming, operating systems, and computer architecture. Most of this is accomplished through the required lecture courses indicated in the curriculum.

- C. Students will obtain an ability to identify, formulate, and solve practical electrical and computer engineering problems, including the planning, specification, design, implementation, and operation of systems, components, and/or processes that meet performance, cost, time, safety, and quality requirements.
- D. Students will obtain an ability to design and conduct scientific and engineering experiments and to analyze and interpret the resulting data. All undergraduate engineering programs provide for design experience, as described in objectives C and D. However, the approach used to provide the experience varies considerably at different institutions. The electrical and computer engineering programs at Texas Tech utilize five 3-hour credit, stand-alone project design laboratories to achieve this objective. The projects are long-term (no more than two per semester), open-ended, and team-oriented.
- E. Students will recognize the need for and the ability to engage in perpetual learning by working on projects for which they have no prior experience. They will develop their ability to learn by working both individually and within multidisciplinary teams. One of the objectives of the laboratory program at Texas Tech is to expose students to areas they have not seen before. It is important for students to develop confidence in their basic knowledge and to realize that they can extend that knowledge to new and exciting areas. In addition, it is important for students to begin the transition to lifelong learning and not be afraid of something they have not seen in a class. Engineers are seldom asked to solve problems that have already been solved. In industry, engineers are constantly asked to learn and develop new techniques and systems for which they may have little prior experience.
- F. Students will obtain an ability to function and communicate effectively, both individually and within multidisciplinary teams. Another major objective of the electrical and computer engineering laboratory programs is to develop in each student a strong, fundamental capability in oral and written communication. In line with this, the majority of time spent in weekly meetings is devoted to student presentations.

A number of other areas are very important for practicing, professional engineers. Specific objectives for these areas are as follows:

- G. Students will experience professional and ethical responsibility through interaction with other students, faculty, and practicing professionals.

- H. The programs will promote cultural diversity within the ranks of the profession by encouraging minority and women students and faculty.

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:

- I. 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 electronics, power, signals and systems, communications, optoelectronics, and electro-mechanical systems.

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 for a single foreign language are ex-

pected 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 of Electrical and Computer Engineering. 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 E E 2331, 2372, 3302, 3303, 331, 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.

Both master's and doctoral students must develop proficiency over the entire range of electrical engineering activities by taking courses in a variety of subjects determined by the department. Minor subjects are taken outside 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 | 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 1305, Intro. Engr& Comp. Prog. | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | **Elective | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | TOTAL | 16 |
| TOTAL | 16 | | |
| | | SECOND YEAR | |
| | | Fall | Spring |
| MATH 2350, Calculus III | 3 | MATH 3350, Math for Engr. I | 3 |
| E E 3302, Fund. of Elect. Engr | 3 | E E 331, Electronics I | 3 |
| PHYS 1308, Prin. of Phys. I | 3 | E E 2331, Proj. Lab. I | 3 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | PHYS 2301, Prin. of Phys. II | 3 |
| E E 3362, EngrAppr. to Dig. Des. | 3 | PHYS 1106, Prin. of Phys. II (Lab.) | 1 |
| **Elective | 3 | E E 3303, Linear SystemAnalysis | 3 |
| TOTAL | 16 | TOTAL | 16 |
| | | 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 3342, ElectromagTheory II | 3 |
| E E 3341, ElectromagTheory I | 3 | E E 3353, Feedback ContrSys. | 3 |
| E E 3312, Electronics II | 3 | **Electives | 6 |
| **Elective | 3 | TOTAL | 15 |
| TOTAL | 15 | | |
| | | FOURTH YEAR | |
| | | Fall | Spring |
| E E 4333, Senior Proj. Lab. IV | 3 | E E 4334, Proj. Lab. V | 3 |
| Elective (Mathematics) | 3 | **Electives | 15 |
| **Electives | 12 | TOTAL | 18 |
| TOTAL | 18 | | |

Minimum hours required for graduation—130.
 *Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1304 before those listed.
 **Choose from Core Curriculum requirements, plus 4 electrical engineering, and 2 other engineering. Option courses include: (Choose three) Electronics—E E 4314, 4321, 4324, 4382; power—E E 4316, 4343, 4345, 4391; signals and systems—E E 4364, 4367, 4368; communications—E E 4323, 4325, 4342, 4360, 4361, 4364, optoelectronics—E E 4314, 4360, 4362, 4367; electromechanical—E E 4316, 4368, 4391, 4376, and a mechanical engineering elective.

Electrical Engineering-Computer Science Dual-Degree Curriculum

| | | FIRST YEAR | |
|------------------------------------|----|-----------------------------------|--------|
| | | Fall | Spring |
| MATH 1351, Cal. I | 3 | MATH 1352, Cal. II | 3 |
| *CHEM 1307, Prin. of Chem. I | 3 | C S 1412, Programming Princ. II | 4 |
| CHEM 1107, Prin. of Chem. I (Lab.) | 1 | E E 2372, Mod. Dig. Syst. Des. | 3 |
| E E 1305, Intro. Engr& Comp. Prog. | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | **Elective | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | TOTAL | 16 |
| TOTAL | 16 | | |
| | | SECOND YEAR | |
| | | Fall | Spring |
| MATH 2350, Calculus III | 3 | MATH 3350, Math for Engr. I | 3 |
| C S 2413, Data Structures | 4 | C S 2382, Disc. Struc. | 3 |
| E E 3302, Fund. of Elec. Engr | 3 | E E 3303, Linear SystAnalysis | 3 |
| E E 3362, EngrAppr. to Dig. Des. | 3 | MATH 2360, Linear Algebra | 3 |
| TOTAL | 13 | PHYS 1308, Prin. of Phys. I | 3 |
| | | PHYS 1105, Prin. of Phys. I (Lab) | 1 |
| | | TOTAL | 16 |
| | | THIRD YEAR | |
| | | Fall | Spring |
| E E 2331, Proj. Lab. I | 3 | E E 3341, ElectromagTheory I | 3 |
| E E 331, Electronics | 3 | E E 3323, Prin. Comm. Sys. | 3 |
| PHYS 2301, Prin. of Phys. II | 3 | E E 3312, Electronics II | 3 |
| PHYS 1106, Prin. of Phys. II (Lab) | 1 | C S 3361, Concepts Prog. Lang. | 3 |
| C S 3365, Software Eng. | 3 | **Elective | 3 |
| **Elective | 3 | TOTAL | 15 |
| TOTAL | 16 | | |
| | | FOURTH YEAR | |
| | | Fall | Spring |
| Elective | 3 | E E 3353, Feedback ContrSys. | 3 |
| E E 3342, ElectromagTheory 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 | Electives | 6 |
| TOTAL | 12 | 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 |
| **Electives | 9 | C S 3383, Theory of Automata | 3 |
| TOTAL | 15 | **Electives | 6 |
| | | TOTAL | 15 |

Minimum hours required for graduation—149.
 *Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1304 before those listed.
 **Choose from Core Curriculum requirements, plus 1 electrical engineering and 1 technical elective.

Computer Engineering Curriculum

| FIRST YEAR | | | |
|------------------------------------|----|---------------------------------|----|
| Fall | | Spring | |
| MATH 1351, Cal. I | 3 | MATH 1352, Cal. II | 3 |
| *CHEM 1307, Prin. of Chem. I | 3 | C S 1412, Programming Princ. II | 3 |
| CHEM 1107, Prin. of Chem. I (Lab.) | 1 | E E 2372, Mod. Dig. Syst. Des. | 4 |
| E E 1305, Engr& Comp. Prog. | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | **Elective | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | TOTAL | 16 |
| TOTAL | 16 | | |

| SECOND YEAR | | | |
|------------------------------------|----|-------------------------------------|----|
| Fall | | Spring | |
| MATH 2350, Calculus III | 3 | MATH 3350, Math for Engr. I | 3 |
| E E 2304, Fund. of Elect. Engr | 3 | E E 331, Electronics I | 3 |
| PHYS 1308, Prin. of Phys. I | 3 | E E 2331, Proj. Lab. I | 3 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | PHYS 2301, Prin. of Phys. II | 3 |
| E E 3362, EngrAppr. to Dig. Des. | 3 | PHYS 1106, Prin. of Phys. II (Lab.) | 1 |
| C S 2413, Data Structures | 4 | E E 3303, Linear SystemAnalysis | 3 |
| TOTAL | 17 | TOTAL | 16 |

| THIRD YEAR | | | |
|---------------------------------|----|-------------------------------|----|
| Fall | | Spring | |
| E E 3334, Comp. Eng. Proj. Lab. | 3 | E E 3332, Proj. Lab. II | 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 |
| MATH 2360, Linear Algebra | 3 | **Electives | 6 |
| **Elective | 3 | TOTAL | 18 |
| TOTAL | 18 | | |

| FOURTH YEAR | | | |
|----------------------------------|----|-----------------------------|----|
| Fall | | Spring | |
| E E 4333, Senior Proj. Lab. IV | 3 | E E 4334, Proj. Lab. V | 3 |
| C S 3364, Des. & Anal. of Algor. | 3 | C S 4352, Operating Systems | 3 |
| **Electives | 12 | **Electives | 9 |
| TOTAL | 18 | TOTAL | 15 |

Minimum hours required for graduation—134.
 *Students who do not have high school credit for chemistry or physics must take CHEM 1301 and/or PHYS 1304 before those listed.
 **Choose from Core Curriculum requirements, plus 1 computer science elective from C S 3368, 3461, 3383, 4354, or 4395 and 2 electrical engineering courses from E E 4364, 4367, 4375, or 4382.



Engineering Physics Program

Faculty

- Gregory, James M.**, Professor of Civil Engineering, Coordinator, Engineering Physics, and Associate Dean, College of Engineering, 1985. B.S.A.E., Missouri, 1970; M.S.A.E., 1971; Ph.D., Iowa State, 1977; Reg. Prof. Engr. (Texas).
- Myles, Charles W.**, Professor of Physics and Director, Engineering Physics, 1978. B.S., Missouri (Rolla), 1969; M.S., Washington (St. Louis), 1971; Ph.D., 1973.
- Dallas, Timothy**, Assistant Professor of Electrical Engineering and Director, Engineering Physics, 1999. B.A., Chicago, 1991; M.S., Texas Tech, 1993; Ph.D., 1996.
- Akchurin, Nural**, Associate Professor of Physics and Engineering Physics, 2000. B.A., Vassar College, 1982; Ph.D., Iowa, 1990.
- Baker, Mary Catherine**, Associate Professor of Electrical Engineering and Engineering Physics, 1989. B.S., Texas Tech, 1983; M.S., 1985; Ph.D., Texas (Arlington), 1988.
- Dunn, Jerry R.**, Associate Professor of Mechanical Engineering and Engineering Physics, 1975. B.S. in M.E., Lamar State Coll. of Technology, 1962; M.S. in M.E., Georgia Inst. of Technology, 1964; Ph.D., 1972; Reg. Prof. Engr. (Texas).
- Gangopadhyay, Shubhra**, Professor of Physics and Engineering Physics, 1986. B.S., Jabalpur, 1975; M.S., 1977; Ph.D., Indian Inst. of Technology (Kharagpur), 1982.
- Gibson, Thomas L.**, Associate Professor of Physics and Engineering Physics, 1985. B.S., Cameron, 1977; Ph.D., Oklahoma, 1982.
- Hatfield, Lynn Lamar**, Professor of Physics, Engineering Physics, and Chairperson, Department of Physics, 1968. B.S., Arkansas Polytechnic, 1960; M.S., Arkansas, 1964; Ph.D., 1966.
- Holtz, Mark W.**, Professor of Physics and Engineering Physics, 1991. B.S., Bradley, 1980; Ph.D., Virginia Polytechnic Inst. and State U., 1987.
- Kristiansen, Magne**, Horn and Thornton Professor of Electrical Engineering, Physics, and Engineering Physics, 1966. B.S.E.E., Texas (Austin), 1961; Ph.D., 1967; Reg. Prof. Engr. (Texas).
- Lamp, David**, Associate Professor of Physics and Engineering Physics, 1988. B.G.S., Missouri, 1979; Ph.D., 1984.
- Lichti, Roger L.**, Professor of Physics and Engineering Physics, 1979. B.S., Ottawa (Kansas), 1967; M.S., Illinois, 1969; Ph.D., 1972.
- Menzel, E. Roland**, Horn Professor of Physics, Chemistry, and Engineering Physics, 1979. B.S., Washington State, 1967; Ph.D., 1970.
- Simon, Sindee**, Associate Professor of Chemical Engineering and Engineering Physics, 1999. B.S., Yale, 1983; Ph.D., Princeton, 1992.
- Thacker, Bethann**, Assistant Professor of Physics and Engineering Physics, 1999. B.S., Davidson Coll., 1980; M.S., Cornell, 1986; Ph.D., 1990.
- Trost, Thomas F.**, Professor of Electrical Engineering and Engineering Physics, 1970. B.S.E.E., Case Inst. of Technology, 1964; M.S.E.E., 1966; Ph.D., 1969; Reg. Prof. Engr. (Texas).
- Vann, W. Pennington**, Associate Professor of 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).

About the Program

The College of Engineering and the Department of Physics supervise the following degree program: ENGINEERING PHYSICS, *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.

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 2301, Prin. Phys. II | 3 |
| PHYS 1308, Prin. Phys. I | 3 | PHYS 1106, Prin. Phys. II (Lab) | 1 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | E E 2372, Mod. Dig. Sys. Des. | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | C S 1462, Fund. of Comp. Sci. | 4 |
| POLS 1301, Amer. Govt., Org. | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| TOTAL | 16 | TOTAL | 17 |
| | | 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 | CHEM 1307, Prin. of Chem. I | 3 |
| Elective (History) | 3 | CHEM 1107, Prin. of Chem. I (Lab) | 1 |
| TOTAL | 16 | E E 3311, Electronics I | 3 |
| | | TOTAL | 16 |
| | | 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 | E E 3353, Feedback Cont. Sys. | 3 |
| **Elective (Engineering) | 3 | *POLS 2302, Amer. Pub. Pol. | 3 |
| TOTAL | 15 | Elective (History) | 3 |
| | | 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. and Therm. Phys. | 3 |
| PHYS 4306, Senior Project | 3 | or PHYS 4309, Solid State Physics | |
| **Elective (Engineering) | 3 | E E 4334, Proj. Lab. V | 3 |
| Elective (Hum. and Fine Arts) | 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 | |
|------------------------------------|----|---------------------------------------|--------|
| | | Fall | Spring |
| MATH 1351, Calculus I | 3 | MATH 1352, Calculus II | 3 |
| PHYS 1305, Eng. Phys. Anal. I | 3 | PHYS 2301, Prin. Phys. II | 3 |
| PHYS 1308, Prin. Phys. I | 3 | PHYS 1106, Prin. Phys. II (Lab) | 1 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | 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 | |
| | | Fall | Spring |
| MATH 2350, Calculus III | 3 | MATH 3350, Math. for 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. Thermo. | 3 |
| C E 2301, Statics | 3 | C E 2101, Const. Materials (Lab) | 1 |
| Elective (Hum. and Fine Arts) | 3 | Elective (History) | 3 |
| TOTAL | 17 | TOTAL | 16 |
| | | THIRD YEAR | |
| | | Fall | Spring |
| 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 |
| TOTAL | 12 | COMS 3308, Bus. and Prof. Comm. | 3 |
| | | C E 3121, Geotech. Eng. (Lab) | 1 |
| | | TOTAL | 18 |
| | | FOURTH YEAR | |
| | | Fall | Spring |
| 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 | | 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 1308, Prin. Phys. I | 3 | PHYS 2301, Prin. Phys. II | 3 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | PHYS 1106, Prin. Phys. II (Lab) | 1 |
| 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 | | 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. Thermo. | 3 |
| C E 2301, Statics | 3 | Elective (History) | 3 |
| Elective (History) | 3 | TOTAL | 15 |
| TOTAL | 17 | | |

| THIRD YEAR | | 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 |
| COMS 3308, Bus. and Prof. 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 | | FOURTH YEAR | |
|--|----|--------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| PHYS 4307, Intro. Quant. Mech. or PHYS 3301, Optics | 3 | PHYS 4304 Mechanics | 3 |
| PHYS 4306, Senior Project | 3 | PHYS 4302, Stat. & Them. Phys. | 3 |
| C E 3372, Water Sys. Des. | 3 | C E 4330, Des. Eng. Systems | 3 |
| C E 4353, Des. Hydraulic Sys. | 3 | Elective (Hum. and Fine Arts) | 3 |
| ENVE 4391 or 4399 | 3 | TOTAL | 12 |
| Elective (Hum. and Fine Arts) | 3 | | |
| TOTAL | 18 | | |

**Engineering Physics Curriculum
Chemical Engineering Option**

| FIRST YEAR | | FIRST YEAR | |
|------------------------------------|----|---|----|
| <i>Fall</i> | | <i>Spring</i> | |
| MATH 1351, Calculus I | 3 | MATH 1352, Calculus II | 3 |
| PHYS 1308, Prin. Phys. I | 3 | PHYS 1305, Eng. Phys. Anal. I or CH E 1305, Eng. Anal. | 3 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | PHYS 2301, Prin. Phys. II | 3 |
| CHEM 1307, Prin. of Chem. I | 3 | PHYS 1106, Prin. Phys. II (Lab) | 1 |
| CHEM 1107, Prin. of Chem. I (Lab) | 1 | CHEM 1308, Prin. of Chem. II | 3 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | CHEM 1108, Prin. of Chem. II (Lab) | 1 |
| POLS 1301, Amer. Govt., Org. | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| TOTAL | 17 | TOTAL | 17 |

| SECOND YEAR | | 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 | | 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 | | FOURTH YEAR | |
|--|----|----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| PHYS 4306, Senior Project | 3 | PHYS 4304, Mechanics | 3 |
| PHYS 4307, Intro. Quant. Mech. or PHYS 3301, Optics | 3 | CH E 3330, Materials | 3 |
| CH E 4232, Unit Oper. Lab. I | 2 | CH E 4554, Chem. Eng. Plant Des. | 5 |
| CH E 4323, Chem. Reaction Eng. | 3 | Chemical Engineering Elective | 3 |
| I E 3301 Eng. Econ. Anal. | 3 | Elective (Ind. and Group Behav.) | 3 |
| Elective (Humanities/Multicultural) | 3 | TOTAL | 17 |
| TOTAL | 17 | | |

**Engineering Physics Curriculum
Industrial Engineering Option**

| FIRST YEAR | | 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 2301, Prin. Phys. II | 3 |
| PHYS 1308, Prin. Phys. I | 3 | PHYS 1106, Prin. Phys. II (Lab) | 1 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | 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 | | 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 | | 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 | | FOURTH YEAR | |
|---|----|---------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| PHYS 4307, Intro. Quan. Mech. or PHYS 3301, Optics | 3 | PHYS 4305, Mechanics | 3 |
| PHYS 4306, Senior Project | 3 | PHYS 4302, Stat. & Them. Phys. | 3 |
| I E 4311, Oper. Res. II | 3 | I E 4333, Senior Des. Project | 3 |
| I E 4361, Engr. Des. for People | 3 | I E 4362, Industrial Ergonomics | 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 | | 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 2301, Prin. Phys. II | 3 |
| PHYS 1308, Prin. Phys. I | 3 | PHYS 1106, Prin. Phys. II (Lab) | 1 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | 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, Advanced College Rhet. | 3 |
| TOTAL | 16 | E GR 1306, Engr. Graphics | 3 |
| | | TOTAL | 17 |

| SECOND YEAR | | 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 | 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 2464, Mechanics I | 4 |
| TOTAL | 17 | TOTAL | 15 |

| THIRD YEAR | | THIRD YEAR | |
|--------------------------------|----|---------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| PHYS 3305, Elec. & Mag. | 3 | PHYS 3306, Elect. & Mag. II | 3 |
| M E 3464, Intro. to Mech. Des. | 4 | M E 3371, Heat Transfer | 3 |
| M E 3370, Fluid Mechanics | 3 | M E 3311, Materials Science | 3 |
| E E 3302, Fund. of Elec. Engr. | 3 | M E 3322, Engr. Thermo. II | 3 |
| POLS 2302, Amer. Pub. Pol. | 3 | COMS 3358, Bus. and Prof. Comm. | 3 |
| TOTAL | 16 | M E 3465, Intro. to Design | 4 |
| | | TOTAL | 19 |

| FOURTH YEAR | | 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

Larry B. Masten, Chairperson

Professor, 2000. B.S.E.E., Texas Tech, 1961; M.S.E.E., 1964; Ph.D., 1969.

Faculty

Akram, Mujahid H., Assistant Professor, 1999. B.S.C.E., Pakistan, 1983; M.S.C.E., West Virginia, 1992; Ph.D., 1995.

Alayyan, Sudqi, Associate Professor, 1984. B.S., Texas Tech, 1977; M.S., West Texas A&M, 1993.

Bai, Yong, Assistant Professor, 1999. B.Eng., Tsinghua, 1986; M.S., Clemson, 1992; Ph.D., North Carolina State, 1996.

Burkett, William R., Associate Professor, 1993. B.S., Lamar, 1981; M.E., Texas A&M, 1984; Ph.D., Texas (Austin), 1992; Reg. Prof. Engr. (Texas).

Darwish, M. Mukaddes, Assistant Professor, 1999. B.S., Ataturk U., 1978; M.S., Texas Tech, 1991; Ph.D., 1998.

Ernst, David L., Associate Professor, 1984. B.S. in M.E., Cornell, 1973; M.E. in Nuclear Engr., 1974.

Green, Bobby Lynn, Associate Professor, 1986. B.S.E.E., Texas Tech, 1975; M.S.E.E., 1979; Reg. Prof. Engr.

Hubbard, Jerry, Lecturer, 1998. B.S.E.E., Texas Tech, 1975; M.S.E.E., 1979; Reg. Prof. Engr.

Piggott, Ronald, Professor, 1991. ONC, Sheffield Coll. of Technology, 1963; B.Tech., Bradford (England) 1967; M.Sc., Nottingham (England), 1969; Ph.D., Pennsylvania, 1975.

Potter, Richard D., Lecturer, 1996. B.S., Texas (Austin), 1972; M.S., 1975.

Reeder, Clayton W., Lecturer, 1999. B.S.M.E.T., Texas Tech, 1996; M.En., 1999.

Reynolds, Lee, Associate Professor, 1982. B.S. in I.E., Arizona State, 1967; M.S. in I.E., 1968.

Emeritus Faculty

Graham, Lyman Moody Jr., Associate Professor, Emeritus, 1956-1984.

Helmers, Donald Jacob, Professor, Emeritus, 1948-1982.

Wagner, Fred Philip Jr., Associate Professor, Emeritus, 1967-1994.

About the Program

This department supervises the following degree program: ENGINEERING TECHNOLOGY, *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 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 business and professional communications studies (COMS 3358) and technical writing (ENGL 2311).

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 the two 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 im-

proved 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 of Engineering Technology will permit students to receive credit for any course 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 1321, Trigonometry | 3 | MATH 2322, Anal. Geo. & Calc I | 3 |
| *CHEM 1305, Chem. and Society | 3 | PHYS 1306, Gen. Phys. I | 3 |
| *CHEM 1105, Gen. Chem. I (Lab.) | 1 | PHYS 1103, Gen. Phys. I (Lab.) | 1 |
| CTEC 1312, Const. Methods | 3 | E GR 1307, Engineering Graphics | 3 |
| GTEC 1130, Technology Seminar | 1 | GTEC 1211, Computer Prog. | 2 |
| TOTAL | 14 | TOTAL | 15 |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MATH 2323, Calculus II | 3 | GTEC 3311, Appl. Mech II | 3 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | GTEC 3412, Appl. Mech. III—Fluids | 4 |
| PHYS 1307, General Physics II | 3 | GTEC 1312, AC/DC Technology | 3 |
| PHYS 1104, General Physics II Lab. I | 1 | ENGL 2311, Technical Writing | 3 |
| GTEC 2311, Statics | 3 | POLS 1301, Amer. Govt., Org. | 3 |
| CTEC 2301, Surveying & Surveys | 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 |
| COMS 3358, Bus. & Prof. 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 Mgmt. Lab. | 1 |
| CTEC 3104, Soil Properties Lab. | 1 | GTEC 2351, Thermodynamics | 3 |
| CTEC 4342, Cost Estimating | 3 | GTEC 4121, Technology Seminar | 1 |
| TOTAL | 16 | CTEC 4341, Const. Management | 3 |
| | | TOTAL | 17 |
| 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 |
| POLS 2302, Amer. Public Policy | 3 | CTEC 4343, Constr. Safety & Health | 3 |
| *ECO 2305, Prin. of Economics | 3 | Visual & Performing Arts Elective | 3 |
| Humanities Elective | 3 | TOTAL | 15 |
| TOTAL | 17 | | |

Minimum number of hours required for graduation—129 including internship.
 *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 1321, Trigonometry | 3 | MATH 2322, Anal. Geo. & Calc I | 3 |
| CHEM 1305, Chem. and Society | 3 | PHYS 1306, Gen. Phys. I | 3 |
| CHEM 1105, Gen. Chem. I (Lab.) | 1 | PHYS 1103, Gen. Phys. I (Lab.) | 1 |
| E GR 1306, Engineering Graphics | 3 | HIST 2300, Hist. of U.S. to 1877 | 3 |
| GTEC 1130, Technology Seminar | 1 | GTEC 1211, Computer Prog. | 2 |
| POLS 1301, Amer. Govt., Org. | 3 | Ind. or Group Behav. | 3 |
| TOTAL | 17 | TOTAL | 18 |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MATH 2323, Calculus II | 3 | EET 2312, Optoelec. Devices | 3 |
| GTEC 1312, AC/DC Technology | 3 | EET 2112, Optoelectronics Lab. | 1 |
| EET 2311, Linear Elec. | 3 | GTEC 2351, Thermodynamics | 3 |
| EET 2111, Linear Elec. Lab. | 1 | GTEC 2311, Statics | 3 |
| EET 2314, Digital Techn. I | 3 | HIST 2301, Hist. of U.S. Since 1877 | 3 |
| EET 2114, Digital Technology I Lab. I | 3 | ENGL 2311, Technical Writing | 3 |
| PHYS 1307, General Physics II | 3 | TOTAL | 16 |
| PHYS 1104, General Physics II Lab. I | 1 | | |
| TOTAL | 18 | | |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MATH 3322, Math. for En. Tech. | 3 | EET 3312, Digital Communications | 3 |
| POLS 2302, Amer. Pub. Pol. | 3 | EET 3112, Digital Comm. Lab. | 1 |
| EET 3311, Telecomm. Tech. | 3 | EET 3314, Digital Technology II | 3 |
| EET 3111, Telecomm. Tech. Lab. | 1 | EET 3114, Digital Tech. II Lab | 1 |
| EET 3316, Local/Internet Networks | 3 | EET 3324, Linear Des. Appls. | 3 |
| EET 3116, Local/Internet Lab. | 1 | EET 3124, Linear Des. Lab | 1 |
| TOTAL | 14 | COMS 3358, Bus. & Prof. Comm. | 3 |
| | | 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 |
| EET 3321, Prog. Logic Cont. | 3 | GTEC 4131, Intro. Proj. Mgt. | 1 |
| EET 3121, Prog. Logic Cont. Lab. | 1 | Visual & Performing Arts Elective | 3 |
| GTEC 4121, Technology Seminar | 1 | C S 1462, Fund. of Comp. Sci. | 4 |
| Humanities Elective | 3 | TOTAL | 14 |
| TOTAL | 14 | | |

Minimum number of hours required for graduation—129 including internship.

(Continued from previous page)

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 1306, Gen. Phys. I | 3 |
| CHEM 1105, Gen. Chem. I (Lab.) | 1 | PHYS 1103, Exp. Gen. Phys. I (Lab.) | 1 |
| E GR 1306, Engineering Graphics | 3 | POLS 1301, Amer. Govt., Org. | 3 |
| GTEC 1130, Technology Seminar | 1 | GTEC 1211, Computer Prog. | 2 |
| MTEC 1312, Mech. Technology | 3 | TOTAL | 15 |
| TOTAL | 17 | | |
| | | SECOND YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| MATH 2323, Calculus II | 3 | GTEC 3311, Strength of Materials | 3 |
| PHYS 1307, Gen. Phys. II | 3 | MTEC 3370, Intro. Proj. Mgt. | 3 |
| PHYS 1104, Gen. Phys. II (Lab.) | 1 | GTEC 2351, Thermodynamics | 3 |
| POLS 2302, Amer. Public Policy | 3 | ENGL 2311, Technical Writing | 3 |
| GTEC 2311, Statics | 3 | COMS 3358, Bus. & Prof. Comm. | 3 |
| GTEC 1312, AC/DC Technology | 3 | TOTAL | 15 |
| TOTAL | 16 | | |
| | | THIRD YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| MTEC 3441, Mat. for Mech. Tech. | 4 | GTEC 3412, Fluid Mechanics & 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 elective | 3 |
| MATH 3322, Math. for En. Tech. | 3 | HIST 2301, Hist. of U.S. Since 1877 | 3 |
| Individual or Group Behavior | 3 | Humanities Elective | 3 |
| TOTAL | 14 | TOTAL | 17 |
| | | FOURTH YEAR | |
| | <i>Fall</i> | | <i>Spring</i> |
| MTEC 4351, Mechanisms | 3 | MTEC 4352, Dynamics | 3 |
| MTEC 4311, AC Design I | 3 | MTEC 4353, Mech. Design | 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 | TOTAL | 14 |
| GTEC 4121, Technology Seminar | 1 | | |
| TOTAL | 17 | | |

Minimum number of hours required for graduation—128 including internship.

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.

Department of Industrial Engineering**Milton Louis Smith, Chairperson**

Professor, 1968. B.S., Texas Tech, 1961; M.S., 1966; Ph.D., 1968; Reg. Prof. Engr. (Texas).

Faculty

Beruvides, Mario G., Associate Professor, 1994. B.S., Miami, 1981; M.S., 1988; Ph.D., Virginia Tech, 1993; Reg. Prof. Engr. (Texas).

Hsiang, Simon M., Associate Professor, 2000. B.S., Taiwan, 1982; M.S.I.E., Texas Tech, 1989; Ph.D., 1992.

Kobza, John E., Associate Professor, 1999. B.S.E.E., Washington State, 1982; M.S.E.E., Clemson, 1984; Ph.D., Virginia Polytech. Inst. and State U., 1993; Reg. Prof. Eng. (Texas).

Liman, Surya D., Associate Professor, 1991. B.S., Florida, 1986; M.E., 1987; Ph.D., 1991; Reg. Prof. Engr. (Texas).

Montes, Elliot J. Jr., Associate Professor, 2003. B.S., St. Mary's, 1988 M.S., 1991; Ph.D., Texas Tech, 1998.

Ramsey, Jerry Dwain, Professor, 1965. B.S., Texas A&M, 1955; M.S., 1960; Ph.D., Texas Tech, 1967; Reg. Prof. Engr. (New Mexico).

Rivero, Iris V., Assistant Professor, 2002. B.S., Pennsylvania State, 1996; M.S., 1998; Ph.D., 2002.

Smith, James L., Professor and Interim Dean, College of Engineering, 1979. B.S., Northwestern, 1971; M.S., Texas (Arlington), 1973; Ph.D., Auburn, 1980; Reg. Prof. Engr. (Texas).

Zhang, Hong-Chao, Professor, 1990. B.S., China, 1976; M.S., Denmark, 1986; Ph.D., Technical U. of Denmark, 1989; Reg. Prof. Engr. (Texas).

Emeritus Faculty

Ayoub, Mohamed Mohamed, Horn Professor, Emeritus, 1961-2002.

Dudek, Richard Albert, Horn Professor, Emeritus, 1958-1988.

About the Program

This department supervises the following degree programs: INDUSTRIAL ENGINEERING, *Bachelor of Science in Industrial Engineering*; Master of Science in Industrial Engineering, *Doctor of Philosophy*; SYSTEMS AND ENGINEERING MANAGEMENT, *Master of Science in Systems and Engineering Management*; MANUFACTURING SYSTEMS AND ENGINEERING, *Master of Science in Manufacturing Systems and Engineering*.

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 Systems Engineering and Management program is offered both on campus and by distance education and is designed to prepare its graduates for positions in technical management.

Specialty areas available include:

- 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.

With the counsel of a graduate advisor, students are expected to design individualized academic programs. Programs will incorporate courses taken in each of the three areas listed above. The course selection may include a minor in an area outside industrial engineering. 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. Details regarding admission and degree requirements are available from the department.

Industrial Engineering Curriculum

| | | FIRST YEAR | | | |
|------------------------------------|----|-------------|------------------------------------|--------|--|
| | | Fall | | Spring | |
| I E 1305, EngrAnal. | 3 | | I E 101, 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, EngrGraphics | 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, EngrDesign Prod. | 3 | | I E 3301, EngrEco. | 3 | |
| MATH 2350, Calculus III | 3 | | M E 331, Materials | 3 | |
| PHYS 1308, Prin. of Phys. I | 3 | | MATH 3350, Higher Math Engr. I | 3 | |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | | ††Communications Elective | 3 | |
| C E 2301, Statics | 3 | | PHYS 2301, Prin. of Phys. II | 3 | |
| *Social Science Elective | 3 | | PHYS 1106, Prin. of Phys. II (Lab) | 1 | |
| TOTAL | 16 | | TOTAL | 16 | |
| | | THIRD YEAR | | | |
| | | Fall | | Spring | |
| I E 3351, Manuf. Engr | 3 | | I E 331, Operations Research I | 3 | |
| I E 3341, EngrStat. | 3 | | I E 3343, Q. C. & EngrStat. | 3 | |
| I E 3361, Wrk Anal. & Des. | 3 | | I E 3371, Production Contr | 3 | |
| M E 2322, EngrThermo. I | 3 | | I E 3372, Mgt. Syst. Contr | 3 | |
| *Soc. Sci.—Humanities | 3 | | E E 3302, Elec. SysAnal. | 3 | |
| TOTAL | 15 | | *Soc. Sci.—Humanities | 3 | |
| | | | TOTAL | 18 | |
| | | FOURTH YEAR | | | |
| | | Fall | | Spring | |
| I E 431, Operations Res. II | 3 | | I E 4333, Senior Design Proj. | 3 | |
| I E 4361, EngrDes. 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, Mech. of Solids | | |
| +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.

††Communications elective from the following courses: COMS 2300, 3358, HDFS 2320, MGT 3373, PETR 3308, CH E 2306.

+Engineering elective from the following courses: C E 3302, 3303, 3305, E E 3388, M E 3370.

Department of Mechanical Engineering

Thomas D. Burton, Chairperson

Professor, 1995. B.S.E., Caltech, 1969; M.S.M.E.A.M., Pennsylvania, 1972; Ph.D., 1976.

Faculty

Anderson, Edward E., Professor and Associate Director, Teaching, Learning, and Technology Center, 1986. B.S.M.E., Iowa State, 1964; M.S.M.E., 1966; Ph.D., Purdue, 1972; Reg. Prof. Engr. (Iowa).

Barhorst, Alan A., Associate Professor, 1991. B.S., Texas A&M, 1984; M.S., 1989; Ph.D., 1991.

Berg, Jordan M., Associate Professor, 1996. B.S.E., Princeton, 1981; M.S.E., 1984; M.S., Drexel, 1992; Ph.D., 1992.

Chyu, Ming-Chien, Professor, 1987. B.S., Tsinghua (Taiwan), 1977; M.S., 1979; Ph.D., Iowa State, 1984.

Dunn, Jerry R., Associate Professor of Mechanical Engineering and Engineering Physics, 1975. B.S. in M.E., Lamar State Coll. of Technology, 1962; M.S. in M.E., Georgia Inst. of Technology, 1964; Ph.D., 1972; Reg. Prof. Engr. (Texas).

Ekwaro-Osire, Stephen, Assistant Professor, 1998. Dipl.-Ing., FH Osnabrück (Germany), 1985; M.S.M.E., Texas Tech, 1989; Ph.D., 1993.

Ertas, Atila, Professor, 1985. B.S. in Marine Machine Engr., Merchant Marine Academy (Turkey), 1968; B.S.M.E., Istanbul State Academy of Engineering and Architecture (Turkey), 1970; M.S.M.E., Texas A&M, 1978; Ph.D., 1984; Reg. Prof. Engr. (Texas).

Hashemi, Javad, Associate Professor, 1991. B.S.M.E., Drexel, 1981; M.S.M.E., 1983; Ph.D., 1988.

Idesman, Alexander V., Assistant Professor, 2000. M.S., Kiev Institute of Technolcoy, (USSR), 1982; Ph.D., Institute of Problems of Strength, (USSR), 1989.

James, Darryl L., Associate Professor, 1993. B.S.M.E., Texas A&M, 1988; M.S.M.E., Georgia Inst. of Tech., 1989; Ph.D., 1992.

Lawrence, James Harold Jr., Professor, 1956. B.S. in M.E., Texas Tech, 1956; M.S. in M.E., 1960; Ph.D., Texas A&M, 1965; Reg. Prof. Engr. (Texas).

Levitas, Valery I., Professor, 1999. M.Sc., Kiev Inst. Tech., 1978; Ph.D., Inst. Superhard Materials (Kiev), 1981; Doctor of Sciences, Inst. Electronic Machinebuilding, (Moscow), 1988; Doctor-Engineering, Habilitation (Germany), 1995.

Maxwell, Timothy Taylor, Associate Professor, 2002. B.M.E., Auburn, 1972; M.S., 1973; D.I.C., Imperial Coll. of Science and Technology (London), 1977; Ph.D., London (England), 1977; Reg. Prof. Engr. (Alabama).

Ma, Yanzhang, Assistant Professor, 1984. B.S., Jilin University (China), 1985; M.S., Jilin University (China), 1987; Ph.D., Jilin University (China), 1995.

Oler, James W., Associate Professor, 1980. B.S., Texas (Austin), 1974; M.S., 1976; Ph.D., Purdue, 1980.

Pantoya, Michelle L., Assistant Professor, 2000. B.S., California (Davis), 1992; M.S.M.E., 1994; Ph.D., 1999.

Parameswaran, Sivapathasundaram, Associate Professor, 1988. B.Sc., Peradeniya (Sri Lanka), 1975; M.Sc., Imperial Coll., U. of London, 1978; Ph.D., 1986.

Rasty, Jahan, Associate Professor, 1988. B.S.M.E., Louisiana State, 1981; M.S.M.E., 1984; Ph.D., 1987.

Emeritus Faculty

Carper, Herbert Jackson Jr., Professor, Emeritus, 1978-1997.

Davenport, Monty E., Professor and Vice President for Operations, Emeritus, 1956-1998.

Jordan, Duane Paul, Associate Professor, Emeritus, 1964-2002.

Martin, Robert Edward, Associate Professor, Emeritus, 1949-1985.

Newell, Robert Lee, Professor, Emeritus, 1941-1982.

Powers, Louis John, Professor, Emeritus, 1942-1979.

Reis, Levern Anthony, Associate Professor, Emeritus, 1957-1990.

Reynolds, Elbert Brunner Jr., Associate Professor, Emeritus, 1964-1990.

About the Program

This department supervises the following degree programs: MECHANICAL ENGINEERING, *Bachelor of Science in Mechanical Engineering*, *Master of Science in Mechanical Engineering*, and *Doctor of Philosophy*.

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 recently implemented a combined B.S.–M.S. program that will allow qualified students to obtain a Master of Science in Mechanical Engineering (M.S.M.E.) degree through an additional 12-15 months of study beyond the bachelor's degree. Students enrolled in the program will follow the standard undergraduate mechanical engineering curriculum for 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 from the department and must be submitted prior to completion of the junior year. Further information on this combined program is available from the department.

Co-Op Program. Mechanical engineering students are encouraged to consider the College of Engineering Co-op program. This normally involves three work assignments in industry for a 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.

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 and must maintain a GPA of 2.0 or better.

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.

Two general plans of study are available for the Master of Science degree: a 30-hour plan (which includes 6 hours credit for the master's thesis) and a 36-hour plan (which includes 3 hours credit for the master's report). The decision on which plan to follow is made jointly by the student and the advisor. Individual degree plans require a selected core of courses basic to mechanical engineering and include additional elective courses chosen by the student and the 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 doctoral advisory committee.

Additional information may be obtained from the department.

Department of Petroleum Engineering

James F. Lea, Chairperson

Roy S. Butler Professor, 1999. B.S.M.E., Arkansas, 1965; M.S.M.E., 1967; Ph.D., Southern Methodist, 1970; Reg. Prof. Eng. (Texas).

Faculty

- Adisoemarta, Paulus S.**, Lecturer, 1999. B.S., Bandung Inst. Tech., 1987; M.S., Texas (Austin), 1995; Ph.D., Texas Tech, 1999.
Cox, Christian J., Assistant Professor, 1999. B.S., Texas Tech, 1985; M.S., 1988; Ph.D., Texas A&M, 1997.
Frailey, Scott M., Associate Professor, 1992. B.S., Missouri-Rolla, 1985; M.S., 1986; Ph.D., 1989; Reg. Prof. Eng. (Texas and New Mexico).
Heinze, Lloyd R., Watford Associate Professor, 1991. B.S., Tulsa, 1973; M.B.A., Wyoming, 1975; M.S., Missouri (Rolla), 1986; Ph.D., 1991; Reg Prof. Engr. (Texas and Wyoming).
House, Waylon V., Associate Professor, 2003. B.S., Massachusetts Inst. Tech., 1966; M.S., Pittsburgh, 1969; Ph.D., 1974.
Lawal, Akanni S., Associate Professor, 1999. B.S., Ife, 1974; M.S., Texas, 1981; Ph.D., 1985.
Oetama, Teddy P., Associate Professor, 2002. M.S., Texas A&M, 1983; Ph.D., 1999.

Emeritus Faculty

- Arnold, Marion Denson**, Professor, Emeritus, 1984-1998.
Land, Carlon Sanford, Professor, Emeritus, 1983-1992.
Winkler, Herald Warren, Professor, Emeritus, 1970-1985.

About the Program

This department supervises the following degree programs: PETROLEUM ENGINEERING, *Bachelor of Science in Petroleum Engineering*; *Master of Science in Petroleum Engineering*; *Doctor of Philosophy*. Admission requirements and details of the programs are posted on the departmental Web site at www.pe.ttu.edu.

Undergraduate Program

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

(Continued from previous page)

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 1308, Prin. of Phys. I | 3 |
| CHEM 1107, Prin. Chem. I (Lab.) | 1 | PHYS 1105, Prin. of Phys. I (Lab) | 1 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| M E 1315, Intro to Mech. Eng. | 3 | E GR 1306, EngrGraphics | 3 |
| HIST 2300, Hist. of U.S. to 1877 | 3 | *Elective (History) | 3 |
| TOTAL | 16 | TOTAL | 16 |
| SECOND YEAR | | | |
| Fall | | Spring | |
| MATH 2350, Calculus III | 3 | MATH 3350, Higher Math. Engr. I | 3 |
| PHYS 2301, Prin. of Phys. II | 3 | M E 2322, Eng.Thermo. I | 3 |
| PHYS 1106, Prin. of Phys. II (Lab) | 1 | M E 2464, Eng. Mechanics I | 4 |
| E E 3302, Fund. of E E | 3 | *Elective (Political Science) | 3 |
| M E 2315, CompAided Anal. | 3 | *Elective (Oral Communication) | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | TOTAL | 16 |
| TOTAL | 16 | | |
| THIRD YEAR | | | |
| Fall | | Spring | |
| M E 3364, EngrMechanics II | 3 | M E 3322, EngrThermo. II | 3 |
| M E 3164, Engr. Mech. II Lab. | 1 | M E 3328, Materials & Mech. Lab. | 3 |
| M E 331, 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, EngrEcon. Anal. | 3 | M E 3371, HeatTransfer | 3 |
| TOTAL | 16 | TOTAL | 17 |
| FOURTH YEAR | | | |
| Fall | | Spring | |
| M E 4334, Cont. Dynamic Sys. | 3 | M E 4371, EngrDesign II | 3 |
| M E 4351,Thermal-Fluid Sys. Lab. | 3 | **Elective (Mech. Engr. Design) | 3 |
| M E 4370, EngrDesign 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.

- 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.

Graduate Program

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 petro-

leum 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.

(Continued on next page)

Graduate Program... (Continued from previous page)

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.

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 | CHEM 1308, Prin. Chem. II | 3 |
| CHEM 1107, Prin. Chem. I (Lab.) | 1 | CHEM 1108, Prin. Chem. II (Lab.) | 1 |
| GEOL 1303, Phys. Geology | 3 | PETR 1305, Engr. Anal. | 3 |
| GEOL 1101, Phys. Geology Lab. | 1 | POLS 1301, Amer. Govt., Org. | 3 |
| PETR 1101, Intro. to Petroleum Engr. | 1 | TOTAL | 16 |
| TOTAL | 15 | | |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MATH 2350, Calc. III | 3 | PHYS 2301, Prin. of Phys. II | 3 |
| PHYS 1308, Prin. of Phys. I | 3 | PHYS 1106, Prin. of Phys. II (Lab.) | 1 |
| PHYS 1105, Prin. of Phys. I (Lab.) | 1 | MATH 3350, Math. Engrs. I | 3 |
| POLS 2302, Amer. Pub. Pol. | 3 | PETR 2302, Res. Fluid Prop. | 3 |
| PETR 2301, Petr. Develop. | 3 | C E 3305, Mech. of Fluids | 3 |
| C E 2301, Statics | 3 | M E 2322, Engr. Thermo. | 3 |
| **Structural Geology Elective | 3 | TOTAL | 16 |
| TOTAL | 19 | | |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MATH 3342, Statistics for Engineers | 3 | C E 3303, Mech. of Solids | 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 | HIST 2300, Hist. of U.S. to 1877 | 3 |
| E E 3302, Fund. of Elec. Engr. | 3 | GEOL 4324, Geol. of Petroleum | 3 |
| C E 3302, Dynamics | 3 | PETR 3407, Drilling Engr. | 4 |
| PETR 3308, Engr. Comm. | 3 | TOTAL | 19 |
| TOTAL | 19 | | |
| 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 2301, Hist. of U.S. since 1877 | 3 | *PETR Elective | 3 |
| I E 3301, EngrEco. Anal. | 3 | †Humanities Elective | 3 |
| PETR 4105, Gas & Prod. Lab. | 1 | TOTAL | 15 |
| †Humanities Elective | 3 | | |
| TOTAL | 17 | | |

Minimum hours required for graduation—136.

*Select from PETR 4000 or 4331.

**Geology electives from the following: GEOL 3402 or 4000 GEOL 400 approved by the Department Chair.

†Choose from Core Curriculum requirements.

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.

College of Human Sciences

Dr. Linda C. Hoover
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 focus is on people, the development of human potential, and the reciprocal relationships between individuals and their environments. Graduates contribute to the functioning of individuals and families and the quality of goods and services available within the diverse global community.

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 are offered in personal financial planning, apparel design and manufacturing, and retailing; food and nutrition with a specialization in general dietetics; human development and family studies, early childhood, and family and consumer sciences. The college also offers the Bachelor of Science degree in Restaurant, Hotel, and Institutional Management and the Bachelor of Interior Design degree. For additional information about undergraduate degree programs in the various departments, see the following pages and/or contact the office of Academic Advising Services.

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.

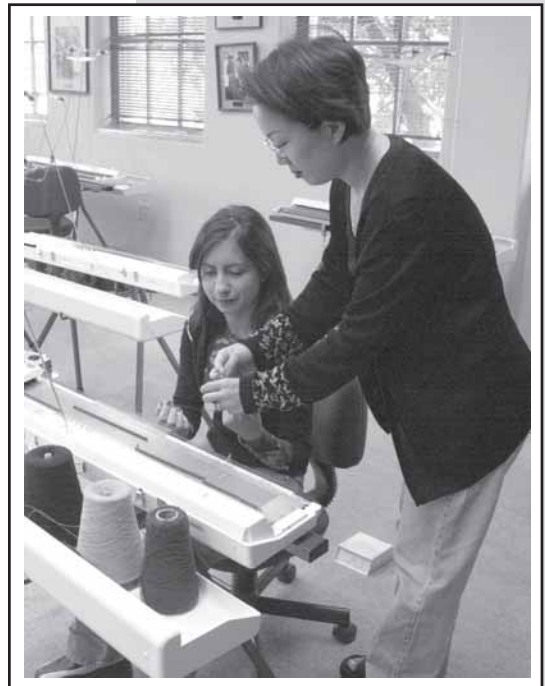
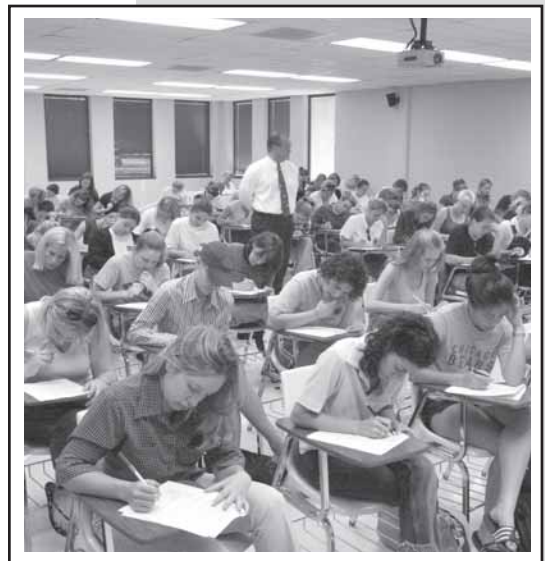
Undergraduate Program

General Standards and Requirements

The College of Human Sciences expects the student to assume responsibility for knowing the rules, regulations, and policies of the university and the requirements pertaining to his or her degree program and to consult the *Catalog*, registration guidelines, and degree plans for the major.

Admission of Transfer Students. Students planning to take their first two years of work at a junior or community college should follow our lower division degree requirements. Up to 66 hours required in the degree program can be accepted from a junior or community college. All hours transfer to the College of Human Sciences for classification purposes but may not necessarily meet degree plan requirements. Only grades earned while enrolled at Texas Tech are used in calculating the grade point average for meeting graduation requirements.

Financial Aid to Students. A number of student scholarships and assistantships providing financial assistance and valuable experience to capable students are available in human sciences. 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.

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 transfer to another institution or another college at Texas Tech, 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 the Web site www.hs.ttu.edu/AAS.Default.htm 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 <http://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 8-12 and 1-4 p.m., Monday-Thursday.

Graduation. Graduation is attained by fulfilling the requirements for a bachelor's degree using an acceptable catalog edition. The student is responsible for fulfilling all catalog requirements. At least one year prior to the graduation semester, students should file a Statement of Intention to Graduate form with Academic Advising Services. After submission of the form, the Coordinator of Undergraduate Programs will complete a degree audit and 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 which may prevent graduation. The last 30 hours are to be taken in residence at 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 to 18 hours. The maximum load for a semester is 19 hours (7 hours for a summer term). A minimum of 12 hours is required for full-time status.

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 colleges of Human Sciences and 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; PSY 4325, Drugs, Alcohol, and Behavior.
4. Take remaining classes in any order: FCSE 3325, Educational Programming; Addiction Issues; HDFS 3329, Addictive Relationships; 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; 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 the Program Director, Dr. Kitty Harris, Center for the Study of Addiction, 172 Human Sciences Building.

Graduate Program

The College of Human Sciences offers graduate programs leading to the Master of Science and Doctor of Philosophy degrees. The Master of Science degree has majors in Environmental Design; Food and Nutrition; Family and Consumer Sciences Education; Human Development and Family Studies; Marriage and Family Therapy; Personal Financial Planning; 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 mission of the College of Human Sciences is to provide multidisciplinary education, research, and service focused on individuals, families, and their environments for the purpose of improving and enhancing the human condition.

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, and currently serve as leaders in the business world, a number of private sector organizations, and in academic settings as educators and administrators.

Persons interested in graduate programs should consult earlier sections of this catalog for information concerning University requirements for master's and doctoral degrees. Information about the graduate minor in risk-taking behavior is provided under the "Opportunities for Interdisciplinary Study" section of this catalog. Admission to master's degree programs requires the recommendation of the department and the 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

Lynn Huffman, Chairperson

Professor, 1980. B.S., Sam Houston State, 1967; M.S., Texas A&M, 1974; Ph.D., 1977.

Faculty

Adams, Charlie, Assistant Professor, 1997. B.G.S., Texas Tech, 1987; B.S., 1988; M.S., 1990; Ph.D., 1997.

Blum, Shane C., Assistant Professor, 1998. B.S., Massachusetts, 1988; MBA, San Diego State, 1993; Ph.D., Nevada (Las Vegas), 1998.

Boyce, Janice C., Associate Professor, 2002. B.S., Texas Christian, 1976; M.Ed., 1978; Ph.D., Texas Woman's, 1990.

Boylan, L. Mallory, Associate Professor, 1986. B.S., Alabama, 1975; M.S., 1978; Ph.D., Virginia Polytechnic Inst., 1986.

Brittin, Dorothy Helen Clark, Professor, 1965. B.S., Florida State, 1960; M.S., Texas Tech, 1965; Ph.D., 1974.

Couch, Anna Sue, Professor, 1978. B.S., Kentucky, 1959; M.S., 1976; Ed.D., 1978.

Dodd, Tim, Associate Professor, 1995. B.Ed., Waikato, 1981; M.B.A., Texas Tech, 1991; Ph.D., 1994.

Felstehausen, Virginia C., Professor, 1984. B.S., South Dakota State, 1959; M.S., Wisconsin (Madison), 1962; Ph.D., 1983.

Goh, Ben K., Assistant Professor, 1988. B.S., Texas Tech, 1986; M.B.A., 1988; Ed.D., Nova Southeastern, 2001.

Hoover, Linda C., Associate Professor and Dean, College of Human Sciences, 1990. B.S., Texas Tech, 1974; M.S., Texas Woman's, 1979; Ph.D., 1989.

Kim, Yen-Soon, Assistant Professor, 2003. B.S., Soonchunhyung U., 1993; M.S., 1995; Ph.D., Oklahoma State, 2002.

Reichelt, Susan, Assistant Professor, 2001. B.S., Wisconsin, 1980; M.S., Florida Tech, 1994; Ph.D., Iowa State, 2001.

Roman-Shriver, Carmen R., Associate Professor, 1997. B.S., Puerto Rico, 1970; M.S., Texas Woman's, 1979; Ph.D., Ohio State, 1987.

Shriver, Brent James, Assistant Professor, 1998. B.S., West Virginia, 1979; M.S., 1983; Ph.D., Ohio State, 1989.

Shumate, Steven R., Assistant Professor, 2001. Mhrta, South Carolina, 1998; Ph.D., 2002.

Spallholz, Julian E., Professor, 1978. B.S., Colorado State, 1965; M.S., 1968; Ph.D., Hawaii, 1971.

Stout, Betty Lee, Associate Professor, 1985. B.S., Fairmont State, 1968; M.S., West Virginia U., 1971; Ph.D., Iowa State, 1977.

Tolbert, Andrew, Instructor, 2002. B.S., William Carey Coll., 1975; J.D., Texas Tech, 1998.

Ward, J. B., Instructor, 2001. B.S., Texas Tech, 1993; M.S., 2001.

Wu, Kenny C., Assistant Professor, 1995. B.S., Tunghai U. (Taiwan), 1981; M.B.A., Sul Ross State, 1985; M.S., Texas Tech, 1988; Ph.D., 1992.

Emeritus Faculty

Bell, Jean Camille Graves, Professor, Emeritus, 1963-1985.

Boswell, Mary Middleton, Associate Professor, Emeritus, 1968-1985.

Chamberlain, Valerie Meyer, Professor, Emeritus, 1971-1985.

Fox, Elizabeth, Associate Professor, Emeritus, 1982-2002.

Harden, Margarette Leggett, Professor, Emeritus, 1967-1992.

Lamb, Mina Marie Wolf, Margaret W. Weeks Professor, Emeritus, 1940-1975.

Logan, Martha Morrow, Associate Professor, Emeritus, 1969-1985.

Martin, Ruth Evelyn, Professor, Emeritus, 1986-1999.

McPherson, Clara Mueller, Associate Professor, Emeritus, 1947-1986.

Oberleas, Donald, Professor, Emeritus, 1985-1998.

Williamson, Billie Frances, Assistant Dean and Professor, Emeritus, 1956-1973.

Yang, Shiang Ping, Professor, Emeritus, 1969-1988.

About the Program

This department supervises the following degree programs: FAMILY AND CONSUMER SCIENCES, *Bachelor of Science in Family and Consumer Sciences*; FAMILY AND CONSUMER SCIENCES EDUCATION, *Master of Science and Doctor of Philosophy*; FOOD AND NUTRITION, *Bachelor of Science, Master of Science, and Doctor of Philosophy*; RESTAURANT, HOTEL, AND INSTITUTIONAL MANAGEMENT, *Bachelor of Science, Master of Science, and Doctor of Philosophy*.

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, family 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 in Texas. See an academic advisor for current information.

Students seeking teacher certification must meet all requirements outlined in the Teacher 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 Teacher Certification Curriculum

| FIRST YEAR | | | |
|---------------------------|----|-----------------------------|----|
| Fall | | Spring | |
| HUSC 1100 or I S 1100 | 1 | ENGL 1302 | 3 |
| ENGL 1301 | 3 | *Math. of 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 | | | |
|-----------------------|----|-----------------------|----|
| Fall | | Spring | |
| HIST 2300 | 3 | HIST 2301 | 3 |
| English Literature | 3 | ENGL 2311 | 3 |
| *Natural Lab. Science | 4 | HDFS 3301 | 4 |
| EDSE 2300 | 3 | FPF 2325 or FCSE 3301 | 3 |
| ADM 2311 | 3 | F&N 1410 | 3 |
| ADM 1303 | 3 | TOTAL | 16 |
| TOTAL | 19 | | |

| THIRD YEAR | | | |
|------------|----|-------------------|----|
| Fall | | Spring | |
| 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 | | | |
|-----------------|----|-------------|----|
| Fall | | Spring | |
| 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—134-148 hours, dependent on transfer student status.
 *Choose from Core Curriculum requirements.
 **Admission to Teacher Education and a minimum 2.5 GPA required (apply prior semester).

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 support areas such as mass communications, business, or computer science. A minor may be obtained by taking 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.

Family and Consumer Sciences Curriculum

| FIRST YEAR | | | |
|---------------------------|----|-----------------------------|----|
| Fall | | Spring | |
| 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 | | | |
|-----------------------|----|------------------|----|
| Fall | | Spring | |
| 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 | | | |
|-----------------------|----|----------------------|----|
| Fall | | Spring | |
| HDFS 3320 | 3 | FCSE 3303 | 3 |
| HDFS 3301 | 3 | HDFS 3331 | 3 |
| FPF 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 | | | |
|---------------------|----|----------------------------------|----|
| Fall | | Spring | |
| 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 | FPF or I D Elective or FCSE 3350 | 3 |
| TOTAL | 14 | TOTAL | 15 |

TOTAL—125-136 hours, dependent on transfer student status.
 *Choose from Core Curriculum requirements.

Pre-Teaching Family and Consumer Sciences Minor. The Pre-Teaching Minor is designed for students in any major in the College of Human Sciences 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 Teacher 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 of Human Sciences 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 1325 or 1410, 2310, choose 4 from the following: F&N 2325, 3340, 4330, 4360, or 4380.

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. ADA accredited graduates from the DPD are eligible to apply for an internship (such as the post-baccalaureate internship offered at Texas Tech) or an approved preprofessional practice (AP4) program. 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.

Food and Nutrition—General Dietetics Curriculum

| FIRST YEAR | | | |
|-----------------------|----|-----------------|----|
| Fall | | Spring | |
| 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 1410 | 4 |
| F&N 1201 | 2 | TOTAL | 17 |
| TOTAL | 16 | | |

| SECOND YEAR | | | |
|-----------------|----|------------------------|-------|
| Fall | | Spring | |
| HIST 2300 | 3 | HIST 2301 | 3 |
| ZOOL 2403 | 4 | F&N 3340 | 3 |
| F&N 2310 | 3 | RHIM 3322 | 3 |
| CHEM 2303, 2103 | 4 | COMS 2300 or 3358 | 3 |
| TOTAL | 17 | AAEC 3401 or MATH 2300 | 3-4 |
| | | TOTAL | 15-16 |

| THIRD YEAR | | | |
|------------|----|-------------------|----|
| Fall | | Spring | |
| RHIM 3460 | 4 | RHIM 3470 | 4 |
| F&N 3402 | 4 | FD T 3301 or 3303 | 3 |
| RHIM 3341 | 3 | F&N 3311, 4120 | 4 |
| HUSC 3214 | 2 | RHIM 3390 | 3 |
| F&N 3310 | 3 | F&N 4320 | 3 |
| TOTAL | 16 | TOTAL | 17 |

| FOURTH YEAR | | | |
|----------------------|----|---------------------------|----|
| Fall | | Spring | |
| F&N 4340, 4130 | 4 | F&N 4350 | 3 |
| F&N 4330 | 3 | F&N 4341, 4130 | 4 |
| F&N 4380 | 3 | FCSE 3303 | 3 |
| HDFS 3320 | 3 | F&N 4360 | 3 |
| *Humanities Elective | 3 | *Visual & Performing Arts | 3 |
| TOTAL | 16 | TOTAL | 16 |

TOTAL—129-150 hours, dependent on transfer student status.

*Choose from Core Curriculum requirements.

NOTE: Students are expected to have competency in computer usage.

Restaurant, Hotel, and Institutional Management Program

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.

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.

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 | SPCS 1301 | 3 |
| RHIM 3460 | 4 | RHIM 3350 | 3 |
| Elective | 3 | RHIM 3470 | 4 |
| TOTAL | 16 | Elective | 3 |
| | | TOTAL | 19 |

| THIRD YEAR | | | |
|------------|----|-----------|----|
| Fall | | Spring | |
| RHIM 3303 | 3 | ANSC 3404 | 4 |
| COMS 3358 | 3 | RHIM 3390 | 3 |
| RHIM 3341 | 3 | RHIM 3320 | 3 |
| RHIM 3321 | 3 | RHIM 3322 | 3 |
| FD T 3303 | 3 | RHIM 3358 | 3 |
| TOTAL | 15 | HUSC 3214 | 2 |
| | | TOTAL | 18 |

| FOURTH YEAR | | | |
|---------------------------|----|-----------------|----|
| Fall | | Spring | |
| RHIM 4322 | 3 | RHIM 4300 | 3 |
| RHIM 4415 | 4 | Elective | 3 |
| *visual & Performing Arts | 3 | RHIM 4316 | 3 |
| RHIM 4312 | 3 | RHIM 4313 | 3 |
| **RHIM elective | 3 | **RHIM elective | 3 |
| TOTAL | 16 | TOTAL | 15 |

TOTAL—129-150 hours, dependent on transfer student status.

*Choose from Core Curriculum requirements.

**Choose from RHIM 3000, 3308, 3330, 3355, 4320, 4330.

Graduate Program

This department supervises the following degree programs: FAMILY AND CONSUMER SCIENCES EDUCATION, *Master of Science* and *Doctor of Philosophy*; FOOD AND NUTRITION, *Master of Science*, and *Doctor of Philosophy*; RESTAURANT, HOTEL, AND INSTITUTIONAL MANAGEMENT, *Master of Science*, and *Doctor of Philosophy*. The Master of Science degree requires a minimum of 30 semester hours including thesis, or 36 hours for a nonthesis plan, with courses 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.

Department of Human Development and Family Studies

Dean M. Busby, Chairperson

Professor, 1999. B.A., Utah, 1986; M.S., Brigham Young, 1988; Ph.D., 1990.

Faculty

Bean, Roy A., Assistant Professor, 2002. B.A., Utah, 1992; M.S., Brigham Young, 1995; Ph.D., 1997.

Bell, Nancy J., Professor and Coordinator, Risk-Taking Behavior Program, 1974. B.A., Allegheny, 1963; M.A., Northern Illinois, 1971; Ph.D., Northwestern, 1973.

Bermúdez, Judith Maria, Assistant Professor, 2001. B.A., Houston, 1991; M.S., Purdue, 1997. **Caldera, Yvonne M.**, Associate Professor, 1994. B.S., Tulane, 1981; M.A., Kansas, 1986; Ph.D., 1990.

Colwell, Malinda J., Assistant Professor, 2000. B.A., Evansville, 1995; M.S., Auburn, 1997; Ph.D., 2000.

Crawford, Duane W., Associate Professor, 1988. B.A., Wichita State, 1977; M.A., 1982; Ph.D., Pennsylvania State, 1988.

Driskill, Jackie Keim, Instructor, 1987. B.S., Texas Tech, 1971; M.S., 1990.

Feng, Du, Associate Professor, 1996. B.S., Beijing, 1991; M.S., Southern California, 1994; Ph.D., 1995.

Fischer, Judith L., Professor, 1979. B.A., Denver, 1966; M.A., 1967; Ph.D., Colorado, 1973.

Fitzpatrick, Jacki, Associate Professor, 1994. B.S., Scranton, 1983; M.S., Auburn, 1990; Ph.D., 1994.

Haley, Elizabeth G., Professor, 1981. B.S., Louisiana Tech, 1966; M.S., Florida State, 1968; Ph.D., 1972.

Harris, Kitty S., Associate Professor, 2002. B.S., North Texas State, 1973; M.S., 1974; Ph.D., Texas Tech, 1983.

Harris, Steven M., Associate Professor and Associate Dean, College of Human Sciences, 1996. B.S., Brigham Young, 1990; M.A., Syracuse, 1992; Ph.D., 1996.

Hart, Sybil, Associate Professor, 1997. B.Ed., McGill, 1976; M.A., 1979; Ph.D., Tufts, 1995.

Ivey, David C., Associate Professor, 1993. B.S., Arizona State, 1983; M.C., 1987; Ph.D., Nebraska, 1993.

Johnson, Stacy L., Instructor and Assistant Director, Child Development Research Center, 1992. B.S., Texas Tech, 1991; M.S., 1996.

Kowalski, Kurt L., Assistant Professor, 2001. B.A., Arizona State, 1990; Ph.D., 1995.

Lindsey, Eric W., Assistant Professor, 1999. B.S., Harding, 1991; M.S., Auburn, 1994; Ph.D., 1997.

McCarty, Michael E., Assistant Professor, 2001. B.S., Denver, 1986; M.A., Vanderbilt, 1991; Ph.D., 1993.

Mulrow, Miriam Haggard, Assistant Professors, 1998. B.S., Alabama, 1979; M.S., Louisiana (Lafayette), 1983; Ph.D., Georgia, 1998.

Nathan, Catherine S., Instructor and Director, Child Development Research Center, 2000. B.A., Emory, 1966; M.Ed., Florida, 1969; Ed.D., Texas Tech, 1989.

Powell, Lane H., Visiting Professor, 1999. B.A., Samford, 1963; MRE, New Orleans Theo. Sem., 1968; Ph.D., Texas Tech, 1984.

Reid, Kary, Adjunct Faculty and Director of Clinical Training, Family Therapy Clinic, 1995. B.A., Texas Tech, 1978; M.A., 1982; Ph.D., 1993.

Reifman, Alan S., Assistant Professor, 1997. B.A., California (Los Angeles), 1984; M.A., Michigan, 1985; Ph.D., 1989.

Scott, Jean Pearson, Professor, 1979. B.S.H.E., North Carolina (Greensboro), 1973; M.S., 1975; Ph.D., 1979.

Sorell, Gwendolyn T., Associate Professor and Director, Women's Studies, 1983. B.A., Goddard, 1976; M.S., Pennsylvania State, 1979; Ph.D., 1982.

Stelle, Charles D., Assistant Professor, 2000. B.S., North Texas, 1994; M.S., 1996; Ph.D., Connecticut, 2000.

Wampler, Karen Smith, Professor, 1989. B.A., Indiana, 1964; M.A., Pennsylvania, 1967; Ph.D., Purdue, 1979.

Wampler, Richard S., Associate Professor, 1989. B.A., Indiana, 1964; M.S.W., Georgia, 1981; Ph.D., Pennsylvania, 1970.

Emeritus Faculty

Drew, Lola Marie, Associate Professor, Emeritus, 1946-1972.

Edwards, Wildring Sherrod, Associate Professor, Emeritus, 1962-1984.

Fowler, Stanley Earl, Professor, Emeritus, 1970-1991.

Longworth, Donald Sherman, Professor, Emeritus, 1966-1982.

O'Bar, Mary Tom Riley, Professor, Emeritus, 1972-2000.

Pinder, Robert Henry, Associate Professor, Emeritus, 1971-1994.

Randle, Helen Caldwell, Associate Professor, Emeritus, 1965-1977.

Wagner, Betty Sue Malone, Associate Professor, Emeritus, 1969-1994.

Wallace, Dorothy Estelle Hays, Professor, Emeritus, 1959-1975.

About the Program

This department supervises the following degree programs: HUMAN DEVELOPMENT AND FAMILY STUDIES, *Bachelor of Science*, *Master of Science*, and *Doctor of Philosophy*; MARRIAGE AND FAMILY THERAPY, *Master of Science* and *Doctor of Philosophy*.

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 the Academic Advising Office 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.

A variety of courses offers 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 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. As part of this core, it is recommended that HDFS 2320 (Basic Interpersonal Skills) be taken to fulfill the oral communication requirement. 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 two courses in the following five areas for a total of 6 credit hours:

- Human Development and Family Studies Area**
 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

Application/Research Area

Students must select one course from this area for a total of 3 hours.

- 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

Department Electives. Twelve credit hours of electives selected from the preceding blocks are required. Some students may want to concentrate their electives in one or two areas to demonstrate a specialization.

Teacher Certification Specializations

Human Development and Family Studies Teacher Certification Curriculum

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 Teacher Education section of this catalog. To be recommended for certification, graduates must achieve satisfactory performance on the TExES examination prescribed by the State Board of Education.

| | | FIRST YEAR | | |
|-----------------------|--|------------|-----------------------------|--------|
| | | Fall | | Spring |
| HUSC 1100 or I S 1100 | | 1 | ENGL 1302 | 3 |
| ENGL 1301 | | 3 | EDIT 2318 | 3 |
| *MATH Elective | | 3 | *Visual & Performing Arts | 3 |
| FCSE 2102 | | 1 | POLS 2302 | 3 |
| POLS 1301 | | 3 | *Math. or Logical Reasoning | 3 |
| HDFS 2320 | | 3 | PFP 2325 or FCSE 3301 | 3 |
| I D 1380 | | 3 | TOTAL | 18 |
| TOTAL | | 17 | | |

| | | SECOND YEAR | | |
|---------------------|--|-------------|--------------------|--------|
| | | Fall | | Spring |
| Natural Lab Science | | 4 | HDFS 3301 | 3 |
| ENGL 2311 | | 3 | HDFS 3350 | 3 |
| HDFS 3320 | | 3 | FCSE 3350 | 3 |
| HIST 2300 | | 3 | English Literature | 3 |
| ADM 1303 | | 3 | F&N 1410 | 4 |
| EDSE 2300 | | 3 | HIST 2301 | 3 |
| TOTAL | | 19 | TOTAL | 19 |

| | | THIRD YEAR | | |
|-------------|--|------------|-------------------|--------|
| | | Fall | | Spring |
| RHIM 3460 | | 4 | **EDSE 4310, 4322 | 6 |
| HDFS 3321 | | 3 | **FCSE 3103, 4302 | 4 |
| **FCSE 3301 | | 3 | HDFS 3313 or 3311 | 3 |
| HDFS 3312 | | 3 | **EDLL 4380 | 3 |
| HDFS 3310 | | 3 | HDFS 3306 or 3317 | 3 |
| HDFS 3326 | | 3 | TOTAL | 19 |
| TOTAL | | 19 | | |

| | | FOURTH YEAR | | |
|--------------------|--|-------------|-------------|--------|
| | | Fall | | Spring |
| **FCSE 4308 | | 3 | **FCSE 4601 | 6 |
| **FCSE 4306 & 4103 | | 4 | **FCSE 4304 | 3 |
| HDFS 3390 | | 3 | TOTAL | 9 |
| HDFS 3322 | | 3 | | |
| HUSC 3214 | | 2 | | |
| HDFS 3331 | | 3 | | |
| TOTAL | | 18 | | |

TOTAL—134-151 hours, dependent on transfer student status.
 *Choose from Core Curriculum requirements
 **Admission into the Teacher Education Program is required to enroll, 2.5 GPA minimum.
 †HDFS 2320 required and can be applied to oral communication.

Early Childhood Teacher Certification Curriculum

The early childhood specialization prepares professionals to work with children from infancy through 4th 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 4th 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 Teacher Education section of this catalog. To be recommended for certification, graduates must achieve satisfactory performance on the TExES, an examination prescribed by the State Board of Education.

FIRST YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|-----------------------|----|---------------------------------------|----|
| 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 | *Natural Lab. Science (Earth Science) | 4 |
| GEOG 1300 | 3 | *Oral Communication | 3 |
| HDFS 2311 | 3 | MUSI 2301 or 3336 | 3 |
| EDEL 2191 | 1 | TOTAL | 19 |
| TOTAL | 17 | | |

SECOND YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|------------------|----|-----------------------------|----|
| HIST 2300 | 3 | HIST 2301 | 3 |
| English Elective | 3 | Natural Lab. (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

| <i>Fall</i> | | <i>Spring</i> | |
|-------------------|----|---------------|----|
| #EDSP 3300 | 3 | #EDLL 3351 | 3 |
| #EDLL 3350 | 3 | #EDLL 3352 | 3 |
| #EDIT 3318 | 3 | #EDBL 3334 | 3 |
| HDFS 3313 or 3311 | 3 | HIST 3310 | 3 |
| HDFS 3306 | 3 | HDFS 4306 | 3 |
| HUSC 3214 | 2 | MATH 3370 | 3 |
| TOTAL | 17 | TOTAL | 18 |

FOURTH YEAR

| <i>Fall</i> | | <i>Spring</i> | |
|---------------------------------|----|---------------|----|
| #EDEL 4360, 4370 | 6 | #EDEL 4330 | 3 |
| #EDEL 4375, EDLL 4380 | 6 | #EDEC 4000 | 9 |
| HLTH 3313 or ESS 3313 | 3 | TOTAL | 12 |
| Natural Lab. (Physical Science) | 4 | | |
| TOTAL | 19 | | |

TOTAL—136, hours, dependent on transfer student status.
 *Choose from Core Curriculum requirements.
 **HDFS 2320 required and can be applied to oral communication.
 #Concurrent enrollment and acceptance into Teacher Education Program; 2.7 GPA minimum.

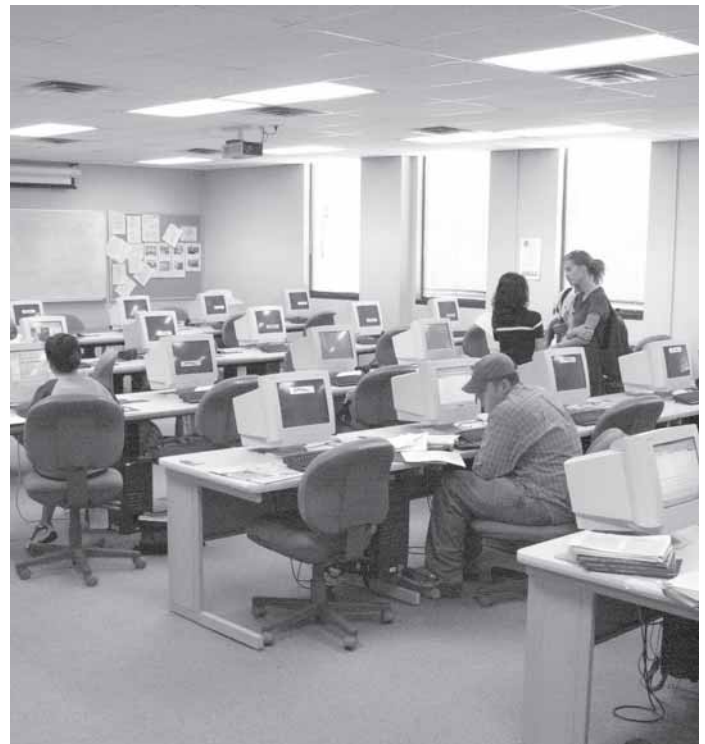
Graduate Program

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 upon the development of the individual 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, 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, interdisciplinary programs which are 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 73 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.



Department of Merchandising, Environmental Design, and Consumer Economics

Joann Shroyer, Chairperson

Professor, 1980. B.S., Texas Tech, 1977; M.S., 1980; Ph.D., Oklahoma State, 1983.

Faculty

Alexander, Theresa C., Instructor in Apparel Design and Manufacturing, 2000. B.S., Texas Tech, 1996; M.A., Nottingham Trent (England), 1999.

Amor, Cherif M., Assistant Professor of Interior Design, 2000. B.Arch., Conitantine (Algeria), 1984; M.Phil. New Castle Upon Tyne (U.K.), 1987; Ph.D., Missouri (Columbia), 2000.

Bagwell, Dorothy Caroline, Assistant Professor of Personal Financial Planning, 2000. B.S., Louisiana State, 1989; M.S., Texas Woman's, 1996; Ph.D., Virginia Polytechnic I., 2000.

Barnhill, Robert E., Part-Time Instructor in Personal Financial Planning, 1988. B.B.A., Texas Tech, 1976; M.B.A., 1980; J.D., 1980.

Collier, Don, Assistant Professor of Interior Design, 2000. B.F.A., Stephen F. Austin, 1975; M.F.A., Texas Tech, 1977.

Cunningham, Carol, Part-time Instructor in Interior Design, 2002. B.F.A., Texas Tech, 1974.

Curry, Zane D., Associate Professor of Interior Design, 1991. B.F.A., North Texas State, 1972; M.S., Texas Tech, 1989; Ph.D., 1991.

Gustafson, William A., Associate Professor of Personal Financial Planning, 1978. B.S., Southern Illinois, 1970; M.S., 1973; Ph.D., Illinois (Urbana-Champaign), 1976.

Hampton, Vickie L., Associate Professor of Planning, 1999. B.S., Illinois (Urbana), 1969; M.S., 1972; Ph.D., 1974.

Harp, Shelley Sue, Associate Professor of Retailing, 1982. B.S., Lamar, 1972; M.S., Texas Tech, 1977; Ph.D., Texas Woman's, 1982.

Hess, Susan, Instructor in Retailing, 2003. B.S., Texas Tech, 1987; M.S., 1998.

Horridge, Patricia Emily, Professor of Interior Design, 1976. B.S., Texas (Austin), 1958; M.S., Houston, 1965; Ph.D., Texas Woman's, 1969.

Joo, So-Hyun, Assistant Professor of Personal Financial Planning, 1999. B.A., Seoul Natl' U., 1992; M.S., 1994; Ph.D., Virginia Tech, 1998.

Khan, Samina, Associate Professor of Apparel Design and Manufacturing, 1978. B.S., Punjab (Pakistan), 1968; M.S., 1970; M.S., Illinois, 1975; Ph.D., Texas Woman's, 1978.

Kirkman, Rebecca L., Instructor in Retailing, 1998. B.S.B.A., U. of the Ozarks, 1989; M.B.A., Arkansas, 1991.

Payne, Kathryn J., Instructor in Retailing, 1993. B.S., Texas Tech, 1982; M.S., 1984.

Peggram, Rosemary, Instructor in Interior Design, 1999. B.A., Texas Tech, 1991; M.S., 1994.

Russ, Randall Ray, Associate Professor of Interior Design, 1996. B.S., Kansas State, 1986; M.S., Oklahoma State, 1993; Ph.D., 1996.

Tombs, Joseph Wingate, Assistant Professor of Personal Financial Planning, 2000. B.S., Texas (Permian Basin), 1985; M.B.A., Texas Tech, 1988; J.D., 1988.

Wilson, Joann, Associate Professor of Interior Design, 2001. B.S., Utah, 1969; M.F.A., 1972.

Yoo, Seulhee (Lori), Assistant Professor of 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.

Emeritus Faculty

Ater, Elizabeth Carolyn, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1969-1996.

Buster, Edna Walker, Associate Professor of Clothing and Textiles, Emeritus, 1927-1955.

Gerlach, Mary Agnes, Associate Professor of Clothing and Textiles, Emeritus, 1955-1982.

Morrow, Carmyn Hula, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1972-1993.

Roch, Delilah Manire, Associate Professor of Clothing and Textiles, Emeritus, 1967-1982.

Shelden, Martha Gene, Professor of Clothing and Textiles, Emeritus, 1955-1969.

Timmons, Myra Bounds, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1961-1995.

Woodson, Eleanor Mary, Associate Professor of Merchandising, Environmental Design, and Consumer Economics, Emeritus, 1970-1987.

About the Program

The department supervises the following degree programs: APPAREL DESIGN AND MANUFACTURING, *Bachelor of Science*; ENVIRONMENTAL DESIGN, *Master of Science*; ENVIRONMENTAL DESIGN AND CONSUMER ECONOMICS, *Doctor of Philosophy*; INTERIOR DESIGN, *Bachelor of Interior Design*; PERSONAL FINANCIAL PLANNING, *Bachelor of Science*, *Master of Science*; and RETAILING, *Bachelor of Science*. 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, interior design, or retailing; and have at least a 2.5 GPA in personal financial planning for all work at Texas Tech. The grade of C 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 many of the advanced courses. The apparel design and manufacturing core consists of the following courses: ADM 1301, 1303, 1304, 2302, and 2308.

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.

Apparel Design and Manufacturing Curriculum

| FIRST YEAR | | | |
|----------------------|----|---------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| 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 | | | |
|-----------------------|----|-----------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| *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 | | | |
|-------------------|----|------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| POLS 1301 | 3 | POLS 2302 | 3 |
| ADM 3312 | 3 | HUSC 3214 | 2 |
| ADM 3310 | 3 | ART 1310 or 2311 | 3 |
| ADM 4309 | 3 | ADM 3303 | 3 |
| TOTAL | 12 | ADM 4307 | 3 |
| | | TOTAL | 14 |

| FOURTH YEAR | | | |
|-------------------------------|----|--------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| *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 | | | |
|-------------------|---|--------------------|---|
| <i>First Term</i> | | <i>Second Term</i> | |
| ADM 4390 | 3 | ADM 4391 | 3 |

TOTAL—121-134 hours, dependent on transfer student status.
*Choose from Core Curriculum 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 | HIST 2300 | 3 |
| POLS 1301 | 3 | *Natural Lab. Science | 4 |
| RTL 1340 | 3 | TOTAL | 13 |
| TOTAL | 13 | | |

| SECOND YEAR | | | |
|--------------------|----|-----------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| POLS 2302 | 3 | *Natural Lab. Science | 4 |
| HIST 2301 | 3 | ACCT 2300 | 3 |
| ISQS 2440 | 4 | ECO 2305 | 3 |
| ENGL 2311 | 3 | RTL 2370 | 3 |
| RTL 2340 | 3 | TOTAL | 13 |
| TOTAL | 16 | | |

| 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 |
| COMS 3358 or MGT 3373 | 3 | HDFS 3320 | 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 |
| Upper Level Elective | 3 | *Humanities | 3 |
| *Visual & Performing Art | 3 | Upper Level Elective | 3 |
| RTL 4360 | 3 | RTL 4330 | 3 |
| RTL 4370 | 3 | RTL 4389 | 3 |
| TOTAL | 15 | TOTAL | 15 |

| SUMMER | | | |
|-------------------|---|--------------------|---|
| <i>First Term</i> | | <i>Second Term</i> | |
| RTL 4390 | 3 | RTL 4391 | 3 |

TOTAL—120-135 hours, dependent on transfer student status.
*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 | 4 |
| POLS 1301 | 3 | PFP 2330 | 3 |
| PFP 1370 | 3 | TOTAL | 16 |
| 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 | 3 |
| PFP 2310 | 3 | PFP 3375 | 3 |
| TOTAL | 15 | TOTAL | 15 |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| HDFS 3320 | 3 | *Natural Lab. Science | 4 |
| BLAW 3391 | 3 | HUSC 3214 | 3 |
| PFP 3330 | 3 | PFP 3378 | 2 |
| PFP 3374 | 3 | PFP 3198, 3350 | 4 |
| PFP 3376 | 3 | PFP 4376 | 3 |
| TOTAL | 15 | TOTAL | 16 |
| SUMMER | | | |
| PFP 4399 (Summer only) | 3 | | |
| FOURTH YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| COMS 3358 | 3 | *Visual & Performing Arts | 3 |
| HDFS Elective | 3 | Upper Division 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—125-141 hours, dependent on transfer student status.

*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 to qualify as entry-level professional 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> | |
| ADM 2311 | 3 | *Natural Lab. Science | 4 |
| HIST 2300 | 3 | ART 1310 or 1311 | 3 |
| *Natural Lab. Science | 4 | ENGL 2311 | 3 |
| I D 2383 | 3 | I D 3311, 3387 | 6 |
| I D 3381 | 3 | TOTAL | 16 |
| TOTAL | 16 | | |
| THIRD YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| HIST 2301 | 3 | POLS 2302 | 3 |
| ECO 2305 | 3 | ARCH 3350 | 3 |
| ARCH 2351 | 3 | I D 3190, 3383, 3385, 3386 | 7 |
| I D 3382, 4383 | 6 | TOTAL | 16 |
| TOTAL | 15 | | |
| SUMMER | | | |
| I D 4307 | 3 | | |
| 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 4406 | 4 | *Humanities | 1 |
| Guided Elective | 3 | TOTAL | 11 |
| TOTAL | 15 | | |

TOTAL—126-139 hours, dependent on transfer student status.

*Choose from Core Curriculum requirements.

Graduate Program

Joint degrees offered at the master's level are: Personal Financial Planning, M.S./J.D.; Personal Financial Planning, M.S./M.B.A.; Personal Financial Planning, M.S./M.B.A.-Finance.

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.

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

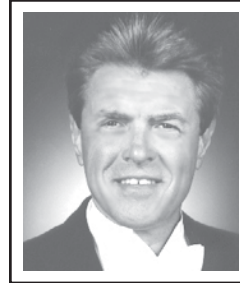
revealed by the examination. Following the completion of all course work, a qualifying examination for admission to candidacy for the Ph.D. degree will be conducted in accordance with the requirements of the Graduate School.

Admission into the master's and the doctor's 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 family financial planning, environmental design, or consumer economics. Students should contact the associate chairperson for graduate programs for departmental procedures and guidelines.



College of Visual and Performing Arts



Dr. Garry W. Owens
Dean

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About the College

The College of Visual and Performing Arts offers a diverse array of programs and courses in art, music, theatre, and dance. The college seeks to prepare students who will be leaders in the profession by employing the highest standards in performance, teaching, research, and artistic and creative vision. The college provides students with opportunities to be innovative and confident, to think critically, and to be successful in their chosen field. Our 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 Core Curriculum 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 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 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 in the Graduate Program sections of this catalog.

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. 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.



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, 220 Administration. A student who has failed a course taken in residence may take that course or a degree plan alternative through Texas Tech 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 elsewhere in 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 major section entitled "Academic Regulations" in 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.

Admission of Transfer Students. Students transferring from another academic institution must meet the university-wide admission requirements stated in an earlier section of this catalog as well as admission requirements of the specific school or department in the college to which the student is applying. Students

requesting to transfer from another college at Texas Tech must have an adjusted cumulative GPA of at least 2.0 and must meet admission requirements of the specific school or department in which they are applying. In addition, the student must provide the Dean with a transcript of all academic work. Approval will be granted by the Dean. The College of Visual and Performing Arts will determine the applicability of any transferred credit to academic programs.

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 60-70 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 section of this catalog describing teacher education and also consult the College of Education 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.

Degrees

Bachelor of Arts. The requirements for the Bachelor of Arts degree in the College of Visual and Performing Arts are the same as those of the College of Arts and Sciences. The degree is administered by the College of Visual and Performing Arts. Please consult the requirements listed under the College of Arts and Sciences section of this catalog.

Bachelor of Fine Arts. The curriculum leading to the Bachelor of Fine Arts degree provides highly professional programs in theatre arts, visual studies, design communication, and studio areas. Requirements for the B.A. degree apply unless specifically shown to the contrary. All Bachelor of Fine Arts degrees are undergoing revisions to incorporate elements of new requirements in the College of Visual and Performing Arts. The following curriculum tables for the different degree tracks are for students who entered Texas Tech *prior to fall 2003*. Students entering Texas Tech in *fall 2003 or later* should consult an advisor in the appropriate school or department within the college.

Semester Hours

| | |
|--|----|
| 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 | 10 |

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. Consult the School of Art or the Department of Theatre and Dance.

Theatre Arts 90
Visual Studies 73
(leading toward teacher certification)

Design Communication 82
Studio Art 82

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, Music Composition, Music Theory, and Music (leading to teacher certification). All Bachelor of Music degrees are undergoing revisions to incorporate elements of new requirements in the College of Visual and Performing Arts. The following curriculum tables for the different degree tracks are for students who entered Texas Tech *prior to fall 2003*. Students entering Texas Tech in *fall 2003 or later* should consult an advisor in the appropriate school or department within the college.

Semester Hours

| | |
|---|---|
| English | 6 |
| Oral Communication | 3 |
| Mathematics and Logical Reasoning | 6 |
| 6 hrs math; or 3 hrs math plus PHIL 2310 or MUTH 3303 | |

Foreign Language 10-16
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 |

3 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 Required for Majors | |
| 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 |

Graduate Program

Admission to graduate programs in the College of Visual and Performing Arts is a two-step process with requirements established by both the Graduate School and the school or department in which the student plans to study. The student should note carefully any particular requirements for admission established by the school or department in which he or she plans to major and contact the graduate advisor of the unit for more detailed information. The director of the Fine Arts program counsels a focus in fine arts management for the Master of Arts degree in Interdisciplinary Studies. See the Interdisciplinary Studies section of this catalog for more information.

School of Art

Jon (Don) Wink, Chairperson

Professor, 2002. B.F.A., Texas, 1960; M.F.A., Washington, 1963.

Faculty

Bauer, George, Visiting Assistant Professor, 2002. B.F.A., Acad. Of Arts, 1984; M.A., Charles Univ., 1972, M.A., West Texas State, 1988; M.F.A., 1988; Ph.D., Texas Tech, 2002.

Cannings, Shannon, Part-Time Instructor, 2000. B.F.A., Virginia Commonwealth, 1995; M.F.A., Syracuse, 1998.

Cannings, Will, Assistant Professor, 2000. B.F.A., Tyler, 1995; M.F.A., Syracuse, 1998.

Check, Ed, Associate Professor, 1996. B.F.A., Wisconsin (Milwaukee), 1980; M.S., 1987; Ph.D., Wisconsin (Madison), 1996.

Dingus, Phillip Rick, Professor, 1982. B.A., California (Santa Barbara), 1973; M.A., 1977, New Mexico; M.F.A., 1981.

Fehr, Dennis Earl, Associate Professor, 1997. B.F.A., Illinois (Urbana), 1975; M.A., 1985; Ed.D., 1988.

Flueckiger, Carol Fitzgerald, Assistant Professor, 1997. B.F.A., Minnesota, 1989; M.F.A., New Mexico, 1994.

Fowler, Carol, Part-Time Instructor, 2001. B.F.A., West Texas A&M, 1993.

Fowler, Dirk, Assistant Professor, 1998. B.F.A., West Texas State, 1992.

Fuentes, Christina (Tina), Professor, 1986. B.F.A., North Texas State, 1972; M.F.A., 1975.

Germany, Robin Dru, Associate Professor, 1996. B.A., Tulane, 1980; M.F.A., North Texas, 1985.

Glover, Robly A., Associate Professor, 1988. B.F.A., Indiana State, 1983; M.F.A., Indiana, 1987.

Granados, Juan D., Associate Professor, 1995. B.A., Oklahoma, 1987; M.F.A., Ohio State, 1991.

Hartsfield, Mark, Part-Time Instructor, 1997. B.F.A., Texas Tech, 1984.

Kreneck, Lynwood, Professor, 1965. B.F.A., Texas (Austin), 1958; M.F.A., 1965.

Lloyd, Phoebe, Associate Professor, 1993. B.S., Columbia, 1968; M.A., Hunter, 1973; Ph.D., City U. New York, 1980.

Locke, Arthur, Part-Time Instructor, 2000. B.F.A., North Texas, 1990; B.F.A., 1991; M.F.A., 1995.

Martin, Andrew W., Associate Professor, 1995. B.F.A., New Mexico, 1984; M.F.A., California (Los Angeles), 1988.

Milosevich, Deborah, Part-Time Instructor, 1999. B.S., Texas Tech, 1973; M.A., 1989.

Morrow, John Terrence, Professor, 1968. B.F.A., Texas (Austin), 1962; M.S., Indiana, 1967.

Rasberry, John Lawson, Part-Time Instructor, 1997. B.F.A., Howard Payne, 1974.

Ricco, John Paul, Assistant Professor, 1998. B.A., New York, 1988; M.A., Chicago, 1991; Ph.D., 1998.

Slagle, Nancy Ann, Associate Professor, 1991. B.F.A., Drake, 1980; M.F.A., Indiana, 1987.

Steele, Brian D., Associate Professor and Director, Fine Arts Program, 1988. M.A., Iowa, 1983; Ph.D., 1988.

Stinespring, John Albright, Associate Professor, 1989. B.A., Duke, 1958; M.S. in Ed., Indiana, 1961; Ph.D., Texas Tech, 1989.

Tate, Carolyn Elaine, Associate Professor, 1993. B.F.A., B.A., Texas, 1974; M.A., 1980; Ph.D., 1986.

Tedeschi, Carla, Associate Professor, 1999. B.S., State U. Coll. (Buffalo), 1983; M.F.A., Rochester Inst. Tech., 1992.

Venhuizen, Von, Assistant Professor, 2002. B.A., Iowa, 1990; M.F.A., Indiana, 1996.

Waters, Sara, Professor, 1977. B.F.A., Spalding, 1974; M.F.A., Indiana, 1977.

Emeritus Faculty

Alesch, Eugene Raymond, Associate Professor, Emeritus, 1969-1992.

Bright, Peggy Howard, Associate Professor, Emeritus, 1966-1986.

Cheatham, Beverly Jane, Associate Professor, Emeritus, 1973-1998.

Cheatham, Frank Reagan, Professor, Emeritus, 1973-1998.

Durland, Donald Lewis, Professor, Emeritus, 1969-1996.

Funk, Verne James, Professor, Emeritus, 1977-1997.

Glenn, Edna Smith, Associate Professor, Emeritus, 1968-1987.

Greer, Hiram Varner, Associate Professor, Emeritus, 1963-1982.

Hanna, James Walter, Associate Professor, Emeritus, 1968-2001.

Hanna, Paul Dean Jr., Professor, Emeritus, 1960-1993.

Houghton, Edna Nawanna, Associate Professor, Emeritus, 1932-1973.

Howze, James Dean, Professor, Emeritus, 1958-1992.

Lockhart, Billy Clarence, Professor, Emeritus, 1955-1987.

Mittler, Gene Allen, Professor, Emeritus, 1982-1995.

Moon, Marvin Lee, Associate Professor, Emeritus, 1973-1996.

Parkinson, Roderick, Associate Professor, Emeritus, 1946-1975.

Queen, John William, Associate Professor, Emeritus, 1960-1991.

Stephen, Francis B., Professor, Emeritus, 1967-1983.

Street, Betty Ann, Associate Professor of Art, Emeritus, 1967-1995.

About the Program

This school supervises the following degree programs: VISUAL STUDIES (leading to teacher certification), DESIGN COMMUNICATION, and STUDIO ART, *Bachelor of Fine Arts*; ART HISTORY, *Bachelor of Arts*; ART EDUCATION, *Master of Art Education*; ART, *Master of*

Fine Arts; FINE ARTS, *Doctor of Philosophy* 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 College 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 3381, 3388, 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, 1311, 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, 4326, or 3326 with a different emphasis. Six of the 21 hours of the photography minor must be taken at the junior and senior level 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

Visual Studies Major, B.F.A. Degree. The Bachelor of Fine Arts in Visual Studies (leading toward art teacher certification) prepares graduates to teach critical reflection and creative visual expression in multiple settings (schools, museums, community, and regional art programs), assume community and state leadership roles within the field of art education, and innovate curricular content based on contemporary cultural developments and community needs. The curriculum critically responds to mainstream, "fine art," popular, mass media, and other normalized images. Course work emphasizes contemporary theories and issues in art and education, such as contemporary art, inter-cultural issues, community activism, instructional technology, critical pedagogy, alternative resources, and dynamic teaching.

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.

The Bachelor of Fine Arts degrees are undergoing revisions to incorporate elements of new requirements in the College of Visual and Performing Arts. The following curriculum tables for the different degree tracks are for students who entered Texas Tech *prior to fall 2002*. Students entering Texas Tech in *fall 2002 or later* should consult an advisor in the School of Art.

Semester Hours

English 6
CLEP allowed.

Oral Communication 3
COMS 2300, 3358 or HDFS 2320*

Mathematics and Logical Reasoning: 6
MATH 1320 or higher. CLEP allowed.
MATH 0301, 0302, 3430, PSY 3403, SOC 3391, and MUTH 3303 may not be used to fulfill any part of this requirement.

Natural (Laboratory) Science* 8

Technology 0-3
ART 3362 may be used to fulfill 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. Three hours must be taken in residence.

Political Science (POLS 1301 and 2302) 6
CLEP allowed. 3hours must be taken in residence.

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 0-3
ART 1310, 1311, 3310, 3311, 3315, 3317, 3318, and 4315 may be used to fulfill this requirement.

Individual and Group Behavior 0-3
ART 3311 or 4315 may be used to fulfill this requirement.

Professional Education Requirements

Students should contact the College of Education concerning professional education course requirements for all-level certification and secondary art certification.

All-Level Certification

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

Freshman Core Studio 13
ART 1100, 1302, 1303, 2304, 2303

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 3335, 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 SCH of 2000 level or above of which 3 SCH is art history

Studio Area of Emphasis* 12
12 SCH 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 faculty advisor.

Design Communication Major, B.F.A. Degree. The Bachelor of Fine Arts 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. Emphasis is placed on the integration of form and information for the purpose of effective communication. To engage students in a critical understanding of the implications of their work, this program also emphasizes 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 which 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 insure admission to the design communication program. The application form may be downloaded at www.art.ttu.edu. See the Web site for detailed information 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
CLEP allowed.

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 3403, 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. Three hours must be taken in residence.

Political Science (POLS 1301 and 2302) 6
CLEP allowed. Three hours must be taken in residence.

Natural (Laboratory) Science 8

Technology* 0-3

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 0-3
ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 may be used to fulfill this requirement.

Individual and Group Behavior* 0-3

Art Courses

Freshman Core Studio 13
ART 1302, 1303, 2304, 2303

Art History Core 9
ART 1310, 2311, 3312

Upper Level Art History 3
Including ART 3311 and 4315

Design Comm. Emphasis & Electives 45
ART 3385, 3386, 3387, 3388

Studio Art Electives* 12
*See advisor for recommendation.

Studio Art Major, B.F.A. Degree. 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
CLEP allowed.

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 3403, 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, but 3 hours must be taken in residence.

Political Science (POLS 1301 and 2302) 6
Credit by examination for part of this requirement is available, but 3 hours must be taken in residence.

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 0-3
ART 1310, 2311, 3310, 3311, 3315, 3317, 3318, and 4315 may be used to fulfill this requirement.

Individual and Group Behavior 0-3
ART 3311 or 4315 may be used to fulfill this requirement.

Art Courses

Freshman Core Studio 13
ART 1100, 1302, 1303, 2304, 2303

Art History Core 9
ART 1310, 2311, 3312

Upper Level Art History 3
Including ART 3311 and 4315. If either ART 3311 or 4315 are 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 6
ART 3323, 3324. If drawing is the student's area of emphasis, ART 3323 and 3324 in the drawing emphasis will need to be replaced with 6 hours of studio electives to total the required hours.

2-Dimensional Studio Art 6
Choice of two: ART 3323, 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.

Art History Major, B.A. Degree. Students working toward 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 Bachelor of Arts 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 125.

Graduate Program

The Master of Art Education degree (M.A.E.) 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 of Texas Tech University. The applicant for the Master of Art Education 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 Master of Art Education degree program and will determine and prescribe any leveling work to be completed before or after acceptance.

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 metalsmithing, painting, photography, printmaking, or sculpture. Drawing may be selected as a minor studio option or studio elective. Ad-

mission to the Master of Fine Arts 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.

The program leading to the Doctor of Philosophy degree in Fine Arts is detailed in the "Opportunities for Interdisciplinary Study" section of this catalog. The major in the School of Art (the visual arts major) is designed to prepare broadly-trained teachers in art education and/or art history-criticism. The visual arts major includes preparation in the following: Focus in teaching survey art history and art appreciation and/or beginning and upper division art education classes at the university level; or a combination of art education or art history-criticism with museum science can be arranged. 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 into the program.

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 on programs and admission requirements, contact the graduate coordinator, visual arts major, Interdisciplinary Fine Arts Program, School of Art.

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 Fine Arts Doctoral Committee for acceptance into the program. Acceptance is also contingent upon satisfaction of all Graduate School requirements for admission. After admission, a specific degree plan is determined. In part, this process entails a formal evaluation that clarifies students' 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 of enrollment.

School of Music

Nancy Lee Cochran, Director

Professor, 2002. B.M., Wisconsin (Madison), 1967; M.M., Ball State, 1969.

Faculty

Anderson, Amy Brisco, Associate Professor, 1995. B.M., North Texas, 1978; M.M., 1982.

Arnold, Sue, Associate Professor, 1971. B.A., Campbell Coll., 1969; M.M., Illinois, 1971.

Barber, Gail G., Professor, 1966. B.M., Eastman School of Music, 1959; M.D. (M.A.), 1996.

Bearden, Keith, Professor, 1980. B.M.Ed., Texas Tech, 1969; M.Ed., 1975.

Beheshti, Setareh, Visiting Assistant Professor, 2002. B.M., Minnesota, 1997; M.M., San Francisco Conservatory, 2000.

Birdwell, John Cody, Associate Professor, 1998. B.M.E., West Texas A&M, 1981; M.A., 1982; D.M.A., North Texas, 1996.

Bogle, James G., Professor, 1976. B.M., Baylor, 1971; M.M., Midwestern, 1973; Ph.D., Oklahoma, 1982.

Brumfield, Susan Hendrix, Associate Professor, 1996. B.A., Louisiana Tech, 1979; M.Ed., Stephen F. Austin, 1994; Ph.D., Oklahoma, 2000.

Capuzzo, Guy M., Assistant Professor, 2000. B.M., William Paterson U., 1991; M.M., Queens College, 1994; Ph.D., Eastman School of Music, 2000.

Deahl, Lora Ching, Professor, 1973. Mus.B., Oberlin Conservatory of Music, 1972; M.M., Indiana, 1975; D.M.A., Texas (Austin), 1988.

Dees, David Andrew, Assistant Professor, 1999. B.M., North Texas, 1989; M.M., North-western, 1991.

Dent, Karl D., Associate Professor, 1995. B.M.Ed., Centenary College, 1976; M.M., North Texas, 1983.

Dickson, John H., Professor, 2000. B.A., Dallas Baptist College, 1975; M.M., Baylor, 1977; D.M.A., Texas (Austin), 1985.

Dolter, Gerald, Associate Professor, 1996. B.M., Indiana, 1978; M.A., 1980.

Elrod, Pamela Gail, Assistant Professor, 2001. B.M., Texas (Austin), 1979; M.M., 1982; D.M.A., Illinois (Urbana-Champaign), 2001.

Ezerman, Alexander, Assistant Professor, 1998. B.M., Oberlin, 1992; M.M., State U. of New York (Stony Brook), 1994; D.M.A., 1998.

Fried, Eric, Associate Professor, 1990. B.M., Indiana, 1975; M.A., Denver, 1977; D.M.A., Arizona, 1982.

Gilbert, John H., Associate Professor, 1995. B.M., Eastman School of Music, 1981; M.M., Yale, 1983; D.M.A., Minnesota, 1996.

Hartwell, William G. III, Associate Professor, 1973. A.B., Whitman, 1961; Soloist's Diploma, 1961; M.M., Indiana (Bloomington), 1964.

Henry, Robert, Professor and Associate Dean, College of Visual and Performing Arts, 1985. B.M.E., Oklahoma State, 1972; M.Ed. in Music, Missouri-Columbia, 1978; Ph.D., North Texas, 1987.

Hinds, Stuart, Visiting Assistant Professor, 2001. B.Mus., Texas Tech, 1978; M.Mus., Michigan, 1987; Mus.D., 1987.

Hobbs, Wayne C., Professor, 1987. B.M.E., Florida State, 1960; M.C.M., New Orleans Baptist Theological Seminary, 1962; Ph.D., Tulane, 1971.

Hollins, John S., Visiting Instructor, 2002. B.M., South Carolina, 1993; M.M., Southern Seminary, 1995; D.M.A., 2002.

Hughes, Thomas E., Associate Professor, 1996. B.S., West Chester State, 1971; M.A., Ohio State, 1973; A.Mus.D., Arizona, 1991.

Jahnke, Jenny, Visiting Instructor, 2000. B.M.Ed., Oklahoma, 1998.

Killian, Janice Nelson, Professor, 2002. B.M.E., Kansas, 1968; M.A., Connecticut, 1973; Ph.D., Texas, 1980.

Lewis, Gary, Associate Professor, 1998. B.M.E., Oklahoma, 1984; M.M., Texas Tech, 1986.

Lucas, Don, Associate Professor, 1995. B.M., Texas Tech, 1979; M.M., 1981; Advanced Solo Studies and Premier Prix Diplomas, Guildhall School of Music, London, ENG, 1983.

McNeil, Kathy, Associate Professor, 1998. M.B., West Texas A&M, 1976; M.M., 1978.

Meek, C. Richard, Professor, 1965. B.M., Oberlin, 1963; Performer's Certificate, Eastman School of Music, 1965; M.A., 1970.

Owens, Garry W., Professor and Dean, College of Visual and Performing Arts, 1999. B.M., Wisconsin, 1969; M.M., 1978; Ph.D., 1992.

Paxton, Steven, Associate Professor, 1981. B.M., North Texas State, 1973; M.M., 1977; Ph.D., Texas Tech, 1981.

Pollard, Cara Flynn, Visiting Assistant Professor, 2002. B.S., Texas, 1991; M.M., New Mexico State, 1995; D.M.A., Texas Tech, 2002.

Rogers, Lisa Luwane, Assistant Professor, 1994. B.M.E., Texas Tech, 1985; M.M., 1988; D.M.A., Oklahoma, 1999.

Santa, Lisa Garner, Assistant Professor, 1999. B.M., West Texas State, 1990; M.M., Florida State, 1992; D.M.A., Rice, 1997.

Santa, Matthew Sidney, Assistant Professor, 1999. B.M., Louisiana State, 1993; M.Phil., City U. of New York, 1998; Ph.D., 1999.

Sharpe, Paul Colin, Associate Professor, 1997. B.M., Northwestern, 1991; M.M., Iowa, 1995.

Shea, David Lawrence, Assistant Professor, 2000. B.M. and B.A., Oberlin College, 1988; M.M., Illinois, 1990; D.M., Indiana, 1996.

Shinn, Alan D., Professor, 1982. B.S. in Ed., Missouri, 1976; M.M., Texas Tech, 1979.

Sifford, Jason, Assistant Professor, 2001. B.M., Southwest Missouri State, 1995; M.M., Louisiana State, 1997; D.M.A., Michigan, 2001.

Smith, Angela M., Visiting Assistant Professor, 2002. B.M., Massachusetts, 1977; M.M., Indiana, 1990.

Smith, Christopher John, Assistant Professor, 2000. B.A., Massachusetts, 1987; M.M., Indiana, 1990; Ph.D., 2000.

Smith, Christopher M., Assistant Professor, 2002. B.M., Murry State, 1989; M.M., Michigan, 1991.

Stoune, Michael, Professor and Associate Director, School of Music, 1973. B.M., Texas (Austin), 1962; M.M., 1965; D.M.A., Michigan (Ann Arbor), 1972.

Strieder, Will, Associate Professor, 1991. B.M., Houston, 1986; M.M., Northwestern, 1987.

Van Appledorn, Mary Jeanne, Horn Professor, 1950. B.M., Eastman School of Music, 1948; M.M., 1950; Ph.D., 1966.

Wass, Kevin, Assistant Professor, 2001. B.S., Dana Coll., 1993; M.M., Indiana, 1995; D.M.A., Michigan, 2002.

Westney, William F., Horn Professor, Browning Artist in Residence, 1978. B.A., Queens (City U. of New York), 1968; M.M.A., Yale, 1971; D.M.A., 1976.

Wilson, Jane Ann Henry, Associate Professor, 1970. B.M., Texas Tech, 1962; M.M., Indiana, 1965; D.Mus., 1982.

Wood, Bruce Wilton, Associate Professor, 2002. B.M.E., Morningside Coll., 1977; M.M., Wisconsin (Madison), 1980; Ph.D., 2002.

Emeritus Faculty

Barber, James Joseph, Professor, Emeritus, 1966-1995.

Brittin, Anthony Norman, Professor, Emeritus, 1963-2002.

Cutter, Paul Frederick, Professor, Emeritus, 1968-2000.

Deahl, Robert Waldo, Professor, Emeritus, 1966-1994.

Elliott, Raymond Pruitt, Professor, Emeritus, 1950-1969.

Follows, Arthur Gail, Associate Professor, Emeritus, 1967-1996.

Gettel, Georgette Elizabeth, Associate Professor, Emeritus, 1963-2000.

Gillas, John Arthur, Horn Professor, Emeritus, 1971-2002.

Kellogg, Virginia Katherine, Professor, Emeritus, 1963-1993.

Kenney, Earl Eugene, Professor, Emeritus, 1957-1982.

Killion, Marlin Dean, Director of Bands, Emeritus, 1959-1985.

Marple, Hugo Dixon, Professor, Emeritus, 1969-1985.

Maynard, Judson Dana, Professor, Emeritus, 1961-1992.

McCarty, Darrell Keith, Professor, Emeritus, 1994-1988.

McGowan, Richard Allen, Associate Professor, Emeritus, 1969-1994.

Payne, Henry David III, Associate Professor, Emeritus, 1967-2002.

Post, Charles William, Professor, Emeritus, 1957-1984.

Schettler, Theodore William, Associate Professor, Emeritus, 1968-1983.

Tanner, Donald Ray, Professor, Emeritus, 1977-2001.

Thomas, Orlan Earl, Associate Professor, Emeritus, 1967-2002.

Tolley, Richard Earl, Professor, Emeritus, 1959-1991.

Turner, Fred Donavon, Associate Professor, Emeritus, 1971-2002.

Vaughan, Mary Ann, Associate Professor, Emeritus, 1967-1996.

About the Program

The school supervises the following degree programs: PERFORMANCE, MUSIC COMPOSITION, MUSIC THEORY, MUSIC (leading toward teacher certification), *Bachelor of Music*; MUSIC, *Bachelor of Arts*; PERFORMANCE, MUSIC HISTORY AND LITERATURE, MUSIC THEORY, *Master of Music*; FINE ARTS (with a major in Music), *Master of Music Education* and *Doctor of Philosophy*; COMPOSITION, CONDUCTING, PERFORMANCE, PIANO PEDAGOGY, *Doctor of Musical Arts*. 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.

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.

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 Programs. Performance degrees include majors in piano (pedagogy or accompanying specializations are also available), organ, voice, brass, woodwind, percussion, and stringed instruments. Majors are also offered in music composition and music theory. The Bachelor of Music (leading toward teacher certification) degree replaces the degree formerly known as the Bachelor of Music Education. A minimum of 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; 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 MUHL 2301, 2302, 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 a School of Music 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 this catalog under Miscellaneous Special Fees. Applied music students are required to practice a minimum of 3 clock hours per week for each semester-hour credit.

Bachelor of Music Curricula. The curriculum tables that follow are provided as a convenience to students and advisors. All music majors plan their individual courses of study in consultation with a faculty advisor.

All Bachelor of Music degrees are undergoing revisions to incorporate elements of new requirements in the College of Visual and Performing Arts. The following curriculum tables for the different degree tracks are for students who entered Texas Tech *prior to fall 2003*. Students entering Texas Tech in *fall 2003 or later* should consult an advisor in the School of Music.

Music Curriculum (Leading Toward Teacher Certification). All tracks have the same Core Curriculum and Professional Education courses. These tracks are undergoing revisions to incorporate elements of the new standards for certification as determined by the State of Texas. The following curriculum tables for the different teacher certification tracks are for students who entered Texas Tech *prior to fall 2003*. Students entering Texas Tech for teacher certification in music *in fall 2003 or later* should consult an advisor in the School of Music.

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, MUSI 3341 | 3 |
| American History, HIST 2300, 2301 | 6 |
| Political Science, POLS 1301, 2302 | 6 |
| Individual or Group Behavior , | 3 |
| Humanities | 3 |
| Total hours | 44 |

*Professional Education

| | <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 |

*Students should contact the College of Education concerning professional education course requirements for all-level certification.

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 1214 if not piano principal.

Music: MUSI 3202, 3237, 3238, 3216, 3217

Music History & Literature: MUHL 1301, 1302, 2301, 2302

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: 70

Total program hours: 135

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 1214 if not piano principal.

Music: MUSI 3202, 3237, 3238, and 3218 & 3219 or 3225 & 3226

Music History & Literature: MUHL 1301, 1302, 2301, 2302

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 3202, 3237, 3238, and 3216 & 3217, or 3218 & 3219, or 3225 & 3226, or 3221 & 3222

Music History & Literature: MUHL 1301, 1302, 2301, 2302

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: 71

Total program hours: 136

Graduate Program

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, depending upon the dissertation area. Except for the music history major (one foreign

language), there is no foreign language requirement 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.

All applicants for admission to graduate programs in music are required to submit scores for the General Test of the Graduate Record Examination. 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 section of this catalog entitled "Admission to the Graduate School."

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 Fine Arts doctoral program consists of a minimum of 60 semester hours including 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. See the section of this catalog entitled "Opportunities for Interdisciplinary Study—Fine Arts" for further description of the program.

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 |
| MUHL 1301, Intro. Mus. Lit. | 3 | MUHL 1302, Intro. Mus. Lit. | 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 | 15 | TOTAL | 15 |
| 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 2301, Hist. of Music | 3 | MUHL 2302, 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 elective | 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—131

*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 |
| MUHL 1301, Intro. Music Lit. | 3 | MUHL 1302, Intro. Music Lit. | 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 | 15 | TOTAL | 15 |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 2001, Organ | 4 | MUAP 2002, Organ | 4 |
| MUHL 2301, Hist. of Music | 3 | MUHL 2302, 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 | 15 | TOTAL | 15 |
| 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, Physics 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 |
| Music elective | 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—129

*Optional for students with extensive piano background.

Performance—Voice Curriculum

| FIRST YEAR | | | |
|-----------------------------------|----|----------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 1001, Voice | 2 | MUAP 1002, Voice | 2 |
| MUHL 1301, Intro. Mus. Lit. | 3 | MUHL 1302, Intro. Mus. Lit. | 3 |
| MUAP 1303, Sing. Diction I | 3 | MUSI 1304, Sing. Diction II | 3 |
| MUTH 1303, Elem. Theory I | 3 | MUTH 1304, Elem. Theory II | 3 |
| MUTH 1103, Elem. Aural Skills I | 1 | MUTH 1104, Elem. Aural Skills II | 1 |
| ENGL 1301, Ess. Coll. Rhet. | 3 | ENGL 1302, Adv. Coll. Rhet. | 3 |
| MUEN 3102, Music Theatre Ensemble | 1 | Ensemble | 1 |
| TOTAL | 17 | TOTAL | 16 |

| SECOND YEAR | | | |
|--------------------------------------|----|--------------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 2001, Voice | 2 | MUAP 2002, Voice | 2 |
| MUHL 2301, Hist. of Music | 3 | MUHL 2302, 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 |
| For. Lang. (German, French, Italian) | 5 | For. Lang. (German, French, Italian) | 5 |
| Oral Communications | 3 | Humanities | 3 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 18 | TOTAL | 18 |

| THIRD YEAR | | | |
|-----------------------------|----|--|----|
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 3001, Voice | 3 | MUAP 3002, Voice | 2 |
| MUAP 3303, Vocal Literature | 3 | MUAP 3190, Jr. Recital | 1 |
| MUTH 3303, Form Ana. Synth. | 3 | For. Lang. (2nd yr. Germ., Fren., Ital.) | 3 |
| Natural Science | 4 | Mathematics | 3 |
| For. Lang. (2nd yr.) | 3 | PHYS 1406, Physics Sound & Music | 4 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 17 | Technology & Applied Science | 3 |
| | | TOTAL | 17 |

| FOURTH YEAR | | | |
|------------------------------|----|------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 4001, Voice | 4 | MUAP 4002, Voice | 3 |
| HIST 2300, American History | 3 | MUAP 4190, Sr. Recital | 1 |
| POLS 1301, Amer. Govt., Org. | 3 | MUAP 3206, Conducting | 2 |
| Ensemble | 1 | POLS 2302, Amer. Public Pol. | 3 |
| MUAP 4305, Vocal Ped. | 3 | Ensemble | 1 |
| TOTAL | 14 | Individual or Group Behavior | 3 |
| | | HIST 2301, American History | 3 |
| | | TOTAL | 16 |

Total program hours—133

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 |
| MUHL 1301, Intro. Mus. Lit. | 3 | MUHL 1302, Intro. Mus. Lit. | 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 | 15-16 | 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 2301, Hist. of Music | 3 | MUHL 2302, 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 |
| 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, Physics 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 |
| TOTAL | 13-14 | Natural Science | 4 |
| | | 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 |
| MUHL 1301, Intro. Mus. Lit. | 3 | MUHL 1302, Intro. Mus. Lit. | 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 | 14 | TOTAL | 14 |

| SECOND YEAR | | | |
|-------------------------------------|----|--------------------------------------|----|
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 2001, Major Instr. | 3 | MUAP 2002, Major Instr. | 3 |
| MUHL 2301, Hist. of Music | 3 | MUHL 2302, 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 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 |
| TOTAL | 15 | MUEN 3106, Chamber Music | 1 |
| | | TOTAL | 15 |

Total program hours—124

*Guitar students participate in ensemble and chamber music for six semesters each.



Music Composition Curriculum

| FIRST YEAR | | | |
|-------------------------------------|-----------|--------------------------------------|-----------|
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 1001, Prin. Instr. or Voice | 2 | MUAP 1002, Prin. Instr. or Voice | 2 |
| *Applied Music, Sec. Instr. | 1 | *Applied Music, Sec. Instr. | 1 |
| MUCP 1201, Intro. Contemp. Mus. | 2 | MUCP 1202, Intro. Contemp. Mus. | 2 |
| MUHL 1301, Intro. Mus. Lit. | 3 | MUHL 1302, Intro. Mus. Lit. | 3 |
| MUTH 1303, Elem. Theory I | 3 | MUTH 1304, Elem. Theory II | 3 |
| MUTH 1103, Elem. Aural Skills I | 1 | MUTH 1104, Elem. Aural Skills II | 1 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | ENGL 1302, Adv. Coll. Rhetoric | 3 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 16 | TOTAL | 16 |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 2001, Prin. Instr. or Voice | 2 | MUAP 2002, Prin. Instr. or Voice | 2 |
| *Applied Music, Sec. Instr. | 1 | MUCP 2302, Mus. Composition | 3 |
| MUCP 2301, Mus. Composition | 3 | MUHL 2302, Hist. of Music | 3 |
| MUHL 2301, Hist. of Music | 3 | MUTH 2304, Intermed. Theory II | 3 |
| MUTH 2303, Intermed. Theory I | 3 | MUTH 2104, Intermed. Aural Skills II | 1 |
| MUTH 2103, Intermed. Aural Skills I | 1 | Ensemble | 1 |
| Mathematics | 3 | Humanities | 3 |
| Ensemble | 1 | TOTAL | 16 |
| TOTAL | 17 | | |
| THIRD YEAR** | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 3001, Prin. Instr. or Voice | 2 | MUAP 3002, Prin. Instr. or Voice | 2 |
| MUCP 3301, Mus. Composition | 3 | MUCP 3302, Mus. Composition | 3 |
| MUTH 3303, Form Ana. Synth. | 3 | MUTH 3308, 20th Cent. Tech. | 3 |
| MUCP 4207, Instrumentation | 2 | MUCP 4208, Orchestration | 2 |
| †Tech. and App. Science | 3 | Oral Communication | 3 |
| Natural Science | 4 | PHYS 1406, Sound & Music | 4 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 18 | TOTAL | 18 |
| FOURTH YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| Individual or Group Behavior | 3 | MUCP 4402, Mus. Composition | 4 |
| ††MUCP 4401, Mus. Composition | 4 | MUAP 4190, Sr. Recital | 1 |
| MUTH 4305, Modal Counterpoint | 3 | MUTH 4307, Tonal Cpt. & Fugue | 3 |
| HIST 2300, American History | 3 | HIST 2301, American History | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | MUAP 3206, Conducting | 2 |
| Ensemble | 1 | POLS 2302, Amer. Pub. Pol. | 3 |
| TOTAL | 17 | Ensemble | 1 |
| | | TOTAL | 17 |

Total program hours—135

*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 | 2 | MUAP 1002, Prin. Instr. or Voice | 2 |
| *Applied Music, Sec. Instr. | 1 | *Applied Music, Sec. Instr. | 1 |
| MUHL 1301, Intro. Mus. Lit. | 3 | MUHL 1302, Intro. Mus. Lit. | 3 |
| MUTH 1303, Elem. Theory I | 3 | MUTH 1304, Elem. Theory II | 3 |
| MUTH 1103, Elem. Aural Skills I | 1 | MUTH 1104, Elem. Aural Skills II | 1 |
| ENGL 1301, Ess. Coll. Rhetoric | 3 | ENGL 1302, Adv. Coll. Rhet. | 3 |
| HIST 2300, American History | 3 | HIST 2301, American History | 3 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 17 | TOTAL | 17 |
| SECOND YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 2001, Prin. Instr. or Voice | 2 | MUAP 2002, Prin. Instr. or Voice | 2 |
| *Applied Music, Sec. Instr. | 1 | MUHL 2302, Hist. of Music | 3 |
| MUHL 2301, Hist. of Music | 3 | **Foreign Language | 3 |
| MUTH 2303, Intermed. Theory I | 3 | MUTH 2304, Intermed. Theory II | 3 |
| MUTH 2103, Intermed. Aural Skills I | 1 | MUTH 2104, Intermed. Aural Skills II | 1 |
| **Foreign Language | 3 | Ensemble | 1 |
| Mathematics | 3 | Technology & Applied Science | 3 |
| Ensemble | 1 | TOTAL | 16 |
| TOTAL | 17 | | |
| THIRD YEAR† | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 3001, Prin. Instr. or Voice | 2 | MUAP 3002, Prin. Instr. or Voice | 2 |
| MUAP 3303, Form Ana. Synth. | 3 | MUTH 3308, 20th Cent. Tech. | 3 |
| MUCP 4207, Instrumentation | 2 | MUCP 4208, Orchestration | 2 |
| Oral Communication | 3 | Individual or Group Behavior | 3 |
| Humanities | 3 | PHYS 1406, Sound & Music | 4 |
| Natural Science | 4 | MUAP 3206, Conducting | 2 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 18 | TOTAL | 17 |
| FOURTH YEAR | | | |
| <i>Fall</i> | | <i>Spring</i> | |
| MUAP 4001, Prin. Instr. or Voice | 2 | MUAP 4002, Prin. Instr. or Voice | 2 |
| MUHL elective | 3 | MUHL elective | 3 |
| MUTH 4305, Modal Counterpoint | 3 | MUTH 4307, Tonal Cpt. and Fugue | 3 |
| MUTH 4302, Fund. of Comp. | 3 | MUTH 4303, Fund. of Comp. | 3 |
| POLS 1301, Amer. Govt., Org. | 3 | POLS 2302, Amer. Pub. Pol. | 3 |
| Ensemble | 1 | Ensemble | 1 |
| TOTAL | 15 | TOTAL | 15 |

Total program hours—132

*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.

Department of Theatre and Dance

Frederick B. Christoffel, Chairperson

Associate Professor, 1989. B.A., Texas Tech, 1978; M.F.A., Illinois-Champaign, 1984.

Faculty

Aarnio, Margaret (Peggy) Willis, Professor, 1972. B.F.A., Texas Christian, 1970; M.F.A., 1972.
Bert, Norman A., Professor, 1995. B.A., Upland Coll., 1964; B.D., Assoc. Mennonite Biblical Sem., 1967; M.A., Kansas State, 1972; Ph.D., Indiana, 1975
Bilkey, Andrea, Assistant Professor, 2002. B.F.A., Mankato State, 1995; M.F.A., Wisconsin, 2002.
Donahue, Linda, Assistant Professor, 1997. B.A., Pan American, 1970; M.A., Texas Tech, 1974; Ph.D., 1992.
Gelber, Bill, Assistant Professor, 2002. B.A., Houston, 1984; M.Ed., Texas A&M, 1988; M.F.A., Texas, 1991; Ph.D., 1997.
Marks, Jonathan E., Associate Professor, 1995. B.A., Yale, 1968; M.F.A., 1972; D.F.A., 1984.
Merz, Melissa, Assistant Professor, 2001. B.F.A., Southwest Texas State, 1990; M.F.A., Arizona, 1994.
Williams, David A., Assistant Professor, 2000. B.A., Evangel U., 1988; M.A., Southwest Missouri State, 1991; Ph.D., California (Davis), 1998.

Emeritus Faculty

Ashby, Clifford Charles, Professor, Emeritus, 1963-1989.
Moore, Diana, Associate Professor, Emeritus, 1971-2000.
Sorensen, George Wendell III, Professor, Emeritus, 1976-1996.
Weaver, Richard Alden, Professor, Emeritus, 1972-1996.

About the Program

This department supervises the following degree programs: THEATRE ARTS, *Bachelor of Arts, Bachelor of Fine Arts, Master of Arts, Master of Fine Arts*; DANCE, *Bachelor of Arts*. The department also participates in the *Doctor of Philosophy* degree 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.

Dance Curriculum

Plan I (Ballet)

First Year
 DAN 1102
 DAN 1103-301
 DAN 1304-301
 (2 semesters)

Second Year
 DAN 1107-301
 DAN 1304-302
 (2 semesters)

Third Year
 DAN 1204-301
 DAN 1204-302
 DAN 1304-303
 (2 semesters)
 DAN 3104
 DAN 3209
 DAN 3313

Fourth Year
 DAN 1204-302
 DAN 1304-303
 (2 semesters)
 DAN 4102
 DAN 4104
 DAN 4200
 DAN 4207

Plan II (Modern Dance)

First Year
 DAN 1103-301
 DAN 1103-302
 DAN 1304-301
 (2 semesters)

Second Year
 DAN 1107-301
 DAN 1204-301
 DAN 1204-302
 DAN 1304-302
 DAN 2102

Third Year
 DAN 1204-302
 DAN 1204-303
 DAN 3104
 DAN 3207
 DAN 3209
 DAN 3313

Fourth Year
 DAN 1204-303
 DAN 3201
 DAN 4104
 DAN 4200
 DAN 4201
 DAN 4107

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—3 hours.

Major in Theatre Arts. 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.

Minor in Theatre Arts. For a minor in theatre arts, the following courses for a total of 18 hours are required: TH A 303, 2302, 3335; 3 hours from the following list with no course counted more than once: TH A 101, 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.

Major in Dance. Students seeking the B.A. degree with a major in Dance are required to complete 45 hours of study, including the core plus either Plan I (ballet) or Plan II (modern dance). No minor is required. Plan I allows the student to take up to 7 of the 45 hours from support areas, while Plan II permits up to 3 of the 45 hours.

Core Requirements
 DAN 3104, 4104, 4207.

Plan I (Ballet) Courses
 DAN 1102 (1-2 semesters), 1304 (8 semesters), 1204 (3 semesters), 4102 (1-2 semesters). In addition, ballet majors must complete 7 hours from the support areas.

Plan II (Modern Dance) Courses
 DAN 1103, 1107, 1204 (5 semesters), 1304 (3 semesters), 2102 (1-2 semesters), 3201 (1-2 semesters). In addition, modern dance majors must complete 17 hours from the support areas.

Support Areas
 DAN 3207, 3209, 3313, 4200, 4201, TH A 3304, 3308, 3309, 4000, 4308, 4311, MUHL 3221, 3222, 3304, 3308, 3336.

Minor in Dance. 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 in their sophomore year 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 probation.

Probationary students 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 3323or 2303. Also 9 hours must be selected from TH A 100, 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, 2302, 2303, 3303, 3304, 3305, 3308, 3309, 4302, and one 3-hour elective. Students desiring secondary certification in dance must complete the following courses: DAN 1102 or 2102, 1103, 1107, 1204, 1304, 3104, 3207, 3209, 3313, 4200, 4201, 4207, and MUTH 1300 or 3336.

Graduate Program

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.

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.

The department participates with the faculties in art, music, and philosophy in an interdisciplinary program leading to the Ph.D. degree in Fine Arts, which is detailed in the "Opportunities for Interdisciplinary Study" section of this catalog. Doctoral students whose major area is theatre 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 Fine Arts Doctoral Committee.

For admission to any graduate program in theatre, the applicant must fulfill all requirements of the Graduate School as well as departmental requirements; for the latter contact the graduate advisor in the department. All incoming students must take a diagnostic examination administered 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 the first term of work and doctoral students before the end of the second term.

In keeping with the department's commitment to educate students practically as well as academically, all graduate students are expected to participate actively in the department's production program.





Texas Tech University Health Sciences Center

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 support management; rehabilitation sciences; occupational therapy; physical therapy; physician assistant studies; speech-language pathology; audiology; 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 specific 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: acagsbs@ttuhsc.edu
www.remedy.ttuhsc.edu/gsbs

Student Affairs Program Offices
School of Nursing
3601 - 4th St.
Lubbock, Texas 79430
B.S.N. Undergraduate (806) 743-2737
R.N.-B.S.N. Undergraduate 1-800-493-3954 / (806) 743-2740 ext. 305
M.S.N. Graduate 1-800-851-8240 / (806) 743-3063
www.ttunursing.com



School of Allied Health Sciences

Professor Paul P. Brooke Jr., *Dean*

About the Program

The Health Sciences Center School of Allied Health Sciences offers the following degree programs: CLINICAL LABORATORY SCIENCE and CLINICAL SUPPORT SERVICES MANAGEMENT, *Bachelor of Science*; SPEECH, LANGUAGE, AND HEARING SCIENCES, *Bachelor of Science, Master of Science*; SPEECH-LANGUAGE PATHOLOGY, *Master of Science*; REHABILITATION SCIENCES and MOLECULAR PATHOLOGY, *Master of Science*; AUDIOLOGY, *Doctor of Audiology*; PHYSICIAN ASSISTANT, *Master of Physician Assistant Studies*; ATHLETIC TRAINING, *Master of Athletic Training*; OCCUPATIONAL THERAPY, *Master of Occupational Therapy*; PHYSICAL THERAPY, *Master of Physical Therapy and Doctor of Science*; and REHABILITATION COUNSELING, *Master of Rehabilitation Counseling*. 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 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

Rajinder K. Koul, Chairperson

Associate Professor and Chairperson, Speech, Language, and Hearing Sciences, 1994. B.Sc., Mysore, 1984; M.Sc., 1986; Ph.D., Purdue, 1994.

Faculty

Amlani, Aryn, Assistant Professor, 2002. B.A., U. of the Pacific, 1993; M.S., Purdue, 1995; Ph.D., Michigan State, 2002.

Aoyama, Katsura, Assistant Professor, 2002. B.A., Kansai U. (Japan), 1995; M.A., Hawaii, 1997; Ph.D., 2000.

Bogenschutz, Renee, Assistant Professor, 2001. B.A., Eastern New Mexico, 1993; M.S., 1995; Ph.D., Iowa, 2000.

Clapsaddle, Kathy, Clinical Instructor, 2003. B.S., Texas Tech University Health Sciences Center, 1997; M.S., 1999.

Corwin, Melinda D., Assistant Professor, 1994. B.S., Texas Tech, 1987; M.S., 1989.

Flores-Rivas, Lisa, Instructor, 1999. B.S., Texas Tech, 1993; M.S., Texas Tech (Health Sciences Center), 1996; Au.D., 2002.

Gustafson, Tori J., Assistant Professor, 1993. B.S., Texas Tech, 1990; M.S., 1992.

Hicks, Candace Bourland, Assistant Professor, 2000. B.S.E., Arkansas State, 1992; M.S., Purdue, 1995; Ph.D., Vanderbilt, 2000.

Keller, Judith P., Instructor, 1993. B.S., Texas Tech, 1987; M.S., 1990.

Paschall, D. Dwayne, Associate Professor, 1996. B.A., Baylor, 1989; M.S., Texas (Dallas), 1992; Ph.D., 1995.

Sancibrian, Cheryl L., Associate Professor and Program Director, Speech-Language Pathology, 1993. B.S., Texas Tech, 1976; M.S., 1978.

Schmitt, Mary Beth, Clinical Instructor, 2000. B.S., Texas Tech (Health Sciences Center), 1996; M.S., 1998.

Sims, Frankie, Clinical Instructor, 1998. B.S., Texas Tech (Health Sciences Center), 1976; M.S., Texas Tech, 1978.

Zhang, Ming, Assistant Professor, 2001; M.D., Shanghai Medical U. II, 1980; Advanced M.D., 1988; M.S., 1988; Ph.D., Iowa, 1995.

About the Program

This department offers study in the following graduate degree programs: SPEECH, LANGUAGE, AND HEARING SCIENCES, *Bachelor of Science*; SPEECH-LANGUAGE PATHOLOGY, *Master of Science*; and AUDIOLOGY, *Doctor of Audiology*.

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 1321 (or higher level) and 2300 or PSY 3400 or SOC 3391 | 6 |
| Lab. Sciences | One biological/life science, one physical science required. Suggested courses are BIOL 1402, ZOOL 2403, PHYS 1303 and 1101 | 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 trigonometry (or calculus) and one course in statistics are required.

***One course addressing life span issues and one course addressing multicultural issues are required.

Department of Laboratory Sciences and Primary Care

Hal S. Larsen, Chairperson

Professor of Clinical Laboratory Science; Associate Dean, School of Allied Health Sciences; and Chairperson, Laboratory Sciences and Primary Care, 1987. B.S., Brigham Young, 1970; M.S., 1973; M.T. (ASCP), Utah Valley Hospital, 1974; CLS (NCA), 1984; Ph.D., Nebraska (Medical Center), 1980.

Faculty

Border, Barbara G., Associate Professor and Program Director, Molecular Pathology, 1993. B.A., Stephen F. Austin State, 1974; B.S., Texas (Southwestern Medical Center), 1977; MT (ASCP), 1977; Ph.D., 1988; CLSp (Molecular Biology), 2001.

Chestnutt, Jacqueline, Faculty Associate and Lab Manager, Clinical Laboratory Science, 2002. B.S., Texas Tech (Health Sciences Center), 1997.

Collins, Robert, Faculty Associate in Clinical Laboratory Science, 2001. B.S., Texas Tech University Health Sciences Center, 1996; M.S., 2003.

Dennis, Larry P., Assistant Professor and Program Director, Physician Assistant Studies, 1999. B.S., West Texas A&M, 1971; B.S., Texas (Medical Branch), 1975; M.P.A.S., Nebraska (Medical Center), 1998.

Hearn, Thomas W., Assistant Professor and Clinical Coordinator, Physician Assistant Studies, 2002. B.S., Nebraska (Medical Center), 1976; M.P.A.S., 2000.

Hubbard, Joel D., Associate Professor of Clinical Laboratory Science, 1990. B.S., Texas Tech, 1976; M.T. (ASCP), Baptist Memorial Hospital (Dallas), 1977; Ph.D., Texas Tech (Health Sciences Center), 1986.

Le, Son M., Assistant Professor of Clinical Laboratory Science, 1997. B.S., Texas Tech (Health Sciences Center), 1992; M.T. (ASCP), 1992; M.Ed., Texas Tech, 2000.

Ream, Tammy, Assistant Professor of Physician Assistant Studies and Clinical Coordinator, 2002. B.S., Texas (Southwestern Medical Center), 1992; M.P.A.S., Nebraska (Medical Center), 2001.

Rice-Spearman, Lori, Associate Professor and Program Director, Clinical Laboratory Science and Molecular Pathology, 1988. B.S. Texas Tech (Health Sciences Center), 1986; M.T. (ASCP), 1986; M.S., Texas Tech, 1991.

Spannagel, Elaine, Assistant Professor of Physician Assistant Studies and Clinical Coordinator, 2003; C.P.A.S., Washington, 1995; M.S., Arizona School of Health Sciences, 2003.

Tatum, Tootie, Assistant Professor of Molecular Pathology, 2002. B.S., Texas Tech, 1994; M.S., 1997; Ph.D., New Mexico, 2002.

Graduate Program

Speech-Language Pathology. This professional education requires two years of study beyond the baccalaureate level. Admission into the professional program begins in March 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 a comprehensive capstone course 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.

About the Program

This department offers study in the following graduate degree programs: CLINICAL LABORATORY SCIENCE, *Bachelor of Science*; PHYSICIAN ASSISTANT, *Master of Physician Assistant Studies* and MOLECULAR PATHOLOGY, *Master of Science*.

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 pre-medical (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 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 (Genetics) | 8 |
| Science Elective* | CHEM 1307 & 1107, 1308 & 1108, and 2303 & 2103 | 3-4 |
| Chemistry | ENGL 1301 and 1302 | 12 |
| English | HIST 2300 and 2301 | 6 |
| History | POLS 1301 and 2302 | 6 |
| Political Science | MATH 1320 | 6 |
| Mathematics (College Algebra) | MBIO 3401 | 3 |
| Microbiology | | 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 | ZOO 2403 and 2404 | 8 |
| Microbiology | MBIO 3401 | 4 |
| Chemistry | CHEM 1307 & 1107, 1308 & 1108, and 2305 & 2105 | 12 |
| English | ENGL 1301 and 1302 | 6 |
| Mathematics (College 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 |
| Anatomy and Physiology | ZOO 2403 and 2404 | 8 |
| General Chemistry | CHEM 1307 & 1107 and 1308 & 1108 | 8 |
| Behavioral Science | | 9 |
| Nutrition | F&N 3320 or 3340 | 3 |
| Statistics | MATH 2300 or PSY 3400 | 3 |
| Electives* | | 14 |
| TOTAL | | 66 |

*Computer Basics & 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 2.75 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 Admissions Sciences and Student Affairs Office or the Physician Assistant 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 the School of Allied Health Sciences Admissions and Student Affairs Office 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 Admissions and Student Affairs Office or the Physician Assistant Program.

The following 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:

| | <i>Semester Hours</i> |
|---|-----------------------|
| General Chemistry with Lab | 8 |
| Microbiology | 4 |
| Biochemistry | 3-4 |
| Cell Biology | 4 |
| Anatomy & Physiology | 8 |
| College Algebra | 3 |
| General Biology | 8 |
| Organic Chemistry | 8 |

Department of Rehabilitation Sciences

Steven F. Sawyer, Chairperson

Associate Professor of Physical Therapy, 1994. B.S., California (Irvine), 1980; Ph.D., California (San Diego), 1988; MPT, Texas Tech (Health Sciences Center), 1997.

Faculty

Boss, Jeffrey L., Assistant Professor of Occupational Therapy, 1998. B.S., Medical College of Georgia, 1985; M.S., Bowie State, 1995.

Brismee, Jean-Michel, Assistant Professor of Physical Therapy, 1997. B.S., Catholic U. of Louvain (Belgium), 1982; M.S., Texas Tech, 1996.

Brooke, Paul P. Jr., Professor of Rehabilitation Sciences and Dean, School of Allied Health Sciences 1998. B.A., St. Joseph's Seminary & College, 1964; M.H.A., Baylor, 1976; M.M.A.S., U.S. Army Command & Staff College, 1979; Ph.D., Iowa, 1986.

Brooks, David J., Assistant Professor and Program Director, Rehabilitation Counseling, 2001. B.A., Northeastern Oklahoma State, 1969; M.S., Oklahoma State, 1975.

Clopton, Nancy Ann, Associate Professor of Physical Therapy, 1983. B.S., Kansas, 1970; M.S., Texas Woman's, 1983; Ph.D., Texas Tech, 1989.

Cook, Chad, Assistant Professor of Physical Therapy; Regional Chair, Physical Therapy; and Program Director, Rehabilitation Sciences, 1999. B.S., Maryville; M.B.A., Phoenix, 1999.

Daniel, John, Associate Professor of Physical Therapy, 1991. B.A., University of Delhi, India, 1975; BLS, Iowa State, 1990; M.A., Iowa, 1991; Ed.D. Texas Tech, 1999.

Elliott, Loree, Assistant Professor of Clinical Support Services Management, 2003. B.B.A., West Texas A&M, 1990; M.B.A., Wayland Baptist, 1995.

Everhardt, Nancy, Assistant Professor and Program Director, Occupational Therapy, 1999. B.S., Texas Tech, 1968; M.Ed., 1972; M.S., Texas Women's, 1995.

Geddie, Matthew, Assistant Professor of Occupational Therapy, 2003. B.S., Texas Tech University Health Sciences Center, 1994; M.B.A., Wayland Baptist, 2002.

Gilbert, Kerry, Assistant Professor of Physical Therapy, 1999. B.S., Texas, 1993; M.P.T., Texas Tech (Health Sciences Center), 1997.

Hooker, Joan, Instructor of Physical Therapy, 1999. B.S., Texas Southwest Medical Center, 1991; M.S., West Texas A&M, 2002.

Hooten, Michael, Assistant Professor; Regional Dean, Amarillo; and Program Director, Clinical Support Services Management, 1999. B.S., Texas Tech, 1981; M.H.A., Baylor, 1990.

Jonely, Holly E., Assistant Professor of Physical Therapy, 2002. B.A. Midway College, 1996; M.P.T., Texas Tech (Health Sciences Center), 1999.

Karakostas, Tasos, Assistant Professor of Physical Therapy, 1999; B.S., Rhodes; M.S., Michigan State, 1992; Ph.D., Ohio State, 2001.

Knotts, Valerie, Associate Professor of Occupational Therapy, 1995. B.S., New Hampshire, 1954; M.S. Boston, 1983.

Matthews, Pamela, Assistant Professor of Occupational Therapy, 2001. B.S., Texas (Medical Branch), 1975; M.S., Washington, 1984; Ph.D., New Mexico, 1999.

Meers, Dawndra A., Assistant Professor of Occupational Therapy, 2001. B.S., Texas Tech, 1992. B.S., Texas Tech (Health Sciences Center), 1994; M.S., Texas Women's, 2001.

Munger, Larry R., Assistant Professor and Clinical Education Coordinator, Athletic Training, 2002. B.S., Kansas, 1995; M.S., Arizona (School of Health Sciences), 1997.

Priest, Andrew, Assistant Professor and Program Director, Physical Therapy, 1995. B.S., Brigham Young, 1987; MPT., Baylor (Army Program), 1989; Ed.D., Texas Tech, 2001.

Ramey, Kevin, Assistant Professor of Physical Therapy, 2002. B.S., Texas (San Antonio), 1998; M.S., North Texas, 2001.

Rogers, Toby, Assistant Professor in Physical Therapy, 2002. B.S. Lubbock Christian, 1995; M.P.T., Texas Tech (Health Sciences Center), 1998.

Schultz, Jared C., Assistant Professor of Rehabilitation Counseling, 2000. B.S., Brigham Young, 1993; M.A., George Fox, 1996; Ph.D., Northern Colorado, 2000.

Sizer, Phillip S., Associate Professor of Physical Therapy, 1990. B.S., Texas (Medical Branch), 1985; M.S., Texas Tech, 1994, Ph.D., 2002.

Smith, L. DeAn, Instructor of Occupational Therapy, 1999. B.S., Texas Women's, 1994; M.S., West Texas A&M, 2002.

Smith, Michael, Assistant Professor of Athletic Training, 2000. B.S., State U. New York (Plattsburgh), 1994; M.S., Arizona (School of Health Sciences), 1997.

Spears, Evans, Assistant Professor of Rehabilitation Counseling, 2002. B.A. Coe College, 1991; M.A., Iowa, 1994.

Stickley, Lois A., Assistant Professor of Physical Therapy, 1996. B.S., Texas Woman's, 1982; M.S., 1987, Ph.D., Texas Tech, 2002.

Taylor, LesLee, Assistant Professor and Program Director, Athletic Training, 2000. B.S., Kansas, 1993; M.S. Arizona, 1995; Ph.D., Texas Tech, 2001.

Wells, Jennifer, Assistant Professor of Occupational Therapy, 2002. B.S. Keuka College, 1976; M.O.T., Texas Woman's, 1987.

Williamson, Elizabeth, Assistant Professor of Physical Therapy, 2002. B.S., Texas (Health Sciences Center-San Antonio), 1981; M.A., Texas A&M (Corpus Christi), 1993.

About the Program

This department offers study in the following degree programs: CLINICAL SUPPORT SERVICES MANAGEMENT, *Bachelor of Science*; ATHLETIC TRAINING, *Master of Athletic Training*; OCCUPATIONAL THERAPY, *Master of Occupational Therapy*; PHYSICAL THERAPY, *Master of Physical Therapy and Doctor of Science*; REHABILITATION SCIENCES, *Master of Science*; and REHABILITATION COUNSELING, *Master of Rehabilitation Counseling*.

Undergraduate Program

Bachelor of Science, Clinical Support Services Management. The objective of this program is to expand educational access to graduates of community college technical programs in allied health disciplines who have an Associate degree in Applied Sciences (AAS). This program will provide the appropriate educational foundation and pre-requisite 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, and Respiratory Care Technicians.

Curriculum. The B.S., CSSM degree program is a "2 + 2" format designed to provide wide exposure to the skills, knowledge, and abilities needed for success in supervisory management in our healthcare delivery system. Students "attend" classes in a non-traditional 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 consist of 54 semester credit hours of upper-level undergraduate courses. Courses will rotate and students 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., CSSM 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. Following the receipt of applications, notice of acceptance will be given 60 days prior to the next semester of class offerings.

Graduate Program

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:

| | <i>Semester Hours</i> |
|-----------------------------------|-----------------------|
| Anatomy and Physiology | 6-8 |
| Exercise Physiology | 3 |
| Statistics | 3 |
| Nutrition | 3 |
| Kinesiology or Biomechanics | 3 |
| First Aid and CPR | 3 |

Applications are accepted beginning September 1 preceding the year of expected matriculation. Applications must be received in the School of Allied Health 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 from state to state according to athletic training practice acts and state regulations governing athletic training.

Occupational Therapy Program. Occupational therapy enables clients to develop or maintain the physical, cognitive, and emotional abilities needed to meet the demands of work, home, and community environments. 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 setting and pass a national examination.

The Office of Admissions and Student Affairs accepts applications each year between Septem-

ber 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, Box 46294, 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.

| | <i>Semester Hours</i> |
|-------------------------------|-----------------------|
| 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.

| | <i>Semester Hours</i> |
|---|-----------------------|
| Psychology and Sociology | 6 |
| Mathematics | 3 |
| Statistics | 3 |
| General Biology | 8 |
| Anatomy and Physiology | 6-8 |
| (1 course must be upper division) | |
| General Chemistry (for majors, lab. required) ... | 8 |
| General Physics (for majors, lab. required) | 8 |
| Electives* | 46-48 |
| TOTAL | 90 |

*Recommended courses: Technical writing, speech, developmental and general psychology.

Upon successful completion of the professional program, students are eligible to take the state licensure examination which is required in order 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.

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 MVR 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, spring, or summer semester. Applications must be received in the School of Allied Health Admissions and Student Affairs Office by August 1 for the fall semester, December 1 for the spring semester, and May 1 for the summer 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 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 MS 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 MS 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 two specialization tracks; Gerontology and Clinical Practice Management. The Gerontology track offers the post-graduate clinician advanced geriatric knowledge to meet the needs of a rapidly aging U.S. population. 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% 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

The Application Process. Applications may be submitted at anytime, however, applications are considered approximately 3 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, Stop 8310, Lubbock, Texas 79430. Applicants should understand that fulfillment of the basic requirements does not guarantee admission.

Graduate School of Biomedical Sciences

Dr. Richard V. Homan, *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 *Master of Science* degree in HEALTH SERVICES RESEARCH and BIOTECHNOLOGY and the *Master of Science* and *Doctor of Philosophy* degrees in CELL AND MOLECULAR BIOLOGY, MEDICAL BIOCHEMISTRY, MEDICAL MICROBIOLOGY, PHARMACEUTICAL SCIENCES, PHARMACOLOGY, and 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, with the consent of the course instructor and the Associate Dean of the Graduate School of Biomedical Sciences, 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 acagsbs@ttuhsc.edu. Access our website: www.remedyt.ttuhs.edu/gsbs for more information and to apply online.

Programs are subject to change, depending on availability of resources and educational goals.



Department of Cell Biology and Biochemistry

Harry M. Weitlauf, Chairperson

Professor, 1982. B.S., Washington, 1961; M.D., 1963.

Faculty

Beale, Elmus G., Associate Professor, 1993; B.S., Oklahoma State, 1970; Ph.D., Baylor (College of Medicine), 1977.

Chilton, Beverly S., Professor, 1984; B.S., Arizona State (Tempe), 1970; M.S., 1973; Ph.D., Tennessee (Knoxville), 1976.

Coates, Penelope W., Associate Professor, 1978; B.S., St. Lawrence 1955; M.M.A., Texas (Southwestern), 1957; Ph.D., 1969.

Cornwall, Gail A., Associate Professor, 1994; B.S., Brigham Young, 1980; M.S., 1982; Ph.D., Johns Hopkins, 1988.

Coué, Martine, Assistant Professor, 1996; D.E.U.G., Université Paris VI, 1976; Maitrise, Université Paris V, 1978; D.E.A., Université Parris VI, 1979; Ph.D., 1987.

Everse, Johannes, Professor, 1976; M.A., Brandeis, 1971; Ph.D., California (San Diego), 1973.

Faust, Charles, Professor, 1984; A.B., Franklin and Marshall Coll., 1964; Ph.D., Colorado State, 1969.

Hardy, Daniel M., Associate Professor, 1995; B.S., South Dakota School of Mines & Technology, 1979; Ph.D., New Mexico, 1986.

Hutson, James C., Professor, 1976; B.S., Peru State (Nebraska), 1969; M.S., Nebraska School of Medicine, 1974; Ph.D., 1976.

Khan, Shafiq A., Associate Professor, 1994; B.S., Gordon Coll., (Pakistan), 1974; M.S., Quaid-i-Azam U., (Pakistan), 1976; M.Phil., 1979; Ph.D., Karolinska Inst., (Sweden), 1985.

Lee, Vaughan H., Associate Professor, 1995; B.S., South Alabama, 1986; Ph.D., 1989.

Little, Gwynne H., Associate Professor, 1972; B.S., Emory, 1964; M.S., Medical Coll. of Georgia, 1966; Ph.D., 1970.

MacDonald, Clinton C., Associate Professor, 1995; B.A., Middlebury Coll., 1980; Ph.D., State U. of New York (Stony Brook), 1990.

Pelley, John W., Associate Professor, 1972; B.A., South Florida, 1964; Ph.D., North Carolina, 1969.

Pence, Barbara C., Professor of Pathology, Cell Biology and Biochemistry, and Adjunct Faculty in Education, Nutrition, and Restaurant-Hotel Management and Environmental and Human Health, 1987. B.A., Texas Tech, 1977; M.S., 1979; Ph.D., 1984.

Pfarr, Curt M., Assistant Professor, 1996; B.S., Oregon, 1985; Ph.D., Colorado, 1990.

Phillips, Catherine A., Professor of Internal Medicine and Cell Biology and Biochemistry, 1993; B.S., Florida (Gainesville), 1972; Ph.D., Florida (College of Medicine), 1978.

Reid, Ted W., Professor of Cell Biology and Biochemistry and Vice Chairperson, Ophthalmology and Visual Science, 1991; B.A., Occidental Coll. (Los Angeles), 1961; M.S., Arizona (Tucson), 1963; Ph.D., California (Los Angeles), 1967.

Schneider, Brandt L., Assistant Professor, 1999; B.S., Washington, 1986; Ph.D., Arizona, 1993.

Sridhara, S., Associate Professor, 1978; B.S., Mysore (India), 1958; M.S., 1959; Ph.D., Indian Inst. of Science (India), 1965.

Stocco, Douglas M., Professor, 1974; B.S., Windsor (Canada), 1967; M.S., 1969; Ph.D., Toronto (Canada), 1972.

Webster, Daniel R., Assistant Professor, 1993; B.A., DePauw, 1978; Ph.D., Miami, 1984.
Whelly, Sandra M., Associate Professor, 1981; A.B. Salve Regina Coll., 1968; Ph.D., Nebraska, 1973.
Williams, Simon C., Associate Professor, 1995; B.A., Trinity Coll. (Ireland), 1983; Ph.D., Roswell Park Mem. Inst. (New York), 1989.
Wright, Stephen E., Associate Professor of Internal Medicine and Cell Biology and Biochemistry, 1987; B.A., Hendrix Coll. (Arkansas), 1963; M.D., Arkansas (School of Medicine), 1967.

About the Program

This department offers study in the following graduate degree programs: CELL AND MOLECULAR BIOLOGY and MEDICAL BIOCHEMISTRY, *Master of Science* and *Doctor of Philosophy*.

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 anatomical sciences and in modern instructional methods and design, and will participate in the teaching mission of the medical school as teaching assistants.

Students with undergraduate degrees in biology and chemistry are well suited for this program. Please contact Dr. 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.

Department of Health Services Research

James E. Rohrer, Chairperson

Professor, 1999. B.S., Indiana, 1978; M.S., Cincinnati, 1981; Ph.D., Michigan, 1985.

Faculty

Aday, Lu Ann, Visiting Professor, 2001. B.S., Texas Tech, 1968; M.S., Purdue, 1970; Ph.D., 1973.

Arif, Ahmed A., Assistant Professor, 2001. M.D., Sind Medical College, 1991; M.S., Western Kentucky, 1996; Ph.D., Texas (Houston), 2001.

Borders, Tyrone F., Assistant Professor, 1999. B.A., Kansas (Lawrence), 1993; M.A., Iowa, 1995; M.S., 2001; Ph.D., 1999.

Rohland, Barbara M., Associate Professor, 1999. B.S., Wisconsin, 1979; M.S., Colorado (Health Sciences Center), 1981; M.D., Washington (School of Medicine), 1989.

Xu, Ke Tom, Assistant Professor, 1999. B.A., Southwest U. of Finance and Economics, (China), 1992; M.S., 1995; Ph.D., North Carolina (Chapel Hill), 1999.

About the Program

This department offers study in the following graduate degree program: HEALTH SERVICES RESEARCH, *Master of Science*. The M.S. degree in health services research (HSR) will take advantage of the specialized training of faculty in the department. 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. James Rohrer at (806) 743-3013.

Department of Microbiology and Immunology

Ronald C. Kennedy, Chairperson

Professor, 2001. B.A., Rutgers, 1976; M.S., Hawaii, 1977; Ph.D., 1981.

Faculty

Bright, Robert K., Associate Professor, 2002. B.S., Idaho (Moscow), 1987; Ph.D., Texas (San Antonio), 1994.
Chaffin, LaJean, W., Professor, 1985. B.A., Texas, 1964; M.S., Wisconsin (Madison), 1969; Ph.D., 1971.
Fralick, Joe A., Professor, 1974. B.A., San Jose State, 1965; Ph.D., Tennessee, 1970.
Griswold, John, Professor of Medical Microbiology and Immunology and Adjunct Faculty in Education, Nutrition, and Restaurant-Hotel Management, 1996. B.S., Notre Dame, 1977; M.D., Creighton, 1981.
Hamood, Abdul, Associate Professor, 1990. M.S., Missouri, 1984; Ph.D., 1985.
Pence, Danny B., Professor of Pathology, Microbiology and Immunology, and Adjunct Faculty in Range, Wildlife, and Fisheries Management, 1976. B.S., Western Kentucky State Coll., 1965; M.S., Louisiana State (Medical Center), 1967; Ph.D., Louisiana State (Medical Center), 1970.
Reilly, Brian D., Assistant Professor, 2001. B.Sc., Northern Colorado, 1980; M.Sc., 1983; Ph.D., New Mexico, 1989.
Rolfe, Rial D., Professor, 1983. B.A., Missouri (Columbia), 1974; M.S., 1976; Ph.D., 1978.
San Francisco, Michael, Assistant Professor of Biological Sciences and Adjunct Faculty in Microbiology and Immunology, 2001. M.A., Massachusetts (Boston), 1980; Ph.D., 1984.
Siddiqui, Afzal A., Associate Professor, 2000. B.S., Aligarh (India) 1976; M.S., 1978; M.Phil., 1980; Ph.D., Western Ontario (Canada), 1986.
Straus, David C., Professor, 1981. B.S., Ohio (Dayton); 1969, Ph.D., Ohio (Cincinnati), 1974.

About the Program

This department offers study in the following graduate degree programs: MEDICAL MICROBIOLOGY, *Master of Science* and *Doctor of Philosophy*. 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 our website at www.ttuhsu.edu/SOM/microbiology/mainweb/main.html.

Department of Pharmaceutical Sciences

Quentin R. Smith, Chairperson

Professor, 1997. B.S., Oberlin Coll., 1976; Ph.D., Utah, 1980.

Faculty

Abbruscato, Thomas J., Assistant Professor, 2000. B.S., Arizona, 1992; Ph.D., 1997.
Ahsan, Fakhru, Assistant Professor, 2001. B.S., Dhaka (Bangladesh), 1990; M.S., 1992; Ph.D., Madrid (Spain), 1999.
Allen, David D., Associate Professor, 1996. B.S., Kentucky (College of Pharmacy), 1985; Ph.D., 1993.
Bickel, Ulrich, Associate Professor, 1999. Doctor of Medicine, University of Ulm (Germany), 1985.
Bouma, Carolyn L., Assistant Professor, 1996. B.A., Western Maryland Coll., 1982; Ph.D., Johns Hopkins, 1992.
Chiriva-Internati, Maurizio, Assistant Professor, 2002. B.A., Inst. Tech. (Milan, Italy), 1987; Ph.D., Milan (Italy), 1996.
Khan, Mansoor A., Professor of Pharmaceutical Sciences and Director, Graduate Program, 1998. B.S., Pharmacy, Kakatiya U. (India), 1982; M.S., Idaho State, 1988; Ph.D., St. John's, 1992.
Klein, Jochen, Associate Professor, 2002. Ph.D., Johannes Gutenberg University of Mainz School of Pharmacy, 1987.
Lindsey, J. Suzanne, Assistant Professors, 1998. B.S., Pacific University, 1991; Ph.D., Oregon Health Sciences U., 1996.
Mehvar, Reza, Professor, 1999. Pharm.D., U. of Tehran (Iran), 1979; Ph.D., Alberta (Canada), 1988.
Shah, Girish V., Professor, 1998. Ph.D., Bombay, 1979.
Srivenugopal, Kalkunte, Associate Professor, 2002. B.S., Bangalore (India), 1972; M.S., 1975; Ph.D., Indian Inst. of Science (India), 1981.
Stoll, James, Assistant Professor, 1996. B.S., New Mexico State, 1980; Ph.D., Johns Hopkins, 1986.
Thekkumkara, Thomas J., Associate Professor, 2000. B.S., Kerala (India), 1976; M.S., Kanpur (India), 1978; Ph.D., 1984.
Van der Schyf, Cornelis (Neels) J., Associate Professor, 2002. B.Pharm., Potchefstroom (South Africa), 1978; M.Sc., 1981; D.Sc., 1983.
Weidanz, Jon A., Assistant Professor, 2000. B.S., West Virginia, 1985; M.P.H., Alabama, 1987; Ph.D., 1992.
Weis, Margaret T., Associate Professor, 1999. B.S., Loyola, 1970; Ph.D., Medical U. of South Carolina, 1983.
Youan, Bi-Botti Célestin, Assistant Professor, 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.

About the Program

This department offers study in the following graduate degree programs: PHARMACEUTICAL SCIENCES, *Master of Science* and *Doctor of Philosophy* 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. Mansoor A. Khan, Director of Graduate Programs, (806) 356-4015 ext. 285.

Department of Pharmacology

Reid L. Norman, Chairperson

Professor of Pharmacology, Cell Biology, and Biochemistry and Chairperson, Pharmacology, 1983. B.S., Kansas State, 1966; M.S., 1968; Ph.D., Kansas, 1971.

Faculty

Blanton, Michael P., Associate Professor, 1995. B.A., California (Santa Cruz), 1983; Ph.D., 1989.
Carroll, Paul T., Professor, 1981. A.B., California, 1966; M.A., San Jose State, 1969; Ph.D., Maryland, 1973.
Dickerson, Richard L., Associate Professor, 1997. B.S., Midwestern State, 1974; M.S., Arkansas, 1980; Ph.D., Texas A&M, 1992.
Frame, Lynn T., Assistant Professor, 2000. B.A., Virginia, 1976; M.S., Virginia Tech, 1983; Ph.D., Arkansas (Medical Sciences), 1995.
Freeman, Arthur S., Associate Professor, 1994. B.A., Colorado (Boulder), 1977; Ph.D., Medical College of Virginia, 1982.
Kaye, Alan David, Professor of Pharmacology and Chairperson, Anesthesiology, 1999. M.D., Arizona (School of Medicine), 1989; Ph.D., Tulane, 1997.
Lombardini, John Barry, Professor, 1973. B.S., St. Mary's Coll., 1963; Ph.D., California (San Francisco), 1968.
Machu, Tina Kay, Associate Professor, 2003. B.S., Texas, 1981; Ph.D., 1990.
McMahon, Kathryn K., Associate Professor, 1988. B.S., New Mexico Inst. of Mining and Technology, 1975; Ph.D., North Dakota State, 1979.
Popp R. Lisa, Assistant Professor, 2003. B.A., Texas, 1976; M.A., 1983; Ph.D., 1995.
Roghani, Ali, Associate Professor, 1995. B.A., Kansas (Lawrence), 1979; Ph.D., Illinois (Urbana-Champaign), 1986.

Strahlendorf, Howard Kurt, Professor of Pharmacology and Adjunct Faculty in Environmental Toxicology, 1977. B.Sc., University of Houston, 1972; M.Sc., Philadelphia College of Pharmacy and Science, 1974; Ph.D., Philadelphia Coll. of Pharmacy and Science, 1979.

Syapin, Peter J., Associate Professor, 1990. B.S., California (Irvine) 1972; Ph.D., 1977.

Tenner, Thomas E. Jr., Professor, 1978. B.A., Dallas, 1971, Ph.D., Texas (Health Sciences Center), 1976.

About the Program

This department offers study in the following graduate degree programs: PHARMACOLOGY, *Master of Science* and *Doctor of Philosophy*. 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, calcium imaging, circadian pharmacology, autonomic pharmacology, cardiovascular pharmacology, neuropharmacology, and molecular pharmacology.

Department of Physiology

John M. Orem, Chairperson

Professor, 1977. B.A., New Mexico, 1966; Ph.D., 1970.

Faculty

Jumper, Cynthia, Assistant Professor, 1998. B.S.N., West Texas State, 1981; B.A., 1984; M.D., Texas Tech (School of Medicine), 1988.

Kurtzman, Neil A., Professor, 1995. B.A., Williams Coll., 1957; M.D., New York Medical Coll., 1961.

Laski, Melvin E., Professor, 1993. B.A., Lewis Coll., 1971; M.D., Abraham Lincoln (School of Medicine), 1976.

Davies, Donald G., Professor, 1974. B.S., Rhode Island, 1963; Ph.D., Johns Hopkins School of Hygiene & Public Health, 1970.

Escobar, Ariel, Assistant Professor, 2000. Ph.D., Republic of Uruguay, 1993.

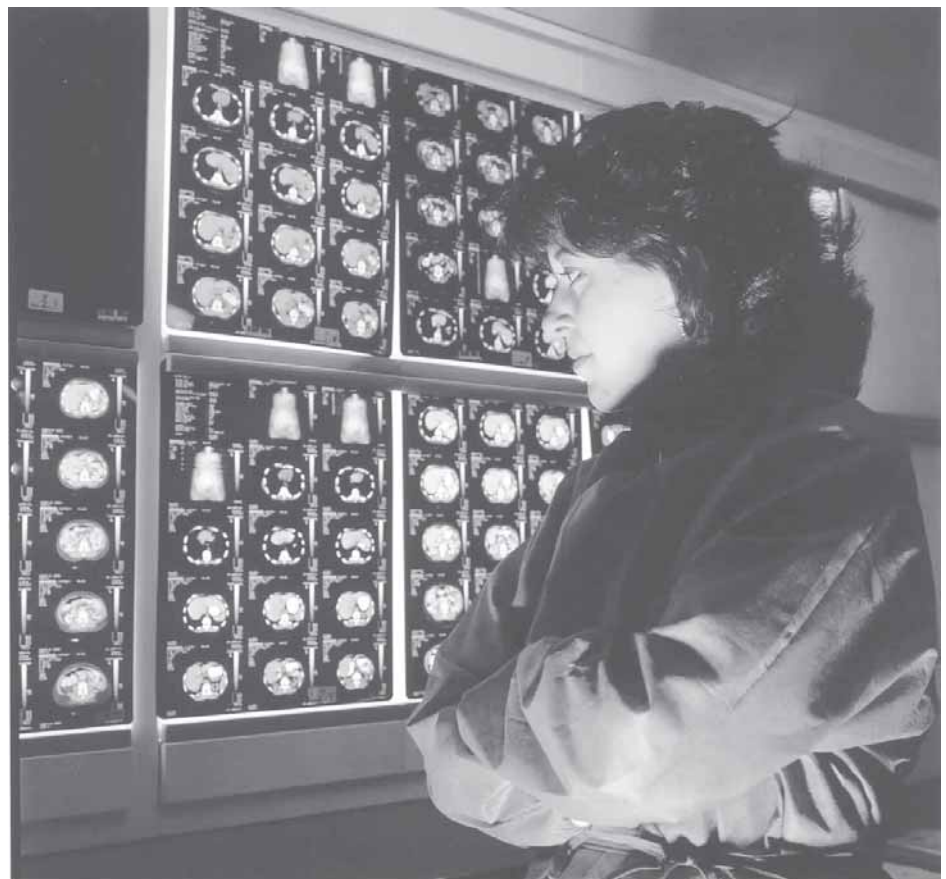
Fowler, John C., Associate Professor, 1990. B.S., New Mexico, 1975; Ph.D., 1982.

Györke, Sandor, Associate Professor, 1994. M.S., Leningrad (USSR), 1983; Ph.D., Sechenov Inst. Physiology and Biochemistry (USSR), 1987.

Heavner, James E., Professor, 1984. D.V.M., Georgia, 1968; Ph.D., Washington (School of Medicine), 1971.

Janssen, Herbert F., Professor, 1981. B.S.E., Midwestern, 1972; M.Ed., Texas Tech, 1973; Ph.D., Texas Tech (Health Sciences Center), 1980.

Lutherer, Lorenz O., Professor, 1973. A.B., Haverford Coll., 1958; M.S., Iowa Coll. of Medicine, 1964; Ph.D., Florida Coll. of Medicine, 1969; M.D., Texas Tech (School of Medicine), 1977.



Martinez-Zaguilan, Raul, Associate Professor, 1995. M.Sci., Universidad Autonoma Metropolitana, Mexico City, 1986; Ph.D., Arizona, 1991.

Nathan, Richard D., Professor, 1977. B.S., Georgia Tech, 1966; Ph.D., Florida, 1971.

Pressley, Thomas A., Professor, 1995. B.A., Johns Hopkins, 1977; Ph.D., Medical U. of South Carolina, 1981.

Sabatini, Sandra, Professor, 1985. B.S., Millsaps Coll., 1962; M.S., Marquette, 1966; Ph.D., Mississippi (Medical Center), 1968; M.D., Texas (Medical School), 1974.

Sarvazyan, Narine A., Associate Professor, 1995. B.S., Moscow State, 1983; M.S., 1986; Ph.D., Inst. of Experimental Biology (Armenia), 1991.

Strahlendorf, Jean C., Professor of Physiology and Adjunct Faculty in Environmental Toxicology, 1981. B.S., Houston, 1972; M.S., Philadelphia Coll. of Pharmacy and Science, 1974; Ph.D., 1978.

Wesson, Donald W., Professor, 1995. B.S., Massachusetts Inst. of Tech., 1974; M.D., Baylor (College of Medicine), 1978.

About the Program

This department offers study in the following graduate degree programs: PHYSIOLOGY, *Master of Science* and *Doctor of Philosophy*. 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 alterna-

tive 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, 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.

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 at the Lubbock campus and a RN to B.S.N. degree completion program for registered nurses at the Lubbock and Permian Basin campuses, as well as at six distance learning sites. Additionally, the school offers a Master of Science in Nursing degree in several specialties, such as Family Nurse Practitioner and Acute Care Nurse Practitioner. 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 the Commission on Collegiate Nursing Education.

Faculty

Acton, Cindy, Instructor and Practice Coordinator, 2000. B.S.N., West Texas State, 1983; M.S.N., West Texas A&M, 1997.

Amos, Elizabeth, Assistant Professor, 2001. Diploma, Jewish General Hospital (Montreal); B.A., Concordia (Montreal), 1969; B.A., Concordia (Montreal), 1977; B.S.N. Rush (Chicago), 1985; M.S.N. Texas Woman's, 1988; Ph.D., 1997.

Andersen, Susan, Assistant Professor, 2000. B.S.N. Lubbock Christian, 1994; M.S.N., F.N.P., Texas Tech (Health Sciences Center), 1997; Ph.D., Texas (Health Science Center), 2003.

Armstrong, Myrna L., Professor and R.N.-B.S.N. / *staRNeTT Coordinator, 1994. Diploma, Walther Memorial Hospital, 1963; B.S.N., De Paul, 1969; M.S., 1972; Ed.D., East Texas State, 1986.

Ashcraft, Alyce, Assistant Professor, 2001. B.S.N., Texas Woman's, 1980; M.S.N., Texas (Arlington), 1984; Ph.D., Texas (Austin), 2001.

Bennett, Krystal, Instructor, 2002. B.S.N., Texas Tech (Health Sciences Center), 1993; M.S.N., 2001.

Boswell, Carol, Associate Professor and Nurse Practitioner, 1999. Diploma, Methodist Hospital, 1974; B.S.N., Texas Tech, 1987; M.S.N., 1991; Ed.D., 1995.

Brice, Linda, Assistant Professor, 2002. B.S. Memphis State, 1973; M.A. Chapman Coll., 1976; B.S. Southern Illinois, 1982; B.S.N. Creighton, 1989; M.S.N., A.R.N.P., South Florida, 1993; Ph.D., 2002.

Bridges, Ruth Ann, Assistant Professor, Nurse Planner, CNE, 1997. Diploma, Methodist Hospital, 1972; B.S.N., West Texas State, 1979; M.S.N. Texas Tech (Health Sciences Center), 1996.

Burwick, Cheryl, Instructor, 2003. B.S.N., West Texas A&M, 1991; M.S.N., 1992; F.N.P., Texas (Arlington), 1993.

Cannon, Sharon B., Associate Professor and Regional Dean, Permian Basin, 1998. B.S.N., St. Louis, 1962; M.S.N., Southern Illinois, 1976; Ed.D., 1985.

Cherry, Barbara, Assistant Professor and Director, Interdisciplinary Programs in Aging, 2001. Diploma, Methodist Hospital, 1973; B.S.N., West Texas A&M, 1980; M.B.A., Texas Tech, 1995; M.S.N., Texas Tech (Health Sciences Center), 1997.

Collins, Cathleen A., Assistant Professor, 1999. B.S.N., Texas Tech (Health Sciences Center), 1996; M.S.N., Texas (El Paso), 1998.

Cookman, Craig, Assistant Professor, 2002. B.S.N., Vermont, 1981; M.S.N., Arizona, 1987; Ph.D., 1992; Post-Doc., 2002.

Dadich, Karen A., Associate Professor, 1981. B.S.N., Carlow Coll., 1966; M.N., Pittsburgh, 1969.

Decker, Sharon I., Professor and Director, Clinical Simulations, 1984. B.S.N., Baylor 1973; M.S.N., Texas (Arlington), 1981.

DiBenedetto, Paula, Assistant Professor, 1999. A.D.N., Grayson County College, 1980; B.S.N., West Texas State, 1986; M.S.N., Texas Tech (Health Sciences Center), 1994.

Edwards, Carrie, Assistant Professor, 1996. B.S.N., Texas Tech (Health Sciences Center), 1993; M.S.N., 1999.

Esperat, Christina R., Professor and Associate Dean, Practice and Research 2000. B.S.N., Silliman (Philippines), 1968, M.A.N., 1969; Ph.D., Texas, 1990; F.N.P., 1996.

Esquibel, Karen A., Instructor, 2002. B.S.N., Texas Tech (Health Sciences Center), 1997; M.S.N., Texas Tech (Health Sciences Center), 2002.

Feng, Du, Associate Professor, 1996. B.S., Beijing, 1991; M.S., Southern California, 1994; Ph.D., 1995.

Galvan, Toni, Associate Professor, 1989. B.S.N., Texas Christian, 1970; M.S.N., Texas (Health Science Center), 1976; Post-Grad., East Texas State, 1994.

Green, Alexia, Professor and Dean, School of Nursing, 2000. A.D.N. Alvin Community Coll., 1970; B.S.N., Texas (Medical Branch), 1984; M.S.N., Texas (Health Science Center), 1986; Ph.D., Texas Woman's, 1990.

Holden-Huchton, Patricia A., Assistant Professor, 2001. B.S.N., Mary Hardin-Baylor Coll., 1974; M.S.N., Texas Woman's, 1980; D.S.N., Alabama, 1995.

Jackson, Dorothy, Assistant Professor, 1994. A.A., Odessa Coll., 1967; B.S.N., West Texas State, 1977; M.S.N./F.N.P., Texas (El Paso), 1996.

Johnston, Barbara, Professor and Associate Dean, Graduate Program, 1998. B.S.N., Hunter Coll., 1959; M.S.N., 1977; Ph.D., Hofstra, 1994.

Kelly, Lynne, Instructor, 1999. B.S., Texas Tech, 1989; M.S.N., Texas, 1996.



Ketner, Kenneth Laine, Horn Professor; Director, Institute for Studies in Pragmaticism; Charles Sanders Peirce Interdisciplinary Professor, College of Arts and Sciences and School of Nursing, 1971. B.A., Oklahoma State, 1961; M.A., 1967; M.A., California (Los Angeles), 1968; Ph.D., California (Santa Barbara), 1972.

Laurentz, Merrill, Instructor, 2002. B.S.N., Texas Woman's (Galveston), 1973; M.S.N., Texas Woman's (Houston), 1976.

Masten, W. Yondell, Professor and Associate Dean, Outcomes Management and Evaluation, 1984. Diploma, Methodist Hospital, 1961; B.S., West Texas State, 1973; B.S.N., 1977; M.S., Texas Tech, 1978; M.S.N., Texas, 1981; Ph.D., Texas Tech, 1985; Post-Master's, W.H.N.P., Texas (Medical Branch), 1992.

Merrill, Emily, Associate Professor and Director, Nurse Practitioner Program, 1988. B.S., Oklahoma, 1972; M.S.N., Texas Woman's, 1977; Post-Master's, Texas Tech (Health Sciences Center), 1994.

Miller, Virginia G., Associate Professor, 1990. B.S.N., Ohio State, 1973; M.S.N., West Virginia, 1979; Ph.D., Texas, 1990.

O'Neal, Cynthia, Assistant Professor, 2002. B.S., Arizona State, 1986; B.S.N., Nevada, 1990; M.S.N., 1993; Ph.D., Vanderbilt, 2003.

Owen, Donna C., Professor and Research Coordinator, 1998. B.A., Case Western Reserve, 1978; B.S.N., 1979; M.S.N., Boston, 1984; Ph.D., Case Western Reserve, 1992.

Pollock, Susan E., Professor, 1994. B.S.N., Ohio State, 1963; M.S.N., Texas, 1974; Ph.D., 1981.

Rodriguez, Isabel, Instructor, 2003. B.S.N., Texas Tech, 1993; M.S.N./F.N.P., 1996.

Saunders, Jana, Associate Professor, 2001. B.S.N., New Mexico, 1974; M.S.N., Virginia, 1982.

Scarrow, Darla, Instructor, 2001. B.S.N., Texas Tech, (Health Sciences Center), 1991; M.S.N., 1995; F.N.P., 1995.

Shaw, Sandra, Instructor, 2002. B.S.N., Texas Tech, 1997.

Slavic, Stacey L. Instructor, 2003. B.S.N., Texas Tech (Health Sciences Center), 1993; M.S.N./F.N.P., 2002.

Scott-Tilley, Donna, Assistant Professor, 1997. B.S.N., Texas Tech (Health Sciences Center), 1991; M.S.N., 1997; Ph.D., Texas (Health Science Center-San Antonio), 2002.

Sridaromont, Kathryn L., Associate Professor, 1981. Diploma, Hotel Dieu School of Nursing (El Paso), 1968; B.S.N., Incarnate Word Coll., 1973; M.S.N., Texas, 1978; N.P., Texas (Galveston), 1992.

Valadez, Ana M., Professor in the Robert's Practicship and Associate Dean, Undergraduate Program, 1994. B.S.N., Incarnate Word Coll., 1958; M.S.N., Boston, 1968; Ed.D., Nova, 1979.

Walulu, Rosemary, Instructor, 1997. M.S.N., Texas Tech (Health Sciences Center), 1996.

Weiss-Kaffie, Cynthia J., Associate Professor, 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.

White, Les, Instructor, 2000. B.S.N., Texas Tech (Health Sciences Center), 1986; M.S.N., Texas (El Paso), 1989; F.N.P., 1996.

Woodward, Tracey, Instructor, 2000. B.S.N., Louisiana State, 1976; M.S.N., Texas Tech (Health Sciences Center), 1999.

Yoder-Wise, Patricia S., Professor, 1979. B.S.N., Ohio State, 1963; M.S.N., Wayne State, 1968; Ed.D., Texas Tech, 1984.

Undergraduate Program

Bachelor of Science in Nursing. For students who are not currently licensed registered nurses (non-licensed 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. A minimum grade point average of 2.25 is required to be considered for admission to the School of Nursing. Admission to the program is competitive.

General requirements for both the non-licensed and RN 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-Fine Arts Elective | 3 |
| U. S. History | 6 |
| Political Science | 6 |
| Introductory Psychology | 3 |
| Introductory Sociology | 3 |
| Human Growth and Development | 3 |
| TOTAL | 52 |

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 Course* Sequence for the Non-Licensed 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 Anat/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 Anat/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 Degree Plan (For Non-Licensed 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.

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 134 credit hours are needed for this degree, including the following: 52 credits of general education requirements, 30 credits of RN-BSN course sequence, and 52 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 or spring semester. There are no course offerings for the RN to B.S.N. student in the summer. Part-time enrollment is available. 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 Course Sequence

| | <i>Semester Hours</i> |
|--|-----------------------|
| 1st Semester | |
| NURS 4801, Professional Nursing Practice | 8 |
| NURS 4601, The Nurse as Leader | 6 |
| and Manager | |
| NURS 4220, The Nurse as a | 2 |
| Consumer of Research | |
| NURS 4304, Advanced Clinical Concepts | 3* |
| 2nd Semester | |
| NURS 4500, The Role of the Nurse | 5 |
| in Community Health | |
| NURS 4301, The Role of the Nurse as | 3 |
| Provider & Consumer of Education | |
| NURS 4305, The Role of the | 3 |
| Professional Nurse | |
| NURS, Elective/Independent Study | 3 |
| TOTAL | 30 |

*This course is often counted with advanced placement hours so is not calculated in total hours of nursing courses at TTUHSC.

Course work is offered from the Lubbock and Odessa campuses. Other sites for the program include Alpine, Brownwood, Cuero, Kerrville/Fredericksburg, McCamey, and Sweetwater. A minimum of five students should be enrolled per site to promote success and educational support among the students.

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.

Graduate Program

The School of Nursing is located in the Texas Tech University Health Sciences Center (TTUHSC) which is a legally separate institution from Texas Tech University. The 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 at Lubbock, Odessa and Hill Country 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. The M.S.N.-Family Nurse Practitioner and Post-Masters Certificate Programs prepare graduates to assume a primary care provider role in rural agencies and other health care settings in underserved areas.

Additionally, the Master of Science 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 ACNP 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.

A sub-focus of nursing administration, the Clinical Research Management Track, is 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 and will be eligible to sit for the Society of Clinical Research Associates (SoCRA) exam. In collaboration with the College of Business, students can obtain an M.S.N.-M.B.A., a dual degree that provides opportunities in leadership and management in health care organizations. These programs offer unique opportunities for the graduate student to receive the latest state-of-the-art nursing education.

Students at the collaborative site (University of Texas at Tyler College of Nursing and Health Sciences) can obtain a M.S.N.-Family Nurse Practitioner, Post-Masters Nurse Practitioner, M.S.N.-Acute Care Nurse Practitioner, and Post-Masters Acute Care Nurse Practitioner from TTUHSC. A Ph.D. in Nursing is offered in collaboration with Texas Women'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 pro-

fession in the discovery, integration, application and dissemination of knowledge.

The Nursing Program is accredited by National League for Nursing Accrediting Commission (NLNAC) and 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.

Applicants to the collaborative programs with Texas Tech University College of Business Administration, the University of Texas at Tyler College of Nursing and Health Sciences, and the Texas Women's University College of Nursing (TWU) are required to contact those schools regarding further admissions criteria. Applicants to these programs will be required to meet the requirements set by both institutions.

Application Information

For further information call 1-800-851-8240 or visit our web site at www.ttunursing.com to download a bulletin and an application.

NOTE: Applications for all campuses should be mailed to the Lubbock Campus, Registrar's Office, Attn: School of Nursing Admissions Evaluator, 3601 - 4th St. MS 8310, Lubbock, TX 79430-8310

Course Descriptions

This section describes all undergraduate and graduate courses taught by departments at Texas Tech University and by three schools within the Texas Tech University Health Sciences Center. The courses are presented by subject area and arranged alphabetically by subject prefix. **For an explanation of how to interpret this information, review pages 12-13 entitled “Reader’s Guide to the Catalog.”**

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Agricultural and Applied Economics (AAEC)

- 2305. Fundamentals of Agricultural and Applied Economics (3:3:0).** Fundamental economic principles and their application to problems and issues in the food, fiber, and natural resource sectors of the economy. F, S, SS. [AGRI 2317]
- 3100. Seminar (1:1:0).** Prerequisite: Junior standing. Assigned readings, informal discussion, outside speakers, and written and oral reports on subjects relating to agricultural and applied economics. F, S.
- 3301. Agribusiness Marketing (3:2:3).** Prerequisite: AAEC 2305 and ENGL 1302. Marketing of raw materials and processed products from the management perspective. Market structure, conduct, performance. Marketing channels. F, S. (Writing Intensive) [AGRI 1325]
- 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.
- 3315. Agricultural Price Theory (3:3:0).** Prerequisite: AAEC 2305, MATH 1331, and junior standing. Basic economic principles with applications to agricultural pricing problems and resource allocations. F, S, SS.
- 3316. Production Economics (3:3:0).** Prerequisite: AAEC 3315. Economic theory and tools for analyzing problems facing the firm. Decision-making process using production functions, costs, linear programming, and time considerations. F, S, SS.
- 3401. Agricultural Statistics (4:3:3).** Prerequisite: College algebra or higher mathematics. Principles and procedures involved in the analysis of agricultural data including indices of central tendency and dispersion; probability; sampling; significance tests; analysis of variance; and simple linear correlation. F, S, SS.
- 4000. Internship in Agricultural and Applied Economics (V1-12).** Prerequisite: Sophomore standing and approval. Supervised study providing in-service training and practice in business and organizations. F, S, SS.
- 4101. Current Problems in Agricultural and Applied Economics (1).** Prerequisite: Senior standing. Topics may vary. May be repeated twice for credit. F, S, SS.
- 4301. Special Problems in Applied Economic Analysis (3).** Prerequisite: AGSC 4300 or approval. Individual instruction in analysis of a research problem. May be repeated with the approval of the department. S. (Writing Intensive)
- 4302. Statistical Methods in Agricultural Research (3:3:0).** Prerequisite: AAEC 3401 and MATH 1331. Advanced agricultural statistical analysis related to research methods using probability theory; tests of statistical significance; multiple correlation and regression; analysis of covariance; and experimental design. S, SS.
- 4303. Property Appraisal (3:3:0).** Prerequisite: AAEC 2305, 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: Department 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 3316. Mathematical tools for analysis of basic 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 (3:2:3).** Prerequisite: AAEC 3316 and 3401. Case studies emphasizing managerial techniques applied to decision-making problems of business firms. F, S. (Writing Intensive)
- 4316. Agricultural Financial Analysis (3:3:0).** Prerequisite: AAEC 3302 or FIN 3320. Principles and procedures in managing financial and credit resources; nature, purposes, and use of financial statements, budgets, and credit instruments; and criteria for decision making in borrowing and lending. S.
- 4317. Commodity Futures Trading and Analysis (3:3:0).** Prerequisite: Junior standing and AAEC 2305. History and characteristics of commodity futures markets, hedging and speculation, and use of futures as a management tool. F, S.
- 4320. Agribusiness Law (3:3:0).** Prerequisite: AAEC 2305 and junior standing. Federal regulatory programs, market orders, Packers and Stockyards Act, bankruptcy. Administrative, environmental, antitrust law, Uniform Commercial Code, in an agribusiness context. F.
- 5301. Special Study in Agricultural and Applied Economics (3).** Individual and group study in advanced topics not covered in other graduate courses. May be repeated for credit. F, S, SS.
- 5302. Food and Agriculture Sector Public Policy (3:3:0).** Prerequisite: AAEC 4305. Analysis of public policies affecting the food and fiber sector; commodity programs, environmental laws, and trade policy. F, 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).** Economic theory and empirical investigations of resource utilization with special emphasis on arid and semi-arid land areas and environmental issues. S.
- 5309. International Economic Development in Food and Fiber Sectors (3:3:0).** Prerequisite: AAEC 3315. World food and development issues; economic development of the food and fiber sector in industrialized and developing economies. F.
- 5310. Advanced Market Analysis (3:3:0).** Prerequisite: ECO 5312 and AAEC 5307. Theoretical and empirical approaches to market structures and market price behavior. S.
- 5312. Agribusiness Analysis (3:3:0).** Prerequisite: AAEC 3315. Application of economic theory and methods to management problems of the business firms in the food and fiber sector. F.
- 5313. Microcomputer Applications in Agribusiness and Research (3:2:2).** Use of microcomputers, software, and design of software for agricultural business and research purposes. Not open to majors. S, SS.
- 6315. Property Appraisal (3:3:0).** Factors governing land prices, valuation. Appraisal for use, sale, lending, condemnation, estate settlement, taxation. Not open to students with AAEC 4303 or equivalent. F.
- 6316. 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.
- 6317. Financial and Commodity Futures and Options (3:3:0).** Mechanics of futures trading, history and functions of futures market. Role of futures and options markets in managing risks. Not open to students with AAEC 4317 or equivalent. F, S, SS.
- 6318. 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.
- 6320. 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.
- 6321. Research Methodology in Economics (3:3:0).** Review of philosophical and conceptual basis of economic research and study of the procedural aspects of designing, planning, and conducting research in economics. S.
- 6000. Master's Thesis (V1-6).**
- 6301. Advanced Special Problems in Agricultural and Applied Economics (3).** Individual study in advanced topics not covered in other graduate courses. F, S, SS.
- 6302. Food, Agriculture, and Natural Resource Policy Analysis (3:3:0).** Prerequisite: AAEC 4305. Analysis of policies, programs affecting food, agricultural commodities, trade, and natural resources. Includes policies in the U.S. and other countries. F.
- 6305. Dynamic Economic Optimization (3:3:0).** Prerequisite: AAEC 5303. Development, use of mathematical economic models emphasizing static and stochastic linear, nonlinear and dynamic processes. S.
- 6308. Advanced Natural Resource Economics (3:3:0).** Prerequisite: AAEC 5308. Advanced economic theory and analysis of environmental and natural resource issues, both domestic and global. F.
- 6310. Demand and Price Analysis (3:3:0).** Prerequisite: 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).**

Accounting (ACCT)

- 2300. Financial Accounting (3:3:0).** Prerequisite: 2.75 GPA and sophomore standing 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).** Prerequisite: 2.75 GPA and ACCT 2300. Uses of accounting information for planning decisions about products and services, activities and processes, suppliers and customers, organizational sub-units, 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.
- 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 Controllorship (3:3:0).** Prerequisite: ACCT 5314 or consent of instructor. Seminar in controllorship 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 or 4305 or 5320. 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 3304 and 5401 or consent of instructor. 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 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 3306, 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.

Agricultural Communications (ACOM)

- 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.
- 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 Agricultural Communications (V1-12).**
- 4001. Agricultural Communications Problems (V1-3).** 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 for credit. F.
- 4300. Advanced Computer Applications in Agricultural Media Production (3:3:0).** Prerequisite: AGED 2302 or equivalent. Computer applications used in development of agricultural

media. Emphasis on desktop publishing, presentation packages, and the use of the Internet.

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.

Apparel Design and Manufacturing (ADM)

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). 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). 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 1320, 1324. Illustration techniques for the fashion figure and rendering of garment details using various media. Includes 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). 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 Fashion Design (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 Fashion Design (3:1:6 each). Prerequisite: A 2.0 cumulative GPA and a grade of C or higher in ADM 3303, 3305, 3310, 4389, 4307, 4309, and 4310. Applied problems in apparel design emphasizing student participation in business and industry.

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, negotiations, management, organizational issues, integrated communications problems. (Writing Intensive)

Advertising (ADV)

2310. Principles of Advertising (3:3:0). Prerequisite: sophomore standing. An overview of the broad field of advertising. Acquaints students with the role of advertising in the American economy and social system and the procedures involved in planning advertising campaigns. [COMM 2327]

3312. Advertising Writing (3:2:3). Prerequisite: ADV 2310, JOUR 2310, and a 2.5 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 2.5 cumulative GPA. A study of the various advertising media to provide students with a knowledge of the use of advertising media, methods of selection, and the skills and background required for media buying.

3361. Advertising Creative Strategy (3:2:3). Prerequisite: ADV 2310 and 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 (V1-3). Prerequisite: Consent of instructor. A hands-on experience in developing and presenting an integrated communications campaign for a business problem or opportunity. May be repeated once for credit.

4300. Individual Study in Advertising (3). Prerequisite: Senior standing, 9 hours of advertising courses, and consent of instructor prior to registration. May be repeated 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.

5326. Advertising and the Consumer (3:3:0). Survey and analysis of current behavioral science findings as related to advertising.

6315. Special Topics in Advertising (3:3:0). A rotating topics course examining theory, research, economics, ethics, performance and practice of advertising. May be repeated twice when topics vary.

7000. Research (V1-12).

Aerospace Studies (AERS)

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.

Agricultural Education (AGED)

2300. Introduction to Agricultural Sciences Development (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. Agricultural Data Base Networks, Information Systems, and Populace (3:3:0). Computer hardware and software used in agricultural data base networks, and the interface with the agricultural populace. F, S, SS.

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.

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. Principles of Agricultural Leadership (3:3:0).** Application of leadership principles with emphasis on interpersonal and personal skills, dynamics of organizational structure, and institutional and agency leadership. For student teaching only.
- 4000. Internship (V1-12).**
- 4301. Agricultural Education Problems (3).** Prerequisite: Senior standing and approval of department chairperson. Individual investigation. May be repeated for credit. F, S, SS.
- 4302. Transfer of Agricultural Technology (3:3:0).** 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.
- 5001. Contemporary Issues in Agricultural and Extension Education (V1-6).** Study current issues and trends in agricultural and extension education and develop plans to improve the disciplines. May be repeated for up to 6 hours credit. F, S, SSI, SSII.
- 5301. Special Problems (3:3:0).** Investigation of problems in agricultural education or extension education of special interest to the student. May be repeated for credit. F, S, SSI, SSII.
- 5302. Research Methods and 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. Advanced Methods in Agricultural Education (3:3:0).** Study and investigation of recent advances, concepts, and current problems in agricultural and extension education. Emphasis on programs for adults. S.
- 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. Doctoral 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 Science (AGSC)

- 1111. The Agricultural Industry (1:1:0).** An overview of agriculture with special topics including orientation, career guidance, and current trends. F, S. [AGRI 1131]
- 2300. Computers in Agriculture (3:2:2).** An introduction to use of computer systems and networks in agricultural applications. Includes networks, spreadsheets, word processing, and data base software. F, S, SSII. [AGRI 1309]
- 2301. Computers in Agriculture II (3:2:2).** Prerequisite: AGSC 2300 or satisfactory performance on placement exam. Introduction to data base management applications, extended application of spreadsheet software, and networked systems. F, S.
- 3301. Agricultural Leadership Principles (3:3:0).** Leadership principles with emphasis on styles of leadership, types of management, group dynamics, managing change, and the adoption process as applied to agriculture and agribusiness.
- 4300. Research Methodology in Agricultural Sciences and Natural Resources (3:3:0).** Prerequisite: Junior or senior standing. Introduction to conceptual issues for organizing, planning, designing, and conducting research in agricultural disciplines.
- 5303. Ecology of Grazing Lands Systems (3:3:0).** A field oriented course on ecology, management, and research in forage-livestock systems.

Agricultural Systems Management (AGSM)

- 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.
- 5301. Investigations in Advanced Agricultural Mechanics (3).** Individual study or investigation of an advanced phase of mechanized agriculture. May be repeated for credit. F, S, SSI, SSII.

Athletic Training (AHAT)

- 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.
- 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.
- 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.
- 5202. Management and Prevention of Injuries (2:1:3).** A study of athletic training room procedures stressing the practical aspects of care and prevention of athletic injury.
- 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.
- 5205. Research Methods II (2:2:0).** Continuation of material introduced in AHAT 5200
- 5206. Clinical Rotation II (2:0:6).** Hands-on experience in athletic training under the supervision of a certified athletic trainer.
- 5208. Management of Acute Injuries (2:1:3).** An advanced athletic training course covering pathomechanics of athletic injuries. Comprehensive analysis of liability risk factors and practical considerations in development of sports emergency care plans, implementation of emergency procedures, and initial injury management.
- 5220. Musculoskeletal Evaluation and Management 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.
- 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.
- 5422. Administration of Athletic Training Programs & Professional Development (4:3:3).** 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 Support Services Management (AHCM)

- 4301. Introduction to Healthcare Management (3:3:0).** Reviews basic healthcare management principles and studies the roles and functions of contemporary healthcare managers.
- 4302. Financial Management for Clinical Supervisors (3:3:0).** Examines the basic principles of financial management related to clinical support activities.
- 4303. Principles of Personnel Management for Clinical Supervisors (3:3:0).** Provides an overview of interpersonal dynamics, conflict resolution, and supervisor responsibilities.
- 4304. Management of Clinical Support 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. Materiel Management for Clinical Supervisors (3:3:0).** An overview of identifying materiel 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.
- 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.
- 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.

Molecular Pathology (AHMP)

- 5100. Issues in Molecular Pathology I (1:1:0).** Presentation of current topics regarding the biomedical application of genetic information using a journal club format. Ethical issues, regulatory issues, and principles of educational methodologies will also be discussed.
- 5101. Issues in Molecular Pathology II (1:1:0).** Prerequisite: AHMP 5100. Basic business and management principles relative to laboratory management and administration will be presented.
- 5102. Issues in Molecular Pathology III (1:1:0).** Prerequisite: AHMP 5101. Graduate seminar. Presentation of graduate research projects.
- 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. Pathology (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. Clinical Preceptorship I.** Corequisite: AHMP 5842. Supervised basic molecular clinical practicum in an affiliated laboratory with emphasis on patient testing and quality assurance.
- 5842. Clinical Preceptorship II.** Corequisite: AHMP 5741. Supervised advanced molecular clinical practicum in an affiliated laboratory with emphasis on patient testing, quality assurance, and case studies assessment.

Allied Health Clinical Laboratory Sciences (AHMT)

- 3015. Special Problems in Clinical Laboratory Science (1-3).** A study of a specific problem in clinical laboratory science under faculty direction.
- 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.
- 4185. Senior Seminar (1:1:0).** Review of current topics 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, Mycology and Virology (4:3:6).** Prerequisite: AHMT 3405 and 3460. Study of medically significant protozoan and helminthic parasites and their vectors, pathogenic fungi, and pathogenic viruses.
- 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.

Occupational Therapy (AHOT)

- 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.
- 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.
- 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).
- 5208. Occupational Therapy Professional Skills III (2:1:3).** Prerequisite: AHOT 5104, 5203. Further study of key practice skills in occupational therapy.
- 5221. Introduction to Research (2:2:0).** Introduction to the research process with an overview of research design, measurement, ethics, proposal development, and support resources specific to research in occupational therapy.
- 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.
- 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.
- 5235. Entrepreneurship for Health Professionals (2:2:0).** Integration of content from previous courses to enhance potential for successfully managing the delivery of health services in a future of constant change.
- 5236. Occupational Therapy Professional Skills II (2:1:3).** Prerequisite: AHOT 5104. Introduction to key practice skills in occupational therapy.
- 5301. Human Physiology (3:3:0).** 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.
- 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.
- 5303. Clinical Kinesiology (3:2:3).** Prerequisite: AHOT 5202. Problem-solving approach to the study of human movement, with emphasis on biomechanics fundamental to understanding physical rehabilitation concepts, musculoskeletal evaluation, and movement dysfunction.
- 5304. Clinical Assessment and Reasoning (3:2:3).** Prerequisite: AHOT 5312, 5104. Introduction to the evaluation process, including selection of assessment tools and methods, administration, interpretation, and documentation.
- 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 (3:0:0).** Prerequisite: AHOT 5104. Study of the profession of occupational therapy including historical and philosophical bases, professional organizations, roles and functions, standards of practice, ethics, cultural diversity, and legal issues.
- 5323. Community Health (3:3:0).** Prerequisite: AHOT 5421, 5423, 5425. Integration of occupational therapy into the healthcare system. Practicing professionals review current concerns affecting health care service delivery outcomes. Expansion of roles, adaptation of existing professional knowledge and appreciation for differences in cultural and social systems are emphasized.
- 5326. Health Organization Management (3:3:0).** Prerequisite: AHOT 5312. Comprehensive review of social, political, economic, and technological factors influencing design, structure, and effective operation of contemporary health care organizations. Focus on applying generally accepted management and organizational theory, concepts and techniques to diagnosing internal and external dynamics of health care organizations and intervening successfully in the design of their structures and processes and the management of their performance.
- 5421. Occupational Function/Dysfunction: Children and Adolescents I (4:3:3).** Prerequisite: AHOT 5306, 5308, 5304. 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.
- 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 5303, 5302, 5308, 5202, 5306, 5433. Overview of the physical, psychological, and cognitive issues commonly seen in adults and the impact of these conditions on occupational performance. Occupational therapy theory and practice related to this population. Focus on occupational therapy process in adult physical rehabilitation, mental health and cognitive rehabilitation settings/programs.
- 5424. Occupational Function/Dysfunction: Adults II (4:3:3).** Prerequisite: AHOT 5500, 5423, 5433. Continues overview of the physical, psychological, and cognitive issues commonly seen in adults and the impact of these conditions on occupational performance. Occupational therapy theory and practice related to this population. Focus on occupational therapy process in adult physical rehabilitation, mental health, and cognitive rehabilitation settings/programs.
- 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. Focuses 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.
- 5433. Current Medical Diagnoses and Treatment (4:4:0).** Prerequisite: AHOT 5500. Etiology, differential diagnosis, prognosis, and medical-surgical management of disorders and injuries in children and adults relevant to occupational therapy practice.
- 5434. Occupational Function/Dysfunction: Adults III (4:3:3).** Prerequisite: AHOT 5424. Continues overview of the physical, psychological, and cognitive issues commonly seen in adults and the impact of these conditions on occupational performance. Occupational therapy theory and practice related to this population. Focus on occupational therapy process in adult physical rehabilitation, mental health, and cognitive rehabilitation settings/programs.
- 5436. Occupational Function/Dysfunction: Older Adults II (4:3:3).** Prerequisite: AHOT 5425. Continues overview of the physical, psychosocial, and cognitive issues commonly seen in older adults and the impact of these conditions on occupational performance. Focuses on the occupational therapy process in a variety of settings.
- 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.
- 5631. 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.
- 5632. Fieldwork II: 2 (6:0:6).** 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.

Physician Assistant (AHPA)

- 5101. Introduction to the Physician Assistant Profession (1:1:0).** This lecture series explores the role and socialization of the physician assistant as a 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.

- 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 Microbiology (3:3:0).** This lecture series describes the significance and interpretation of laboratory studies routinely referred to in the clinical setting. Concepts of microbiology and infectious disease will be examined. This is a distance-learning course taught by interactive teleconferencing from the TTUHSC campus in Lubbock.
- 5302. Physical Examination I (3:2:3).** This is a lecture-laboratory series in which the adult physical examination is demonstrated and practiced. Students will learn and apply the techniques of a comprehensive physical examination with the proper use of diagnostic instruments. The laboratory experience utilizes simulated patients.
- 5303. Physical Examination II (3:2:3).** This is a lecture-laboratory series that is an extension of AHPA 5302. The technique of the physical examination of the pediatric patient, geriatric patient and trauma patient is practiced. Integrating the medical history (learned in AHPA 5310) with the physical examination is reviewed and rehearsed. The laboratory experience utilizes simulated patients.
- 5304. Medical Psychology (3:3:0).** This is a lecture series that distinguishes acute and chronic psychiatric diseases that are frequently encountered in primary care clinical practice. The course will apply interviewing techniques, learned in AHPA 5310 to the approach to patient with a psychiatric illness.
- 5305. Clinical Methods and the Approach to the Patient (3:3:0).** This is a lecture series that analyzes the objective and orderly approach to the patient. The development of a differential diagnosis will be explored. Students will be challenged with clinical simulation vignettes.
- 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.
- 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.
- 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.
- 5405. Pharmacotherapeutics (4:4:0).** This is a lecture series that expands on the concepts learned in AHPA 5202. The action and interaction of pharmacological agents is discussed.
- Therapeutic applications, adverse reactions and contraindications to familiar drugs are considered.
- 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.
- 6201. Medical Ethics & Jurisprudence (2:2:0).** This is a lecture series that examines prominent ethical issues in health care delivery. Students will be engaged in discussion of ethical dilemmas relevant to clinical practice and the unique relationship of the physician and physician assistant. The course will also examine practice statutes and rules regulating physician assistant practice in Texas.
- 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.
- 6303. Introduction to Clerkship (3:3:0).** This is a lecture series that prepares the student for clinical clerkships. Discussions will address appropriate protocol, behavior and dress within the clinical setting. Weekly workshops will enable the student to learn and perform procedures that are essential to clinical practice.
- 6402. Clinical Medicine III (4:4:0).** This is a lecture series that explores specialized and tertiary health care. Students will learn the importance of the relationship between primary care practice and specialty practices. Areas of study will include medical specialties, surgical specialties, and emergency medicine. Technical health care in sophisticated, research and teaching hospitals is evaluated.
- 6403. Health Care Management (4:4:0).** This is a lecture series that informs and prepares the graduate for basic clinical office or hospital practice management. Discussion will emphasize reimbursement issues, coding/billing procedures, licensing and authorization of privileges that are exclusive to physician assistant practice.
- 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.
- 6801. Master Project Tract (8:8:0).** This is a research and writing prospectus. Students must prepare and submit a manuscript for evaluation. The document must be informative, established from evidence based research or it may be a scientific investigation of clinical data gathered by the student. Throughout the course the student will be instructed and monitored in the stages of developing a text suitable for publication.

Physical Therapy (AHPT)

- 5099. Independent Study in Physical Therapy (1-6 hours).** 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 I (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.
- 5108. Clinical Reasoning 1 (1:1:0).** A structured, interactive review of previously presented class material in a facilitation-based learning format.

- 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 5229. 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.
- 5129. Clinical Reasoning 2 (1:1:0).** Prerequisite: AHPT 5108. The process of clinical reasoning is emphasized through the use of clinical cases and emerging practice paradigms for persons with orthopedic conditions.
- 5140. Clinical Seminar (1:1:0).** Prerequisite: AHPT 5149. Integration of the academic and clinical experiences through studies. Research on innovative patient treatment, clinical case study, or management technique. Discussion of current professional topics and issues.
- 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.
- 5146. Research Process 4 (1:1:0).** Prerequisite: AHPT 5128. As a continuation of material presented in Research Process 3, this course will emphasize the out-of-classroom collection and analysis of data by student research groups, acting under the guidance of their principal investigators.
- 5147. Research Process 5 (1:1:0).** Prerequisite: AHPT 5246. This course is the culmination of the Research Process courses. Student research groups complete their group research projects under the guidance of a faculty research advisor. Emphasis is placed on preparation of a manuscript that is suitable for submission to a peer-review scientific journal, and preparation of audiovisual materials for presentation at a professional meeting. A manuscript, poster and platform presentation of research findings are required of all student research groups.
- 5149. Clinical Reasoning 3 (1:1:0).** Prerequisite: AHPT 5129. The process of clinical reasoning is emphasized through the use of clinical cases and emerging practice paradigms for persons 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.
- 5154. Introduction to Athletic Training (1:1:0).** Focus on introducing the physical therapy student to the field of athletic training.
- 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 musculo-skeletal, cardiovascular and central nervous system.
- 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 5529. 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.
- 5229. Research Process 2 (2:2:0).** Prerequisite: AHPT 5126. Covers parametric and non-parametric inferential statistics, with an emphasis on conceptual understanding of statistics and the interpretation of results of statistical analysis in physical therapy research. Theoretical information includes concepts of probability and descriptions of probability distributions.
- 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 5341. 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: Human Anatomy and 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 5529, 5444. 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, arthrogyposis 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.
- 5345. Health Care Business Administration (3:3:0).** Prerequisite: AHPT 5240. The process involved with organizing, directing, developing, and measuring the management and entrepreneurial components of a physical therapy practice.
- 5361. Special Topics 1 (3:3:0).** Focus on basic athletic training skills for physical therapists
- 5362. Special Topics 2 (3:3:0).** Focus on advanced athletic training skills for physical therapists.
- 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. This course consists of an 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 5420, 5320. 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/arthritis, 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 & 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 1st disc related disorders, as well as dysfunction at the sacroiliac joint. 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, treatment to 1st disc afflictions, and joint-specific treatment measures to the sacroiliac joint.
- 6212. Advanced Clinical Practice for Lumbar Secondary Disc Afflictions (2:2:0).** Examination and treatment of 2nd 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 bio-mechanical 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.
- 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.
- 5314. Administration and Management (3:3:0).** Exploration of critical issues in the administration and management of VR services. Includes a review of the organizational structure of public rehabilitation services, the role of the private sector and non-profit organizations in VR delivery, financial resources for rehabilitation services, and cross-disciplinary liaison.
- 5315. Special Topics/Seminars in Rehabilitation Counseling (3:3:0).** Specialized seminars or courses in specific areas of VR as identified by faculty, students, or the community.
- 5321. Vocational Assessment (3:3:0).** Exploration of the approaches, techniques, instruments, and interpretation of vocational assessment, with a strong emphasis on the identification and integration of assessment information from a multi-disciplinary perspective.
- 5322. Employment Development and Placement (3:3:0).** The roles and techniques involved in the development of employment options and placement of persons with disabilities in employment are explored in-depth. Topic areas to be explored include job analysis, job development, work site modification, ergonomics, role of assistive technology, job placement, employer contacts, supported employment, post placement support, job coaching, and building natural supports.
- 5342. Rehabilitation and Substance Abuse (3:3:0).** This course will provide instruction in the issues and treatment of substance abuse as they pertain to persons with disabilities. Attention will be given to treatment modalities, exploring research topics, and building counseling techniques appropriate for this area of service provision.
- 5344. Assistive Technology (3:3:0).** The role of technology in assisting persons with disabilities is reviewed. Applications of assistive technology in VR are explored, with particular emphasis on the use of technology in enhancing employment access and performance.
- 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.
- 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)

- 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. Rehabilitative theory and practice consists of current practice patterns, paradigms, and theoretical treatment models.
- 5302. Social and Cultural Dimensions of Rehabilitation (3:3:0).** Gives students an understanding of the influence of social-economic factors such as age, gender, ethnicity, race, and social-economic status on health care delivery. The goal is to give the practicing clinician a more effective background to provide a culturally competent approach to care.
- 5303. Quantitative Research Methods (3:3:0).** Provides students with 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).** Current medical issues (such as neurological, cardiopulmonary, and orthopedic), that influence the treatment decision-making model in practice are discussed by physicians or medical experts.
- 5306. The Health Care Delivery System (3:3:0).** Provides students with the basic understanding of 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.

Rehabilitation Counseling (AHRc)

- 5301. Foundations of Rehabilitation Counseling (3:3:0).** Introduction to the history and philosophy of rehabilitation, and the legislative and policy background underpinning the modern delivery of rehabilitation counseling services.

- 5307. Health Care Management (3:3:0).** The process involved with organizing, directing, developing, and measuring the management components of a physical medicine practice, including personnel management and the process involved in organizing, directing, developing, and measuring the management components of a physical medicine practice.
- 5308. Rehabilitative Management Theories (3:3:0).** Reimbursement, industry, and ethical issues currently evolving within the rehabilitation professions are focuses within this course. This discussion and interactive-based program capitalizes on a broad range of management techniques to deal with a changing environment.
- 5309. Leadership Concepts and Skills within Rehabilitation (3:3:0).** Organizational leadership and management techniques for clinicians, supervisors and associates with the rehabilitative field are presented. Focus groups, team building, and synergistic mechanisms are discussed.
- 5310. Professional Development Seminar (3:3:0).** Enhances the student's growth through professional development, including effective communication, education, professionalism, ethical issues, and health promotion.
- 5311. Health Care Finance and Resource Management (3:3:0).** Increases the student'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).** Components associated with business entry, budgeting, and business progression, including entrepreneurial skills, marketing, project development, and market growth. Industry life cycles and product life cycle reviews are critical to the class content.
- 5313. Theory of Gerontology (3:3:0).** This course examines the theories related to why the human being ages. In addition to theory, a retrospective analysis of geriatric adaptation to environment influences is investigated, within a rehabilitative realm, as well as the general medical environment.
- 5314. Physiological Aspects of Aging (3:3:0).** Age-related physical changes and the functional results of these changes, assessment and treatment considerations as well as literature regarding current break-throughs in geriatric physiology are discussed.
- 5315. Dynamics of Aging (3:3:0).** An in-depth study of physiological as well as psychosocial changes that affect the aging adult in later years is the focus within this course. A holistic approach to aging, disease prevention, and health promotion will be emphasized and investigated.
- 5316. Consumer Aspects of Aging (3:3:0).** Examines the role of the aging consumer, including consumption of medical services, elderly fraud and abuse, and methods of educating older adults to be knowledgeable health care consumers.
- 5317. Issues in Aging (3:3:0).** This course focuses on public policy, legislative processes, insurance and financial planning, retirement income, protective services, and legal issues that affect older individuals.
- 5318. Aging Internship or Research (3:3:0).** Students are offered the choice of doing an independent comprehensive literature review, research, or practice-based work related to gerontology.
- 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.
- 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 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.
- 5010. Independent Study (V1-3).** A variable credit 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).** A summary of the basic concepts of science and research. Emphasis is placed on the nature of experimental designs and basic inferential statistical analyses, and the application of relevant research methodologies in clinical settings.
- 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.
- 5323. Language Development (3:3:0).** A study of contemporary literature on first language acquisition. Includes examination of biological and cognitive substrates of language acquisition, relevant research methodologies, and atypical language development, with implications for language intervention.
- 5325. Childhood Speech Disorders (3:3:0).** Current approaches to assessment and management of pediatric speech disorders and developmental phonological disorders in special populations.
- 5327. Clinical Neuroscience (3:3:0).** Problem-solving, case study approach to the relationships between pathophysiology of the nervous system and clinical symptomatology as it relates to disorders of speech, language, cognition and swallowing.
- 5328. Seminar in Voice Disorders (3:3:0).** An 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).** 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.
- 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.
- 5390. Graduate Clinical Practicum: Audiology (3:3:0).** Supervised clinical practice in audiology.
- 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,

Speech-Language Pathology (AHS�)

- 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.

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.
- 7321. Clinical Observation and Methods (3:0:3).** Supervised observation of clinical assessment and management of individuals with communication disorders.
- 7322. Management Principles of Health Clinics (3:3:0).** Introduction to the management aspect of modern healthcare clinics. Topics include management of personnel, reimbursement issued in managed healthcare, patient/resource scheduling and responsibilities, interfacing with other healthcare professionals, data collection, and analysis and reporting for fiscal management of clinical activities.
- 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.
- 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. Medical Aspects of Audiology (3:3:0).** The purpose of this course is to provide students with information to understand the following areas: 1) the anatomy and physiology of auditory mechanisms and lowering areas; 2) etiology and pathology of auditory disorders; and 3) audiological and otologic evaluation/management of auditory disorders.
- 7355. Hearing Conservation and Instrumentation (3:3:1).** 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.
- 7364. Electrophysiology I: Auditory System (3:3:1).** First of a two-part sequence covering theoretical knowledge and applied skills of normal and pathological auditory and vestibular systems. Includes laboratory.
- 7365. Electrophysiology II: Vestibular System (3:3:1).** Second of a two-part sequence covering advanced measures of auditory and vestibular systems. Includes laboratory.
- 7370. Cochlear Implants (3:3:0).** Electrophysiology of implantable devices. Also includes processor strategies, and speech/language learning in prelingually deafened listeners.
- 7373. Neuroaudiology (3:3:0).** Focus on neuroanatomical and neurophysiological principles underlying stimulus processing by the auditory system. Assessment and treatment strategies for neuroaudiological disorders, including adaptations of procedures for culturally diverse populations will be discussed.
- 7375. Professional Issues in Audiology (3:3:0).** Overview of the social, political, and economic climate in hearing health care delivery. Basic and advanced strategies for practice management and development. Interprofessional relationships and responsibilities. Supervision of other professionals.
- 7376. Research Symposium (3:3:0).** Seminar discussion on applied research techniques in the field of audiology. Emphasis is placed on analyzing research applied to patients across the lifespan.
- 7379. Audiology Grand Rounds (3:3:0).** Clinical analysis, diagnosis, treatment of different cases, the integration of clinical decision-making, diagnostic reasoning, and treatment justification abilities to a variety of clinical presentations.
- 7385. Externship in Audiology (3:3:0).** Intensive supervised case management within an on-going clinic on or off the campus. May be repeated for credit.
- 7390. Clinical Practicum (3:3:0).** Supervised clinical practicum in audiology. May be repeated for credit.
- 7442. Psychoacoustics (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.
- 7445. Advanced Clinical Amplification (4:3:1).** Advanced topics in clinical amplification including programmable instruments, digital processing and digital amplification, multi-microphone technology and other noise reduction systems will be presented.
- 7446. Advanced Clinical Audiology (4:3:1).** This course will present advanced diagnostic techniques for children and adults including those from diverse populations or with special needs.
- 7449. Anatomy & Physiology of the Auditory System (4:3:1).** Intensive and advanced study of recent developments in auditory-vestibular anatomy and physiology. Includes gross aspects of the temporal bone and cytoarchitectonics of the labyrinth. Laboratory exercises reinforce didactic material.
- 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.
- 7544. Clinical Amplification (5:0:0).** A comprehensive introduction of amplification devices, methods, and techniques. Consideration of special populations and their diverse needs will also be included.

Animal Science (ANSC)

- 1401. General Animal Science (4:3:3).** The application of basic scientific principles to the efficient production of domestic animals. Students must enroll in lecture, lab, and discussion concurrently. F, S.
- 2201. Animal Science Practicum (2:0:4).** Hands-on management practices for farm animal care. Students will develop proficiency in care, handling, and routine procedures for swine, sheep, beef cattle, and horses. F, S, SS.
- 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, and use of nutrients and their metabolites. F.
- 3302. Livestock Production (3:3:0).** The application of scientific and technological advances to production practices in range beef cattle, sheep and goats, swine production, and feedlot practices. Not open to animal science majors. S.
- 3303. Introductory Horse Management (3:3:0).** An introduction to all aspects of equine management including selection, herd health, reproduction, nutrition, behavior, and marketing. F.
- 3304. Management and Training of Horses (3:0:6).** Prerequisite: 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, 1306. The fundamental metabolic principles of nutrition will be developed into concepts applicable to problem solving and situation use in the field. Nutrition-disease involvement. Not open to animal science majors. Will not qualify as prerequisite to ANSC 3307. S, SSI.
- 3306. Animal Diseases (3:3:0).** Diseases of farm animals, both infectious and noninfectious, parasites, parasitic diseases, and the establishment of immunity through the use of biological products. S.
- 3307. Feeds and Feeding (3:2:2).** Prerequisite: ANSC 3301. Characteristics of feedstuffs used in livestock enterprises. Ration formulation and nutritional management of beef and dairy cattle, sheep, goats, swine, and horses. Methods of processing and evaluating feeds. S.
- 3308. Quality Control and Management of Feed Manufacturing (3:1:3).** Application of scientific principles and practices to quality control and management of feed manufacturing with respect to their effects on animal performance.
- 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.
- 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. Majors only. 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 will be studied.
- 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; may take only one of above concurrently. Sheep, goat, wool, and mohair production management and marketing practices. Field trips to ranches and feedlots. S.
- 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 (nthesis) 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).** Lecture, discussion, and seminar on current society issues facing animal and meat science. F.
- 5302. Advanced Beef Production (3:3:0).** Advanced study of beef production and management. Emphasis on the application of current research to improve the efficiency of beef production. SS, even years.
- 5303. Advanced Beef Cattle Feedyard Management (3:3:0).** Emphasis on the application of recent research to improve the management of cattle feedyard operations. Special emphasis will be placed on risk and resource management within the feedyard.
- 5304. Growth and Development (3:3:0).** A study of differentiation, development, growth, and fattening of domestic animals and hereditary and environmental influences and interactions. SS.
- 5305. Advanced Livestock Production (3:3:0).** Prerequisite: ANSC 3302. Advanced study of current research and on-farm practices of livestock production. Not open to animal science majors. S, SS.
- 5306. Advanced Animal Breeding (3:3:0).** Prerequisite: ANSC 3402 or equivalent. Advanced topics in selecting and mating farm animals with the objective of making genetic improvement. Emphasis on breeding value estimation and crossbreeding. S, odd years.
- 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 (3:2:3).** A study of the digestive physiology of ruminants. Emphasis on rumen fermentation and its relationship to practical nutrition. Individual topics and current research information. 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.
- 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.
- 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).**
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Anthropology (ANTH)

- 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).** 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. [ANTH 2301]
- 2301. Introduction to Archaeology (3:3:0).** Introduces archaeology and what it has told us about our past, from the earliest beginnings to the birth of civilization.
- 2302. Cultural Anthropology (3:3:0).** The rich complexity of peoples and cultures in the world as studied by anthropologists. Discussion of basic concepts such as ethnography, ethnocentrism, kinship systems, gender, and culture exchange. (Honors section and Spanish language section offered in some semesters.) [ANTH 2351]
- 2305. Forensic Anthropology (3:3:0).** An introductory lecture course covering forensic anthropology. Topics include skeletal biology, forensic archaeology, age/sex identification, DNA and bone trauma, and courtroom and ethical responsibilities of the forensic anthropologist.
- 3300. Anthropology and Contemporary Life (3:3:0).** An anthropological approach to topics of current interest in American culture. Content varies. Topics have included anthropology and literature, the writings of Carlos Castañeda, evolution vs. creation, and sex and gender. May be repeated for credit.
- 3304. Global Forces and Local Peoples (3:3:0).** Prerequisite: ANTH 2302 or consent of instructor. Anthropological perspective on critical problems facing humanity: the aftermath of colonialism, the fate of indigenous peoples, changing family systems, and the reassertion of ethnic identity.
- 3305. Anthropological Linguistics (3:3:0).** A survey of the origins and development of human language, phonological and grammatical characteristics of languages, and distribution and relationship of languages and language families.
- 3306. Women in Culture and Society (3:3:0).** A comparative study of sex and gender in human society; biological and cultural factors that influence women's roles, status, and their contributions to cultural institutions. Counts toward women's studies minor. (W S 3306)
- 3310. Human Evolution (3:2:3).** Prerequisite: ANTH 2300 or consent of instructor. Study of human

- origins and evolution as a mammal, primate, and bioculturally adapting species. Emphasizes principles in evolution and systematics and recent discoveries in paleoanthropology.
- 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 2300 and 2301 or ANTH 2305. Intensive study of skeletal anatomy emphasizing subadult and adult morphological variation. Includes lab work on trauma analysis; age, sex, and stature characteristics; and postmortem, perimortem, and antemortem assessment.
- 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 Indian 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.
- 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).**

Architecture (ARCH)

Courses with an asterisk (*) are open only to architecture majors or to students having permission of the Dean.

- 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 Ancient Through Baroque Architecture (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. Building Systems (3:3:0).** Corequisite or credit in: ARCH 2401. A study of basic building materials and their development into components for use in construction.
- 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: ARCH 1311, 1412, 1442. Corequisite or credit in: ARCH 2351. An introduction to architectural design addressing issues of perception, conceptual design, structural order, materials, and application of three-dimensional processes of architectural design. Outside assignments required. F.
- 2402. Architectural Design Studio II* (4:1:8).** Prerequisite: ARCH 2401. Theory and principles of architecture as they are applied to the design of structural assemblies and buildings components. Outside assignments required. S.
- 3312. Theory in Architecture (3:3:0).** Prerequisite: Junior standing. Examination of theoretical issues in architecture through critical reading of texts selected from Vitruvius to the most contemporary thinkers in relation to emerging design challenges. S.
- 3313. Contemporary Residential Architecture Theory (3:3:0).** A study and analysis of trends in 20th century, single-family residential architecture in North and South America and Europe. Illustrated lectures.
- 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. Building Technology (3:1:2).** Prerequisite: ARCH 2351. A study of assemblies of building construction components for the aesthetic and technological development of integrated building systems performance.
- 3353. Environmental Systems I (3:3:0).** Prerequisite: ARCH 2351 and 2402. Introduction and analysis of the various systems of human comfort within the built environment including artificial lighting, daylighting, and thermal design with consideration for building orientations and selection of building components. F.
- 3354. Environmental Systems II (3:3:0).** Introduction and analysis of various systems for heating, ventilating, and air conditioning, designing electrical and plumbing piping systems, acoustical material and design, and solutions for vertical transportation. S.
- 3361. Design Workshop (3:3:3).** Special projects and project development in architectural design. May be repeated for credit.
- 3362. Product Design Workshop (3:0:6).** Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. May be repeated for credit. S.
- 3373. Environmental Analysis-Site Planning (3:3:0).** A basic course to develop a working knowledge of the techniques and principles involved in site planning to provide optimum living and working environments.
- 3501. Architectural Design Studio III* (5:2:8).** Prerequisite: Completion of first two years of the architectural degree plan courses in their entirety; cumulative architecture GPA and overall GPA 2.25. Organization of space into a complex building entity with investigation of site conditions, structure, spatial qualities of scale and proportion, daylighting, and materials. Outside assignments required. F.
- 3502. Architectural Design Studio VI* (5:2:8).** Prerequisite: ARCH 3501. Integration of architectural design with program development, context, building technology, environmental systems, and building codes. Outside assignments required. S.
- 4000. Research in Architecture and Urban Studies (V1-6).** Prerequisite: Advanced standing and approval of the Dean. Individual studies of special interest in advanced architecture, history of architecture, and city planning. May be repeated for credit.
- 4091. Architectural Internship* (V1-6).** Prerequisite: Completion of all academic course work through the third year and 2.5 GPA in architectural course work. Individual study provides opportunities for professional experience as an intern in an architectural firm.
- 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* (3:2:4).** 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/Build 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.
- 4391. Architectural Professionalism and Processes (3:3:1).** Prerequisite: Senior standing in architecture curriculum. 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.
- 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.
- 5091. Graduate Architectural Internship (V1-6).** Prerequisite: College approval. Individual study provides opportunities for professional experience as an intern in an architectural firm. May be repeated for credit.
- 5301. Special Problems in Architecture (3).** Prerequisite: College approval. Individual study projects in architecture of special interest to students. May be repeated for credit. Particularly useful for Interdisciplinary Studies master's program.
- 5302. Product Design Workshop (3:0:6).** Introduction to the design and executed construction of a prototypical piece of furniture or other design product using an architectural design process. F.
- 5311. Special Problems in Architectural History (3).** Individual advanced studies in architectural history of special interest to the student. May be repeated for credit.
- 5313. 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 2312 or approval of instructor. History of American Cultural expression, using buildings as a vehicle for exploring diverse issues including race, class and gender. Time period covers Pre-Contact to 1865.
- 5320. History of American Architecture: 1865 to the Present (3:3:0).** Prerequisite: ARCH 2312 or approval of instructor. History of American Cultural expression, using buildings as a vehicle for exploring diverse issues including race, class and gender. Time period 1865 to present.
- 5321. Historic Building Technology and Documentation (3:3:0).** Survey of techniques of restoration and stabilization of historic buildings; standards of workmanship; traditional methods and new technologies. Survey of documentation techniques and preservation design.
- 5324. History and Theory of Historic Preservation (3:3:0).** Survey of theory and practice of historic preservation and restoration; overview of the history of the preservation movement in the U.S.
- 5325. Conservation Policies (3:3:0).** Survey of federal and state enabling legislation; federal, state, and local policies on historic preservation and urban design, discussion of redevelopment strategies.
- 5326. History of American Architecture: Pre-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 western / nonwestern Architectural history involving written and oral analysis of scholarly sources. Topic varies and may include preservation, class, race and/or gender issues. (Writing Intensive)
- 5340. Design Visualization Seminar (3:3:0).** Prerequisite: Approval of the instructor. Critical readings, discussions and writing assignments on issues pertaining to design visualization. Topics may vary per semester. May be repeated for credit.
- 5341. Internet Media for Visualization Design (3:2:2).** 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. Theory of Architecture (3:3:0).** Architecture as art, science, and a contemporary philosophical concept. Exploration of context and goals. Illustrated lectures. May be repeated for credit.
- 5362. Theory in Architecture (3:3:0).** Examination of theoretical issues in architecture through critical reading of texts selected from Vitruvius to the most contemporary thinkers in relation to emerging design challenges. 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.
- 5373. Environment and Site (3:3:0).** Physical and cultural environment analysis and examination of architectural responses.
- 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.
- 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. Thesis Research, Programming, and Schematics (3:3:1).** Prerequisite: ARCH 5365; corequisite or prerequisite ARCH 5362. Guided individual research and programming of an architectural topic, facility, and context and schematic design leading toward a comprehensive architectural thesis 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).** Prerequisite or corequisite: ARCH 5362. 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 Studio (6:0:12).** Research on current preservation issues. Individual projects required.
- 5692. Architectural Design Thesis (6:0:12).** Prerequisite: ARCH 5362, 5395, 5604, and 5605. Design and documentation of a comprehensive architectural thesis project researched, programmed, and schematically articulated in ARCH 5395.
- 6000. Master's Thesis (V1-6).**
- 7000. Research (V1-12).**

Art (ART)

- 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).** 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. [ARTS 1311]
- 1303. Drawing Introduction (3:0:6).** Investigation of a variety of media, techniques, and subjects. Students develop perceptual, descriptive, and verbal skills with consideration of drawing as a conceptual process as well as an end in itself. Outside assignments. AP or portfolio waiver possible. [ARTS 1316]
- 1309. Art Appreciation (3:3:0).** Survey of the visual arts of western and nonwestern cultures with emphasis on understanding art through form, content, and cultural context. Nonmajors and art minors only. [ARTS 1301]
- 1310. Art History Survey I (3:3:0).** A survey of painting, sculpture, architecture, and the minor arts from prehistoric times to the 14th century. AP waiver possible. [ARTS 1303]
- 2303. Design II Introduction (3:0:6).** Prerequisite: ART 1320 or concurrent enrollment. Emphasis on the three-dimensional concept of design. Students learn to apply verbal skills needed in advanced visual arts. Outside assignments. [ARTS 1312]
- 2304. Drawing II Introduction (3:0:6).** 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. [ARTS 1317]
- 2311. Art History Survey II (3:3:0).** A survey of painting, sculpture, architecture, and the minor arts from the 14th through 19th centuries. AP waiver possible. [ARTS 1304]
- 3300. Ceramics I Introduction to Wheel (3:0:6).** Prerequisite: Freshman studio core. Introduction to wheel throwing, glazing and firing. Outside assignments. [ARTS 2346 or 2347] TAS
- 3301. Ceramics I Introduction to Handbuilding (3:0:6).** Prerequisite: Freshman studio core. Introduction to handbuilding techniques, glazing, and firing. Outside assignments. [ARTS 2346 or 2347] TAS
- 3308. Printmaking I Introduction (3:0:6).** Prerequisite: Freshman art core. Introduction to printmaking with sections designated for waterbase screenprinting, lithography, monoprints, woodcut, or etching. Outside assignments. Repeatable once for credit with different emphasis. [ARTS 2333 or 2334] 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. (Writing Intensive)
- 3312. Art History Survey III (3:3:0).** Prerequisite: ART 1309, 1311, 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.
- 3313. Latin American Art (3:3:0).** Prerequisite: ART 1311 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, 1311, or consent of instructor. Begins with the 18th century, then focuses on Impressionism, Post-Impressionism, Symbolism, and the French ambience from which these movements emerged. (Writing Intensive)
- 3317. Baroque Art (3:3:0).** Prerequisite: ART 1309, 1311, 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, 1311, 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 1311 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: Freshman studio core. Introduction to painting concepts and techniques with designated sections for watermedia or oil. Outside assignments. Repeatable once for credit in different emphasis. [ARTS 2316, 2317, or 2366]
- 3322. Advanced Painting (3:0:9).** Prerequisite: ART 2322 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: Freshman 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. [ARTS 2323]
- 3324. Advanced Life Drawing (3:0:9).** 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: ART 1320 and 1324. Introduction to creative black and white photography. Covers camera operation, exposure adjustments, film development, printing, and presentation. Outside assignments. Repeatable for credit. [ARTS 2356 or 2357] TAS
- 3326. Advanced Photographic Arts (3:0:9).** Prerequisite: ART 2326 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 (3:0:9).** Prerequisite: ART 2328 or consent of instructor. Advanced printmaking with topics that rotate each semester between in-depth study of printmaking methods of screenprinting, lithography, intaglio, or relief printing. Outside assignments. Repeatable for credit. TAS

- 3329. Introduction to Digital Imaging (3:0:6).** Prerequisite: Basic Macintosh experience or 3 ATLC workshops. Introduction to digital image making for photographers, designers, and 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 (3:0:9).** 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 (3:0:9).** 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. [ARTS 2341 or 2342] TAS
- 3334. Advanced Metal and Jewelry Design (3:0:9).** Prerequisite: ART 2334 or consent of instructor. 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. [ARTS 2326 or ARTS 2327] 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. [ARTS 2326 or ARTS 2327] TAS
- 3338. Advanced Sculpture: Issues in Metal Fabrication (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** Prerequisite: Freshman studio core. Overview of the role of the visual arts in personal, social, and institutional contexts.
- 3362. Technology in the Visual Arts (3:0:9).** Prerequisite: Art core or consent of instructor. Instructional and studio emphases on technology in the visual arts. Outside assignments. TAS
- 3364. Foundations Art in Social Instruction (3:0:9).** Prerequisite: ART 2364. Examination of historical, political, and pedagogical issues and policies of the visual arts in institutional settings.
- 3365. Visual Culture (3:0:9).** Examination of contemporary thought and practice in the visual arts.
- 3372. Rethinking Art Education (3:0:9).** Contemporary content and teaching in the visual arts.
- 3381. Typography (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** 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 page layout, vector drawing, file integration, and digital production will be introduced including digital peripherals as they relate to image capture.
- 3386. Computer Design Methods II (3:0:6).** Prerequisite: Program acceptance. Introduces technical aspects of raster graphics. Stresses use of digital peripherals to capture and construct images, file integration, and digital production.
- 3387. Design Ideas (3:0:6).** 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)
- 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 (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** Prerequisite: ART 3328 consent of instructor. Problems in printmaking areas. Controlled projects and individual criticism. Outside assignments. Repeatable for credit. TAS
- 4329. Advanced Digital Photo Imaging (3:0:9).** Prerequisite: ART 2326 and 2327. 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 (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** Prerequisite: ART 1382, 3381, and 2320 (drawing 03). Exploration of illustration through structured practical application. Image making, concept, style, appropriateness of imagery, and interpretation of narrative will be stressed.
- 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.
- 4356. Packaging (3:0:9).** Prerequisite: ART 3382 and 3383. Study and design of three-dimensional form and surface. Stresses problem solving and innovative thinking as they relate to the environment and ecological concerns.
- 4357. Online Media (3:0:9).** Prerequisite: ART 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.
- 4358. Motion Graphics. (3:0:9).** Prerequisite: ART 3384. Explores the interactive effects of time and motion, including visual rhythm, continuity, and relationship between form and content of visual communication.
- 4362. Curriculum Theory and Instruction Methodology in Art (3:0:9).** Prerequisite: ART 3364, 3365, or consent of instructor. Art teaching methodologies, including curriculum design, classroom organization and management, assessment strategies, and teaching effectiveness evaluation.
- 4365. Visual Studies Seminar (3:2:4).** Seminar focusing on teaching theories, curriculum development, communication strategies, real-life teaching scenarios, and student teaching preparation.
- 4380. Publication Design (3:0:9).** Prerequisite: ART 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 (3:0:9).** 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 (3:0:9).** Prerequisite: Must pass portfolio review. Emphasizes resume development and final portfolio preparation and refinement. Discusses 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. May be repeated for credit with different emphasis.
- 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. May be repeated for credit with different emphasis.
- 5314. The Visual Arts in Contemporary Context (3:3:0).** Contemporary issues in the field: current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multicultural issues, censorship).
- 5315. Arts of the Indian Americas (3:3:0).** Prerequisite: Instructor approval. Examines art, culture, and architecture of North, Central, or South American Indians. May be repeated for credit with different emphasis.
- 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. May be repeated for credit with different emphasis.
- 5319. 20th-Century Visual Art (3:3:0).** An examination of major developments in 20th-century painting, sculpture, graphic, and ceramic art. May be repeated for credit with different emphasis.
- 5320. Graduate Drawing (3:0:9).** Prerequisite: Instructor approval. The development and execution of advanced problems in drawing. May be repeated for credit.
- 5322. Graduate Painting (3:0:9).** Prerequisite: Instructor approval. The development and execution of advanced problems in painting. May be repeated for credit.
- 5326. Graduate Photography (3:0:9).** Prerequisite: Instructor approval. Experimental investigation into varied aspects of photography as creative media. May be repeated for credit.
- 5328. Graduate Printmaking (3:0:9).** Prerequisite: Instructor approval. The development and execution of advanced problems in printmaking. May be repeated for credit.
- 5330. Graduate Ceramics (3:0:9).** Prerequisite: Instructor approval. The development and execution of advanced problems in ceramics. May be repeated for credit.
- 5331. Ceramic Raw Materials (3:0:9).** 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 (3:0:9).** 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 (3:0:9).** 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).**
- Astronomy (ASTR)*
- 1100. General Astronomy Laboratory I (1:0:2).** Corequisite: ASTR 1300. Use of telescopes and other instruments such as cross-staff, quadrant, and spectroscope. Observation of the sun, planets and their moons, stars, nebulae, our galaxy, and other galaxies. [PHYS 1111]
- 1101. General Astronomy Laboratory II (1:0:2).** Corequisite: ASTR 1301. Astronomic observations with instruments and telescopes. Stellar spectra, classification, and photometry. (Honors section offered.) [PHYS 1112]
- 1300. Solar System Astronomy (3:3:0).** Corequisite: ASTR 1100. Structure of the solar system. Gravitation, light, and orbits of the solar system. Planets and their moons, asteroids, and comets. [PHYS 1311]
- 1301. Stellar Astronomy (3:3:0).** Corequisite: ASTR 1101. Structure, models of the universe. Stellar evolution. Gravitation, light, orbits of the stars and galaxies. Endpoints of stellar evolution. (Honors section offered.) [PHYS 1312]
- Atmospheric Science (ATMO)*
- 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.
- 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 objective 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).**

Business Administration (B A)

- 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 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 prior to employment) by internships toward a degree program.
- 4383. Special Topics in Business (3:3:0).** Prerequisite: Determined by area. Examination of specialized problems including such varied topics as working capital management, commodity and financial futures investment, and small business finance. May be repeated once for credit with no duplication of topic.
- 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.
- 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.
- 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).**

Biological Informatics (BINF)

- 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)

- 1113. Environmental Problems Laboratory (1:0:3).** 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).** An introduction to ecological principles and the analysis of environmental problems. Not for major credit. BIOL 1401, 1402, 1305, and 1306 may be taken in any sequence or simultaneously. Fulfills the lecture component of the natural sciences requirement.
- 1306. Biology of Sex (3:3:0).** An introduction to the diversity of reproductive modes in organisms and issues such as human reproduction, the evolution of sex, and mating systems. BIOL 1401, 1402, 1305, and 1306 may be taken in any sequence or simultaneously.
- 1401. Biology of Plants (4:3:3).** An introductory coverage of plant-environment interactions and plant structure and function as they relate to our understanding of the plant world. Expressly designed for students not majoring in a biological science. Will fulfill laboratory science requirements. BIOL 1401 and 1402 may be taken in any sequence or simultaneously. [BIOL 1411]
- 1402. Biology of Animals (4:3:3).** An introductory coverage of animal-environment interactions and animal structure, function, and behavior as they relate to our understanding of the animal world. Expressly designed for students not majoring in a biological science. BIOL 1401 and 1402 may be taken in any sequence or simultaneously. [BIOL 1413]
- 1403. Biology I (4:3:3).** Prerequisite: One year of high school biology. Enrollment as a freshman requires a minimum composite SAT1 score of 1100, or a minimum composite ACT score of 24, or a minimum AP Biology score of 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. [BIOL 1406]
- 1404. Biology II (4:3:3).** Prerequisite: BIOL 1403. Fundamentals of organismal biology, population biology, and biological diversity. Second semester of an integrated course for majors in biological and related sciences. [BIOL 1407]
- 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 the theory of population biology with a focus on demographic models and interspecific interactions, including competition, predation, and mutualism.
- 3309. Principles of Ecology (3:3:0).** Prerequisite: An introductory course in biology. 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: One year of introductory biology. 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.
- 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 or ecology of populations including a survey of topical, historic, and current literature with emphasis on experimental evaluation of testable hypotheses. S.
- 6000. Master's Thesis (V1-6).**
- 6100. Advanced Topics in Biology (1).** Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
- 6101. Seminar (1:1:0).** Various topics in modern biology. May be repeated for credit.
- 6202. Preparation for Graduate Learning and Teaching in Biology (2:2:0).** Prerequisite: Acceptance in a graduate degree program in the Department of Biological Sciences or consent of instructor. Preparation of graduate students for the roles of scholar, researcher, and teaching assistant. Emphasizes literature research, preparation of visual aids, innovative teaching strategies, and problem-solving methods. F.
- 6301. Advanced Topics in Biology (3).** Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other courses. Content normally different each time offered. May be repeated for additional credit.
- 6304. Principles and Practice of Phylogenetic Systematics (3:3:0).** Prerequisite: BIOL 4305 or 5305; ZOOL 6302 recommended. Character, analysis, phylogeny reconstruction, consensus procedures, and phylogenetic classification, using morphologic and molecular data. F, odd years.
- 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.
- 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).**

Business Law (BLAW)

- 3391. Business Law I (3:3:0).** Prerequisite: Minimum 2.75 GPA. Nature and source of law, courts and procedure, contracts, Texas law of separate and community property. [BUSI 2301]
- 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.
- 5290. Legal, Regulatory, and Ethical Environment of Business (2:2:0).** Pre- or corequisite: MBA tool core. This course examines the legal, regulatory, and ethical issues that arise in the conduct of business to develop a capacity for recognizing and dealing with such issues.
- 5330. E-Business Law (3:3:0).** Prerequisite: BLAW 5290 or 3391. Study of the legal issues surrounding electronic commerce.
- 5392. Advanced Business Law (3:3:0).** Second course in business law. Emphasis on subject matter appearing frequently in the CPA law examination.

Botany (BOT)

- 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. Taxonomy of the Flowering Plants (4:3:3).** Prerequisite: One year of introductory biology. This course addresses the diversity of flowering plants, emphasizing modern approaches to classification and identification of plant species in the regional flora. Field trips may be required.
- 3409. Developmental Plant Anatomy (4:3:3).** Prerequisite: One year of biology. Introduction to plant cells, tissues, and organs with emphasis on structural and functional relationships, control of development, evolutionary history, and environmental adaptation.
- 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.
- 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.

Biotechnology (BTEC)

- 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 4303 or equivalent. 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: MBIOL 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 MBIOL 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)
- 6324. 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 6324)

- 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)

Civil Engineering (C E)

- 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).** Corequisite: MATH 1352, PHYS 1308, 1105. Equilibrium of particles and rigid bodies, friction, centroids, and moments of inertia.
- 3103. Mechanics of Solids Laboratory (1:0:3).** Prerequisite: 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.
- 3130. Civil Engineering Seminar II (1:0:2).** Prerequisite: Junior standing. Study of concepts of professionalism, engineering practice, leadership, and effectiveness of oral and written communications.
- 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. [ENGR 2302]
- 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, stormwater collection, and wastewater collection systems. Oral and written presentations.
- 3385. Structural Mechanics (3:3:0).** Statics and mechanics of solids for students of architecture: history, urban, or design option.
- 3440. Structural Analysis I (4:3:3).** Prerequisite: CE 3303. Introduction to the analysis of statically determinate and indeterminate structures.
- 4000. Special Studies in Civil Engineering (V1-6).** Individual studies in civil engineering areas of special interest. May be repeated for credit.
- 4292. Engineering Ethics and Professionalism (2:2:0).** Prerequisite: Senior standing or consent of department chairperson. Principles and practice of engineering ethics and professionalism. [ENGR 4092]
- 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.
- 4385. Structures (3:3:0).** Prerequisite: CE 3385. Studies of steel, reinforced concrete, and timber structures for students of architecture in the history, urban, or design options.
- 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 physico-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 LFRD 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.
- 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.
- 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: C E 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: C E 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).

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.
- 5301. Theories of Literature (3:3:0).** Intensive exploration of selected theories or methodologies of literary study. May be repeated.
- 5310. Literature and Cultural Studies (3:3:0).** Places a variety of national literatures in relation to other cultural institutions and structures. May be repeated for credit. Readings in English.
- 5314. Literature and Gender (3:3:0).** Examines the representation of gender in various national literatures. May be repeated for credit.
- 5355. Studies in Comparative Literature (3:3:0).** Practice of the study of comparative literature with emphasis on themes and motifs. (ENGL 5355)
- 7000. Research (V1-12).**

Computer Science (C S)

- 1110. Computer Science Seminar (1:1:0).** For majors and minors only. Introduction to the profession and practice of computer science for first-year and transfer students.
- 1300. Computers and Modern Society (3:2:2).** Survey of computers, their uses, and their impact on society. Brief introduction to computer programming and the use of word processor, spreadsheet, and data base application software. Credit may not be applied toward a computer science major or minor. [COSC 1301]
- 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).** 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. [COSC 1305]
- 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).** 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. [COSC 1420]
- 2350. Computer Organization and Assembly Language Programming (3:3:0).** Prerequisite: C S 1412; corequisite: C S 2371. Computer organization and assembly language programming, system and data management macros. [COSC 2425]
- 2371. Introduction to Digital Design (3:3:0).** Prerequisite: PHYS 2301. Logic and computer design fundamentals, including design of combinational

and sequential logic circuits, memory systems, I/O devices, and register transfer logic.

- 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.
- 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. Development of programs and systems using 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. The 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 C S 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. Study of UNIX operating system.

- 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.
- 4391. AI 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: C S 3364. Underlying science, technology, and art or computer games. Specific topics include design planning, interactive graphics, autonomous agents, multi-user interaction, and game engine construction.
- 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 of computer science. Computer organization, high level and assembler languages, job control, software design, data structures, file organization, machines, and formal languages.
- 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: C S 3352 and 3364, equivalent, or consent of instructor. Topics on distributed operating systems, such as synchronization, communication, file systems, and memory sharing are discussed. Several programming projects are implemented.
- 5353. Compiler Construction (3:3:0).** Prerequisite: C S 3364, equivalent, or instructor consent. Implementation aspects of compiler construction, automata for formal grammar, semantics of procedural languages, automatic generation of parser, and assembly code generation. A prototype of a compiler is developed.
- 5355. Real Time and Time Sharing Systems (3:3:0).** Prerequisite: C S 3365, 3352, equivalent, or consent of instructor. Study of the functional needs in real time and time sharing systems. Basic techniques and display concepts, random-access fields, computer networks, simultaneous operations, multiprogramming, and multiprocessing.
- 5356. Advanced Database Management Systems (3:3:0).** Prerequisite: C S 3364, equivalent, or consent of instructor. Systems aspects of relational databases are emphasized. Topics include relational database design, index and access structures implementation and performance evaluation, query processing and optimization, transaction management, and concurrency control.
- 5357. Multimedia Systems (3:3:0).** Prerequisite: C S 3364, equivalent or consent of instructor. Multimedia digital audio processing; image and video data compression; and processing for multimedia presentations. Time-based media representation and synchronization; multimedia communication systems; and hypertext and programming.
- 5358. Software Studio I (3:3:0).** Prerequisite: C S 3365, equivalent, or consent of instructor. Capstone design and implementation experience of a major software project applying comprehensive software engineering techniques.
- 5359. Software Studio II (3:3:0).** Prerequisite: C S 5358. A continuation of software engineering projects begun in C S 5358.
- 5360. Software Construction and Evolution (3:3:0).** Prerequisite: C S 5362, equivalent, or consent of instructor. Theory and practice of the construction, testing, and maintenance of software. Emphasis placed on techniques to evolve software over time to meet the changing needs of users during the life of the software.
- 5362. Software Specification and Design (3:3:0).** Prerequisite: C S 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: C S 3365, equivalent, or consent of instructor. Explores the principles of software project management and their effective application. Topics include project, risk, process, and resource management and improvement techniques.
- 5364. Software Quality Assurance and Testing (3:3:0).** Prerequisite: C S 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: C S 3375, equivalent, or consent of instructor. Comprehensive introduction to the field of parallel and distributed computing systems. Algorithms, architectures, networks, systems. Theory and applications.
- 5366. Software Process Improvement (3:3:0).** Corequisite: C S 5363, equivalent, or consent of instructor. Theory and practice for software process improvement and certification at the organizational, project team, and individual level.
- 5368. Intelligent Systems (3:3:0).** Prerequisite: C S 3364 or consent of instructor. Comprehensive introduction to the field of artificially intelligent computer based systems. Theory and applications in artificial intelligence.
- 5369. Web-based Software Systems (3:3:0).** Prerequisite: C S 3365, equivalent, or consent of instructor. In-depth study of how to engineer Web-based software systems. Topics include process, development, testing, and performance issues.
- 5375. Computer Systems Organization and Architecture (3:3:0).** Prerequisite: C S 3375 or consent of instructor. Introduction to the architecture, organization, and design of computer systems. Topics include processor, control and memory design, computer arithmetic, I/O, and a brief introduction to multiprocessors.
- 5376. Communication Networks (3:3:0).** Networks in the context of parallel and distributed systems. Information theory applied to networks.
- Network topology. Problems and approaches in design, development, and management of communications networks.
- 5377. Distributed Computing (3:3:0).** Prerequisite: C S 4352, equivalent, or consent of instructor. Introduction to distributed systems. Topics include communications, distributed operating systems, fault-tolerance, and performance issues. Case studies and term projects supplement this course.
- 5379. Parallel Processors and Processing (3:3:0).** Prerequisite: C S 3364 and 3375, equivalent, or consent of instructor. Theory, architectures, and algorithms for the design and implementation of parallel computing systems. Operating system and programming language requirements for parallel computing; approaches and applications.
- 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.
- 5382. Theory of Graphs (3:3:0).** Basic concepts in graphs. Fundamental algorithms for path traversal and searching; networks; trees; matchings and planarity testing; NP-completeness in graph theory.
- 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. AI Robotics (3:3:0).** Programming of artificially intelligent robots. Topics include sensing, navigation, path planning, and navigating with uncertainty.
- 5392. Reinforcement Learning (3:3:0).** Introduction to reinforcement learning and Markov decision processes and their applications for making optimal decisions.
- 6000. Master's Thesis (V1-6).**
7000. Research (V1-12).
8000. Doctor's Dissertation (V1-12).

Consumer Economics and Environmental Design (CEED)

- 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 research of residential and nonresidential interiors.
- 5384. Advanced Lighting Systems (3:3:0).** Prerequisite: I D 3381 or equivalent. Advanced study and application of lighting systems.
- 5385. Case Studies (3:3:0).** Exploration of case study methodology to develop problem solving and decision making skills in the student's major area of specialization.
- 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. Master's Thesis (V1-6).
- 6000. Master's Thesis (V1-6).**
- 6330. Research Fund Development (3:3:0).** Exploration of processes for preparing research ideas for presentation to individuals, groups, and/or organizations. Study of research proposal characteristics, how proposals are reviewed, strategies for success, and public versus private funding sources.
- 6370. Environmental Design Technology and Development (3:3:0).** Examination of environmental design processes and related technologies. Analysis and synthesis of human factors, interior components, information systems, and the environment.
- 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. Research (V1-12).
7000. Research (V1-12).
8000. Doctor's Dissertation (V1-12).

Chemical Engineering (CH E)

- 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, 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 2311, MATH 3350; Corequisite: CHE 3115. 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 2321. 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 2321 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 3323 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 4353. 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 the 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, M E 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 3323. Introduction to biochemical reaction engineering and separations. Kinetics of biomass and product information, and substrate utilization. Biotransport phenomena, bioenergetics, downstream separation and purification processes.
- 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 4353. 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, I E 3301 or equivalent. Design of chemical processes and equipment using computer simulation, flow sheeting, optimization, and process synthesis techniques.
- 5000. Advanced Topics in Chemical Engineering (V1-6).** Prerequisite: Approval of department chairperson. Individual study of topics of current interest under the guidance of a member of the staff. May be repeated for credit on different topics.
- 5121. Graduate Seminar (1:1:0).** Discussions of chemical engineering research and its relationship to the philosophy and art of chemical engineering. Required of all chemical engineering graduate students. May be repeated for credit.
- 5310. Advanced Chemical Engineering Techniques (3:3:0).** Application of ordinary and partial differential equations for solution of mass, momentum, and/or energy transfer and transport problems. Primary emphasis is on the mathematical analysis of unsteady state systems and chemical-reaction systems: models, solutions, and model validation.
- 5312. Fluid Transport Principles and Analysis (3:3:0).** Fundamental relations governing mass, momentum, and energy transfer within fluids, with special emphasis on simultaneous transport, process applications, and numerical methods of analysis.
- 5314. Process Dynamics and Automatic Control (3:3:0).** Study of the transient behavior of process systems: methods of analysis; synthesis and simulation of digital control systems; introduction to process model-based control, optimization, and statistical process control.
- 5316. Linear Chemical Process Control Theory (3:3:0).** Prerequisite: 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 thermo-plastic 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.
- 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).**

Chemistry (CHEM)

- 1105. Experimental General Chemistry I (Laboratory) (1:0:3).** Corequisite: CHEM 1305. This course is designed to introduce the student to a variety of laboratory techniques and to complement the lecture course CHEM 1305. [CHEM 1105]
- 1106. Experimental General Chemistry II (Laboratory) (1:0:3).** Prerequisite: CHEM 1105 and CHEM 1305; corequisite: CHEM 1306. [CHEM 1107]
- 1107. Principles of Chemistry I (Laboratory) (1:0:3).** Corequisite: CHEM 1307. Introduction to a wide variety of experimental techniques. [CHEM 1111]
- 1108. Principles of Chemistry II (Laboratory) (1:0:3).** 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. [CHEM 1112]
- 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. [CHEM 1207]
- 1305. Chemistry and Society I (3:3:0).** 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. [CHEM 1305]
- 1306. Chemistry and Society II (3:3:0).** Prerequisite: CHEM 1105 and 1305; corequisite: CHEM 1106. This course consists of chemical applications within society and the modern chemical world. [CHEM 1307]
- 1307. Principles of Chemistry I (3:3:0).** 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. [CHEM 1311]
- 1308. Principles of Chemistry II (3:3:0).** 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. [CHEM 1312]
- 2000. Introduction to Chemical Research (1:0:3).** Prerequisite: One semester of college chemistry or consent of instructor. Selected research problems according to the needs of students, especially group or team projects. Includes an introduction to chemical research and mentorship by the staff. May not be repeated for credit.
- 2100. Introduction to Biochemistry Research (1:1:0).** Prerequisite: CHEM 1307 or consent of instructor. A structured seminar series on contemporary biochemical research topics. May not be repeated for credit.
- 2103. 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).** 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. [CHEM 1419]
- 3000. Undergraduate Research (V1-6).** Prerequisite: Consent of instructor. Individual research project under the guidance of a staff member. May be repeated for credit.

- 3105. Organic Chemistry Laboratory I (1:0:3).** Prerequisite: CHEM 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. [CHEM 2123]
- 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. [CHEM 2125]
- 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. Discovery 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. [CHEM 2323]
- 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. [CHEM 2325]
- 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 kinetics, 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. [CHEM 2401]
- 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).** Corequisite: Concurrent enrollment or credit in CHEM 4309. 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 3301 and 3308. 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)
- 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 Inorganic Chemistry (3:3:0).** Prerequisite: Consent of instructor. Special areas of inorganic chemistry not commonly included in other courses. May be repeated for additional credit.
- 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.
- 5317. Selected Topics in Analytical Chemistry (3:3:0).** Prerequisite: Consent of instructor. Special areas of analytical chemistry not commonly included in other courses. May be repeated for additional credit.
- 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.
- 5325. Topics in Organic Chemistry (3:3:0).** Prerequisite: CHEM 5321. Special areas of organic chemistry not commonly included in other courses. May be repeated for additional credit.
- 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.
- 5334. Topics in Biological Chemistry (3:3:0).** Special areas of biochemistry not commonly included in other courses. May be repeated for additional credit.
- 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.
- 5348. Topics in Physical Chemistry (3:3:0).** Prerequisite: CHEM 3307, 3308, or equivalents. Special areas of physical chemistry not commonly included in other courses. May be repeated for additional credit.
- 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).

Chinese (CHIN)

- 1401, 1402. A Beginning Course in Chinese I, II (4:4:1 each).** Introduction and development of the four language skills in Chinese. Listening comprehension, speaking, reading, and writing.
- 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)

- 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 Olympic Games, 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 archaeological 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)
- 5301. Studies in Greco-Roman Literature (3:3:0).** Selected studies in major authors, genres, or themes. May be repeated for credit.
- 5305. Aims and Methods of Classical Scholarship (3:3:0).** A general overview of aims and methods of ancient studies covering primary and secondary sources.
- 5311. Classical Art and Archaeology (3:3:0).** Examines architecture, sculpture, and painting of the Greco-Roman World. May be repeated for credit.
- 5350. The Classical Tradition (3:3:0).** Designed to acquaint students with the influence of ancient Rome and Greece on Western culture. Readings in English.
- 6000. Master's Thesis (V1-6).**
7000. Research (V1-12).

Classical and Modern Languages and Literatures (CMLL)

- 1301, 1302. Individual Studies in Modern Languages I, II (3 each).** Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 2301, 2302. Individual Studies in Modern Languages III, IV (3 each).** Prerequisite: CMLL 1301 and 1302, or equivalent. Continuation of study of a modern language. Introduction and development of skills in a modern language, including listening comprehension, speaking, reading, and writing.
- 4300. Individual Studies in Modern Language (3).** Prerequisite: CMLL 2302 or equivalent. Independent study in modern language under the guidance of a faculty member. May be repeated for credit with consent of instructor.

Communication Studies (COMS)

- 1300. Introduction to Communication Studies (3:3:0).** A broad-based introduction to the field of Communication Studies, covering the major content areas in the discipline. Required for all majors and minors. May be applied toward the oral communication Core Curriculum requirement. [SPCH 1311]
- 1301. Interpersonal Communication (3:3:0).** A study of the human communication process in one-to-one encounters. Required for all majors. May be applied toward the individual or group behavior Core Curriculum requirement. [SPCH 1318]
- 2300. Public Speaking (3:3:0).** A course in the theory, preparation, delivery, and evaluation of public speeches. May be applied toward the oral communication Core Curriculum requirement. Required for all majors and minors. [SPCH 1315]
- 2301. Communication Theory (3:3:0).** An introduction to communication theories and models in both social-scientific and humanistic research traditions. Required for all majors and minors. (Writing Intensive)
- 2302. Communication Research (3:3:0).** An introduction to the theory and practice of research in communication studies, including the critical evaluation of communication research. Required for all majors. (Writing Intensive)
- 2350. Introduction to Communication Disorders (3:3:0).** Explores the range and types of communication disorders and examines the impact of these disorders on an individual's psychological, social, emotional, cultural, and educational status.
- 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. [SPCH 1144]
- 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. [SPCH 2335]

- 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. [SPCH 2333]
- 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. [SPCH 1321]
- 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.
- 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 requirements will include data entry, statistical analysis, and a research prospectus.
- 5306. Theories of Rhetoric (3:3:0).** An in-depth study of rhetorical theories which have had significant impact on the research, teaching, and practice of communication behavior. Students must write a lengthy research paper in order to successfully complete this course.
- 5307. Historical Critical Research Methods (3:3:0).** Survey of contemporary methods of rhetorical criticism and their application in analyzing a wide variety of message types. Students must write multiple essays exemplifying rhetorical criticism in order to successfully complete this course.
- 5309. Conflict Management and Problem Solving (3:3:0).** In-depth study of, and research into conflict resolution through mediation and negotiation.
- 5313. Theories of Persuasion (3:3:0).** Analysis of representative theories and models of persuasive processes and their implications for communication behavior. Theories of public, interpersonal, and mass communication are included.
- 5314. Communication Issues in Health and 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).**

Cooperative Internship (COIN)

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

Construction Engineering Technology (CTEC)

- 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).** Prerequisite: MATH 1321 or equivalent. Care and use of modern surveying equipment; differential leveling, area calculations; horizontal and vertical curves; effects of observation errors. [ENGR 1307]
- 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: Approval of CTEC advisor. 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: Senior 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: Senior standing or consent of instructor. Capstone course for the construction engineering technology student. Modern methods for managing construction projects, including critical path scheduling, resource allocation, and funds flow. Practical applications are made through simulated projects.
- 4342. Cost Estimating (3:2:2).** Prerequisite: Senior standing or consent of instructor. 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 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.

Dance (DAN)

- 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).** A study of jazz techniques. May be repeated once for credit. [DANC 1147]
- 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 (2:0:41/2).** A study of modern dance techniques. May be repeated for credit. [DANC 1245]
- 1304. Ballet (3:0:71/2).** The academic study of ballet from its beginning to the most sophisticated forms. May be repeated for credit. [DANC 1341]
- 2100. Dance Activities in Theatre (1:0:2).** Skills and knowledge in ballet, modern and jazz dance activities. Intended for students with limited dance experience. May be repeated for credit. [DANC 1131]
- 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. (Writing Intensive)
- 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.

Electrical Engineering (E E)

- 1305. Introduction to Engineering and Computer Programming (3:3:0).** Corequisite: MATH 1351. An introduction to the fundamentals of electrical and computer engineering and its relation to science, mathematics, management, ethics, and society. Computing and structured programming.
- 2331. Project Laboratory I (3:1:6).** Prerequisite: ENGL 1302 and CHEM 1307. Corequisite: E E 3362, 3303, and 3311. A laboratory course to accompany second-year basic courses in electrical or computer engineering.
- 2372. Modern Digital System Design (3:3:0).** Corequisite: MATH 1352. An introduction to combinational and sequential digital systems.
- 3302. Fundamentals of Electrical Engineering (3:3:0).** Corequisite: MATH 2350. Principles of electrical circuits and systems. DC, transient, and sinusoidal steady-state analysis. [ENGR 2305]
- 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. LaPlace transform, Fourier series, and Fourier techniques are stressed.
- 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: E E 3303, Phase III standing in electrical or computer engineering. For majors only or departmental consent. Probability and random variables. Fourier transforms and linear systems concepts. Amplitude, phase angle, and pulse modulation communication systems.
- 3332. Project Laboratory II (3:1:6).** Prerequisite: E E 2331, Phase III standing in electrical or computer engineering; corequisite: E E 3312 and 3323. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in computer engineering.
- 3333. Project Laboratory III (3:1:6).** Prerequisite: E E 3312, 3323, and 3332, Phase III standing in electrical engineering. For majors only or departmental consent. A laboratory course to accompany third-year basic courses in electrical engineering.
- 3334. Computer Engineering Project Laboratory (3:1:6).** Prerequisite: CS 2365 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 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 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 very large-scale integrated design of circuits and devices. Geometrical patterns of semiconductor devices on a chip, Mos circuits, masking and patterning, and automation tools.
- 4314. Solid State Devices (3:3:0).** Prerequisite: E E 3312 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 enhance 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: E E 3333. For majors only or departmental consent. A laboratory course to accompany fourth-year courses in electrical or computer engineering.
- 4334. Project Laboratory V (3:0:9).** Prerequisite: 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, Huygen'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. Computer Architecture (3:3:0).** Prerequisite: E E 3362 and Phase III standing in electrical or computer engineering. For majors only or departmental consent. An introduction to the architecture, organization, and design of microprocessors. Hardware design related to various microprocessors. Analysis of current microprocessors and applications.
- 4381. VLSI Processing (3:3:0).** Prerequisite: PHYS 2301 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 microsensors 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.
- 5120. Electrical Engineering Graduate Seminar (1:1:0).** Discussion will concern present research conducted in electrical engineering and other topics of interest to electrical engineers.
- 5301. General Electrical Engineering (3:3:0).** Prerequisite: Consent of instructor. Introduction and application of a wide range of electrical engineering topics; includes such subjects as circuit analysis, electronics, digital systems, communications, and related systems.
- 5310. Introduction to VLSI Design (3:2:3).** A basic introduction to very large-scale integrated (VLSI) design of circuits and devices. Geometrical patterns of semiconductor devices on a chip, MOS circuits, masking and patterning, and automation tools.
- 5312. Power Semiconductors (3:3:0).** Principles and properties of semiconductor devices, thyristors and other switches, integrated circuit devices, and device modeling.
- 5314. Solid State Devices (3:2:3).** Semiconductor materials and band theory of solids. Physics of semiconductor devices, charge transport, pn junctions, diodes, bipolar junction transistors, optoelectronic devices, and MOS devices.
- 5316. Power Electronics (3:3:0).** Switch mode power conversion, converters and inverters, power supplies and regulators, and power semiconductor circuits.
- 5321. Design and Analysis of Analog Integrated Circuits (3:3:0).** Principles involved in designing analog integrated circuits. Device physics, small signal, and large signal models. Biasing and basic circuit building blocks. Applications.
- 5323. Modern Communication Circuits (3:3:0).** Analysis and design techniques for modern communication circuits.
- 5324. Computer-Aided Circuit Analysis (3:3:0).** Development, implementation, and application of advanced circuit models for the design of integrated circuits. Designed to enhance design skills through direct application of computer-aided analysis tools.
- 5325. Telecommunication Networks (3:3:0).** Networking and standards. Data and voice network architectures, cellular, satellite and telephone networks. 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.
- 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.
- 5362. Modern Optics (3:3:0).** Modern concepts in optics related to engineering applications. Geometrical, physical, and quantum optics; Fourier optics, holography, and image processing.
- 5363. Linear System Analysis and Design (3:3:0).** Basic properties of systems described by linear dynamical equations. Controllability, observability, stability, equivalence transformations.
- 5364. Digital Signal Processing (3:3:0).** An introduction to digital signal processing. Sampling, z-transform, discrete and fast Fourier transforms, flowgraphs, design techniques for digital filters, effects of finite word length and applications.
- 5365. Parametric and Functional Device Testing (3:3:0).** Fundamentals of semiconductor device chip and wafer testing. Parametric and functional tests, test philosophy, C programming for testing, and commercial wafer level testers.
- 5367. Image Processing (3:3:0).** Imaging fundamentals. Linear operators in spatial and spatial-frequency domains. Image enhancement and restoration techniques. Analysis and coding of images.
- 5368. Advanced Control Systems (3:3:0).** An introduction to advanced control systems. Optimal, adaptive, and robust control of linear and nonlinear systems. Fuzzy logic and neural network applications to control systems.
- 5371. Engineering Analysis (3:3:0).** Prerequisite: MATH 3350 or its equivalent. Application of mathematical methods and algorithms to engineering problems, stochastic linear system models, vector spaces and operators, orthogonality principle and its applications, adaptive filtering, matrix factorizational application of eigendecomposition methods.
- 5375. Computer Architecture (3:3:0).** An introduction to the architecture, organization and design of microprocessors. Hardware design related to various microprocessors. Analysis of current microprocessors and applications.
- 5381. Introduction to Semiconductor Processing (3:2:3).** Introduction to the physical principles, techniques, and technologies involved with the fabrication of very large scale integrated circuits (VLSI).
- 5382. Advanced Digital System Design (3:3:0).** Advanced VLSI design. Computer arithmetic. High speed computation. Digital hardware design. CAD tools for VLSI design.
- 5385. Introduction to Microsystems I (3:3:0).** Fundamentals of microelectromechanical (MEMS) and microfluidic systems. Project-based course introduces basic microsystem design, analysis, simulation, and manufacture through several case studies using representative devices.
- 5386. Introduction to Microsystems II (3:3:0).** Prerequisite: E E 5385. Application of microfabrication to create microsensors 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).** Fundamentals of solid state physics relevant to device applications. Semiconductors, dielectrics, ferroelectricity, ferromagnetics, and superconductors. Laser devices, applications, and engineering of lasers.
- 6360. Computer Vision and Image Reconstruction (3:3:0).** Theories of image formation and reconstruction. Reconstruction problems in tomography, magnetic resonance imaging, synthetic aperture radar, and other modalities of imaging.

- 6363. Adaptive Pattern Recognition (3:3:0).** Adaptive approaches to the design of discriminant functions for pattern classification and recognition. Statistical, syntactic, neural networks and fuzzy-set based optimization constraints for discriminants.
- 6365. Topics in Advanced Communications (3:3:0).** Applications of detection and estimation theory in the design of optimum communication systems.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Engineering Graphics (E GR)

- 1306. Engineering Graphics: Software A (3:2:4).** For students majoring in mechanical and industrial engineering and mechanical and electrical/electronics engineering technology. This course provides a background in orthographic projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.
- 1307. Engineering Graphics: Software B (3:2:4).** For students majoring in civil engineering and construction engineering technology. This course provides a background in orthographic projection, selected topics of descriptive geometry, engineering drawing techniques, and computer-aided design and drafting software.

Economics (ECO)

- 2301. Principles of Economics I (3:3:0).** Emphasis on theories of the firm, value and price determination, and functional distribution, with the application of these theories to the problems of particular firms, industries, and markets. [ECON 2302]
- 2302. Principles of Economics II (3:3:0).** An introduction to modern economic society and theories of production and exchange. Emphasis upon monetary and fiscal policy and macroeconomics. [ECON 2301]
- 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).** 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).
- 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).**

Bilingual Education (EDBL)

- 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).** Prerequisite: EDBL 3332. 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.
- 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)

- 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.
- 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.
- 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.
- 5001. Advanced Education Workshops in Curriculum and Instruction (V1-6).** Advanced work-

shop 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).**

Early Childhood Education (EDEC)

- 4000. Student Teaching in the Kindergarten (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).
- 5310. Application of Studies in Maturation and Learning to Early Childhood Education (3:3:0).** Study of the influence of environmental factors on the physical, emotional, social, and intellectual growth of young children.
- 5311. Analysis and Design of Programs in Early Childhood Education (3:3:0).** Research study and laboratory observations to determine nature and need of school experiences for young children.

Elementary Education (EDEL)

- 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 ideological 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.
- 3320. Managing Learning Environments (3:3:0).** This course will focus on the application in the elementary classroom of theories of human development, learning and cognition, and social behavior.
- 4000. Student Teaching in the Elementary School (V1-12).** Prerequisite: Attainment of admission standards to student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an elementary classroom of an accredited school. Course graded credit (CR) or no credit (NC).
- 4330. Capstone Course (3:3:0).** This course emphasizes diagnostic teaching and learning, philosophies of education, current issues, classroom organization, professional portfolios, and teacher assessment.
- 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.
- 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).**

Higher Education (EDHE)

- 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 organizational theory, models, and policies; governance and management processes; and leadership perspectives and theory. A review of research and new conceptual perspectives.
- 5313. The Community Junior College (3:3:0).** An introductory course to acquaint students with the purposes, programs, people, organization, control, and resources of these colleges.
- 5315. Community College Leadership (3:3:0).** A study of different leadership styles, strategies, and theories applicable to the community college sector.
- 5321. The Administration of Higher Education (3:3:0).** Examines administration of higher education at institution and unit level. Addresses organizational culture and behavior, as well as management and leadership studies.
- 5322. Institutional Planning in Higher Education (3:3:0).** An examination of the current models and theories used to develop strategies for organizational planning, including an analysis of internal assumptions and the external environment.
- 5323. Development and Finance in Higher Education (3:3:0).** A study of the requirements for a sound institutional development program, including mission and objectives, budgeting, organization and planning. Relationships with constituencies and proposal preparation is analyzed.
- 5324. Higher Education and the Law (3:3:0).** A study of constitutional, statutory, and case law concerning public and private college and university boards, administrators, faculty, and students.
- 5332. Student Services in Higher Education (3:3:0).** Focuses on the theoretical bases of the profession, roles and models for practice and competencies, and techniques of student services.
- 5333. Issues in Student Affairs (3:3:0).** Prerequisite: EDHE 5332 or consent of instructor. Current issues in the administration of student affairs programs and activities on college and university campuses in the United States.
- 5334. College Student Development (3:3:0).** This course will provide an in-depth study of developmental theories that are unique to college-aged students. Implications for practice will also be included.
- 5335. The American College Student (3:3:0).** This course will examine the changing demographics and characteristics of college students. Research on college students will be reviewed to determine the impact of college on students.
- 5341. Assessment of Student Outcomes in Higher Education (3:3:0).** An examination of the philosophy and practice of assessment and evaluation in higher education.
- 5342. College Teaching (3:3:0).** An exploration of the nature of college teaching and the teaching-learning process, including a review of major issues and problems.
- 5343. College and University Curriculum (3:3:0).** Issues, problems, and basic considerations in curriculum development. The structure of knowledge. Developments and trends in liberal education, the disciplines, and professional education.
- 5393, 5394. Internship in Higher Education (3 each).**
- 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.
- 6325. Policy Analysis and Issues in Higher Education (3:3:0).** Examines the relationship between colleges and universities and policies developed by boards and governments. Explores prevalent issues facing higher education from a policy prospective.
- 6370. Capstone Seminar (3:3:0).** Integrates the Ph.D. experience and prepares graduates for entry into the profession. Students will develop a portfolio, conference research paper, and a reflection paper.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Educational Instructional Technology (EDIT)

- 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).** Prerequisite: EDIT 2318 or pass computing competency examination. Applications of technology in elementary education.
- 5000. Special Topics in Instructional Technology (V1-3).** Covers special designated topics in instructional technology. May be repeated for credit.
- 5316. Foundations of Instructional Technology (3:3:0).** Overview of the field of instructional technology including the design, development, utilization, management, and evaluation of instructional systems.
- 5317. Instructional Design Foundations (3:3:0).** Technological advances in instruction with emphasis in instructional systems design; and a broad overview of the field of instructional technology.
- 5318. Introduction to Small Computers in Education (3:3:0).** Introduction to computers for educators. Includes computer terminology, operations, overview of applications, hardware, and software. Hands-on experience with small computers included.
- 5320. Educational Network Applications (3).** Computer applications for school-based networks. Issues of instructional support, design, and administration will be discussed.
- 5321. Computer Programming for Educators (3:3:0).** Prerequisite: EDIT 5318 or consent of instructor. Overview of instructional programming using a high level object oriented language to develop educational software. Best practice and design will be modeled.
- 5322. Authoring Systems for Educational Software (3:3:0).** Explores computer authoring languages and systems, 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).**

Educational Leadership (EDLD)

- 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.
- 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.
- 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: EDLL 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.
- 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).
- Language Literacy (EDLL)*
- 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.
- 4382. Reading and Writing in the Secondary Classroom (3:3:0).** Developing literacy practices to learn in content area disciplines aimed at grades 4-12.
- 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. Studies in 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: EDRD 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: EDRD 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)*
- 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 ideological 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.
- 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.
- 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.
- 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.
- 6000. Master's Thesis (V1-6).**
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Special Education (EDSP)

- 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.
- 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).**

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 1306, 1103; 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 1307, 1104. 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. Local Internet Lab (1:0:3).** Corequisite: EET 3316 concurrent enrollment. Laboratory experiments include logic link control (LLC) and medium access control (MAC).
- 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 2322; Corequisite: MATH 2323. 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. Local Internet Network Systems (3:3:0).** Prerequisite: EET 3111, 3311; corequisite: EET 3112, 3312. A study of transmission media, protocols, interface, bridges, routing, and Internet working standards.
- 3321. Programmable Logic Controller (3:3:0).** Prerequisite: EET 3114, 3314; Corequisite: MATH 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.
- 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 and EET 4353. Design and analysis of electrical-electronics engineering projects. Projects vary from semester to semester. Participation in a suitable competition can satisfy this course requirement. Generally will include presentation of proposal, scheduling, design, final report, presentation, and teamwork.

Electronic Media and Communications (EM&C)

- 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.
- 3305. Multimedia Development (3:2:3).** Prerequisite: ADV 2310, P R 2310, or EM&C 3310 and JOUR 2310 or consent of instructor; for mass communications majors only. Provides students with the working knowledge required for multimedia production, including exposure to current software, design theory, and CD-ROM production.
- 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. [COMM 1335]
- 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 3310 or consent of instructor. Study of technology and theory of audio media. Opportunity to acquire experience planning and producing broadcast and nonbroadcast audio material. [COMM 2303]
- 3330. Studio Production for Electronic Media (3:2:3).** Prerequisite: EM&C 3310 or consent of instructor. A concentrated course in the theory and application of principles, procedures, and techniques of multi-media studio production. [COMM 1136]
- 3335. Digital Imaging and Editing (3:2:3).** Prerequisite: EM&C 3315. 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 3310, MATH 2300 or 2345, JOUR 2310, and a 2.5 cumulative GPA. 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 3310 or JOUR 3350 and JOUR 3314. A concentrated course in 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 3310, JOUR 2310, or consent of instructor. 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 3310 and 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 or EM&C 3340. 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 3310; 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.
- 4320. Electronic Media Operations (3:3:0).** Prerequisite: EM&C 3340 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 3310 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)
- 4380. Features and Documentaries for Electronic Media (3:2:3).** Prerequisite: JOUR 3314 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 3310, 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.
- 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.

English (ENGL)

- 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.

- 1301. Essentials of College Rhetoric (3:3:0).** 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. [ENGL 1301]
- 1302. Advanced College Rhetoric (3:3:0).** Prerequisite: Successful completion of ENGL 1301. Focuses on writing from sources, research methods, and documentation. [ENGL 1302]
- 1388. Literature and Film (3:3:0).** An introduction to literature, film, and the cultural functions of adaptation.
- 2305. Introduction to Poetry (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of poems.
- 2306. Introduction to Drama (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of plays.
- 2307. Introduction to Fiction (3:3:0).** Prerequisite: ENGL 1301, 1302. Critical study of and writing about a variety of short stories and novels.
- 2308. Introduction to Nonfiction (3:3:0).** Prerequisite: 1301, 1302. Critical study of and writing about a variety of historical, biographical, and scientific writings.
- 2311. Introduction to Technical Writing (3:3:0).** Prerequisite: ENGL 1301 and 1302. Introduction to the patterns of writing used in reports and letters for business, industry, and technology.
- 2351. Introduction to Creative Writing (3:3:0).** Prerequisite: ENGL 1301 and 1302. Fundamentals of creative writing with much practice in writing poetry and short fiction.
- 2371. Language in a Multicultural America (3:3:0).** This course examines language in the U.S. as it relates to race, gender, class, religion, and ethnicity.
- 2391. Introduction to Critical Writing (3:3:0).** Prerequisite: ENGL 1301, 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. Information Design and Usability Testing (3:3:0).** Prerequisite or corequisite: ENGL 3365. Principles and techniques of designing usable documents with emphasis on rhetorical effectiveness and the integration of verbal and visual language.
- 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.
- 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. Selected Plays of Shakespeare I (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. Repeatable.
- 3388. Film Studies (3:3:0).** Prerequisite: 6 hours of 2000-level English courses. Concepts of visual and aural communication and a survey of various film genres.
- 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).** This course examines the diverse literatures and cultures of the Southwest. It focuses on texts by artists from various backgrounds, including Hispanic, Native American, and Asian American.
- 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: ENGL 3365. Methods of editing and publishing in business, science, technology, and the professions. Practical experience with editing reports and publications produced in the university.
- 4367. Developing Instructional Materials (3:3:0).** Prerequisite: ENGL 3365. Preparation of instructions for complex procedures with focus on task and user analysis, organization, format, and usability testing.
- 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. Re-

- quired 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.
- 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 composition.
- 5366. Teaching Technical and Professional Writing (3:3:0).** The theory and teaching of technical and professional writing with special attention to developing course objectives, syllabi, and teaching techniques.
- 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).** 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).**

Engineering (ENGR)

- 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.
- 5000. Special Topics in Engineering (V1-12).** Prerequisite: Graduate standing in engineering. Individual study of advanced interdisciplinary topics in engineering under the guidance of one or more members of the engineering faculty.
- 5340. Turbomachinery (3:3:0).** Working of a typical power plant. Components making up steam and gas turbines. Cycle performance and internal flow in turbines and forces generated.
- 5354. Creativity in Problem Solving (3:3:0).** The basic concept of creativity and means by which individuals and groups can develop more effective creative skills. Exercises to increase creative thinking and problem solving in individual and group settings.
- 5360. Fundamentals of Engineering Science (3:3:0).** An overview of physical, mathematical, and engineering concepts; including electronics, materials, statistics, C programming, digital logic, microprocessors, and project management.
- 5361. Device Characterization and Failure Analysis (3:2:3).** Characterization techniques for materials and devices. Failure analysis of analog and digital devices and systems. Reliability analysis and testing. Diagnostic instrumentation and data analysis techniques.
- 5362. Advanced Semiconductor Processing and Process Characterization (3:2:3).** Prerequisite: E E 5381. This course stresses process flow, yield management, specific device processing steps, and process control. Packaging and back-end processing.
- 5363. Advanced Topics in Semiconductor Product Engineering I (3:1:6).** Prerequisite: Consent of instructor. Advanced industry-related project in the area of semiconductor product engineering.
- 5364. Advanced Topics in Semiconductor Product Engineering II (3:1:6).** Prerequisite: Consent of instructor. Advanced industry-related project in the area of semiconductor product engineering. A continuation of Advanced Topics I.
- 5365. Parametric and Functional Device Testing (3:2:3).** Prerequisite: E E 5384 and 5393. Fundamentals of semiconductor device chip and wafer testing. Parametric and functional tests, test philosophy, C programming for testing, and commercial wafer level testers.
- 6330. Master's Report (3).** Prerequisite: Graduate standing. Formal technical report on an interdisciplinary topic under guidance of faculty from one or more departments.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Environmental Toxicology (ENTX)

- 4000. Undergraduate Research in Environmental Toxicology (V1-3).** Prerequisite: 15 hours of biology or chemistry, junior or senior standing,

- and consent of instructor. Selected research problems according to the needs of the student. May be repeated for credit.
- 4301. Special Topics in Environmental Toxicology (3:3:0).** Prerequisite: Consent of instructor. Special areas of current interest not commonly included in other undergraduate courses (e.g., wildlife toxicology, pesticides in the environment).
- 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.
- 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.
- 6345. Chemical Sources and Fates in Environmental Systems (3:3:0).** 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.
- 6351. Analytical Toxicology Lecture (3:3:0).** Prerequisite: ENTX 6345 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, 6345, 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, 6345, 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 (3:2:1).** Prerequisite: ENTX 6325, 6326, and 6345. Emphasizes testing techniques, site assessment and monitoring procedures, regulatory requirements, and field and laboratory techniques for ecological risk assessments.
- 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.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Environmental Engineering (ENVE)

- 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.
- 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.
- 5315. Advanced Chemodynamics II (3:3:0).** Prerequisite: Consent of instructor. Course is a continuation of ENVE 5314, 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.

Counselor Education (EPCE)

- 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: 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 5350, 5364. 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 5350, 5354, 5357, 5364, 5366, 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).** Overview of theories and paradigms of counseling.
- 5366. Dysfunctional Behavior (3:3:0).** Prerequisite: EPCE 5350 and 5364, 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 5350, 5364, or consent of instructor. Family counseling applied to school settings. Theory, simulation, and practice of techniques used in family counseling applied to school and community agencies.
- 5369. Seminar in Counseling (3:3:0).** Prerequisite: Departmental approval required. A critical investigation of counseling topics related to school and community agencies. May be repeated as topic varies.
- 5370. Ethical and Legal Issues in Counseling (3:3:0).** Prerequisite: EPCE 5350 and 5364. 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 5350, 5364. 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).** 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 Psychology (EPSY)

- 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.
- 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).** An introductory course in statistics with major emphasis on univariate measures for analyzing educational data.
- 5381. Intermediate Educational Statistics (3:3:0).** Prerequisite: EPSY 5380 or STAT 5302. Topics include multiple regression, analysis of variance and covariance, multiple comparison tests, and additional non-parametric tests.
- 5382. Qualitative Research in Education (3:3:0).** Study in theoretical perspectives informing qualitative research in education including relevant issues and methodological criteria.
- 5383. Data Analysis With Statistical Software (3:3:0).** Hands-on analysis of quantitative educational data using statistical software.
- 5385. Foundations of Educational Research (3:3:0).** Methods of educational research; methods of obtaining, processing, interpreting, and using significant educational data.
- 5389. Individual Intelligence Testing (3:3:0).** Use of individual appraisal instruments and techniques 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: EPCE 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: EPCE 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).**

English as a Second Language (ESL)

- 1301. Oral Skills for International Students (3:3:0).** Prerequisite: Consent of instructor. Development of oral language skills and interaction strategies, English pronunciation and intonation, and idiomatic English expression.
- 1302. English Grammar and Composition for International Students (3:3:0).** Prerequisite: Consent of instructor. Development of academic writing skills with emphasis on the grammar of written English.
- 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.

Exercise and Sport Sciences (ESS)

- 1301. Introduction to Exercise and Sport Sciences (3:3:0).** An introduction to the professions in exercise and sport sciences including the history, ideas, events, people, and programs that shaped those professions. [PHED 1301]
- 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: ZOO 2403 or equivalent. The mechanical analysis of human motion with emphasis on biomechanical principles and techniques.
- 3303. Motor Learning (3:2:2).** A study of the many aspects of learning and performance of motor skills.
- 3305. Exercise Physiology (3:2:2).** Prerequisite: ZOO 2403 or equivalent. A study of the various physiological systems as they function during exercise and training.
- 3314. Life Span Motor Development (3:2:2).** Examines factors that influence human motor development from conception through adulthood.

- Discusses theoretical perspectives and practical applications of motor development principles throughout the life span.
- 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. [PHED 1206]
- 3323. Care and Prevention of Athletic Injuries (3:3:0).** Prerequisite: ZOO 2403 or equivalent. An introduction to athletic training and the qualifications and functions of the athletic trainer including emphasis on common athletic injuries.
- 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.
- 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 3302. 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 3302, 3304, 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.
- 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.
- 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.
- 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.
- 5308. Physiology of Exercise (3:3:0).** Effect of muscular activity on body processes.
- 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.
- 5311. Stress Management and Cardiac Disease (3:3:0).** A study of the physiological adaptation and the psychological causes of stress. Intervention techniques and management strategies will be emphasized.
- 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.
- 5331. Research in Sports Health (3).** Prerequisite: ESS 5315. Required for non-thesis candidates for the M.S. degree in sports health.
- 5332. Applied Physiology of Exercise (3:3:0).** Prerequisite: ESS 5308 or equivalent. Applied principles of exercise physiology including cardiorespiratory, biochemical, and environmental considerations.
- 5333. Administration of Sports Health Programs (3:3:0).** An in-depth study of the administration and management of sports health programs.
- 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.
- 5337. Electrocardiography (3:3:0).** An in-depth study of exercise-electrocardiography (ECG) preparation, administration, and interpretation.
- 5338. Cardiopulmonary Rehabilitation (3:3:0).** Topics in cardiopulmonary rehabilitation including program management, organization, advanced diagnostic testing, and prescriptive procedures.
- 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).

Food and Nutrition (F&N)

- 1201. Introduction to Dietetics (2:2:0).** Introduction to the field of dietetics including registration, ethical, legal, and professional issues.
- 1325. Nutrition, Foods, and Healthy Living (3:3:0).** An introduction to the nutrients, their content in food, energy utilization, and the role of diet in health and disease.
- 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).** Application of scientific principles to food preparation. [HECO 1315]
- 2320. Structure and Function of Nutrients (3:3:0).** Prerequisite: F&N 1410. Sources and roles of nutrients and their importance to human health.
- 2325. Sports Nutrition (3:3:0).** Nutrition concepts and applied nutritional practices for the competitive and amateur athlete and physically active individual.
- 3310. Essentials of Dietetic Practice (3:2:2).** Prerequisite: F&N 1410. Role of dietician in modern health care systems. Techniques of assessment, nutrition care planning, and documentation. Legal aspects of dietetic practice. (Writing Intensive)
- 3311. Dietetic Counseling Strategies (3:3:0).** Prerequisite: F&N 1410 and 3310. Application of interviewing, counseling, and educational techniques in dietetics, including individual and group methods.
- 3320. Nutrition and Diet Therapy for Allied Health Professionals (3:3:0).** Prerequisite: ZOOL 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 1410 and ZOOL 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.
- 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 4340 and 4341. 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 1410 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 1410. 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).** Prerequisites: F&N 3310, 3340, 3402, ZOOL 2403, and concurrent enrollment in F&N 4130. 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).** Prerequisites: F&N 4340, and concurrent enrollment in F&N 4130. 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 1410 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)
- 5118. Seminar (1:1:0).** 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, hematopoietic, 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).**

Food Technology (FD T)

- 2300. Principles of Food Technology (3:3:0).** Basic information necessary to understand technological aspects of modern industrial food supply systems. A fundamental background in food classification, modern processing, and quality control. F, S, SS.
- 2302. Elementary Analysis of Foods (3:2:3).** Basic laboratory practice in food product testing. Should have had a course in chemistry or other lab science. S. (Writing Intensive)
- 3100. Food Technology Seminar (1:1:0).** Information to prepare students to function in a competitive work environment or professional/graduate school.
- 3301. Food Microbiology (3:2:3).** Prerequisite: MBI0 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 physicochemical 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.
- 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).**
- Family and Consumer Sciences Education (FCSE)*
- 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.
- 4131. Occupational Clothing Services (1:1:1).** Prerequisite: FCSE 4302, corequisite: FCSE 4132 and 4133. Fundamentals of production merchandising, promotion, coordination and repair, and alteration of mass-produced apparel.
- 4132. Occupational Home Furnishings (1:1:1).** Prerequisite: FCSE 4302, corequisite: FCSE 4131 and 4133. Skill development in home furnishings occupations.
- 4133. Occupational Child Care and Elderly Services (1:1:1).** Corequisite: FCSE 4131 and 4132. Development of competencies needed in occupations related to care for children and elderly services.
- 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. 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. (Concurrently with FCSE 4103).
- 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)
- 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 lifelong 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).**
- Finance (FIN)*
- 1307. Personal Financial Planning and Investing (3:3:0).** Emphasis on elements that should be considered before investing in real estate, insurance, personal property, and securities. Introduction to the operation of securities markets. [BUSI 1307]

- 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 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. 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. 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. 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.
- 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 (may be taken concurrently). 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 (may be taken concurrently). The land conversion process including feasibility analysis, market and merchandising targets, site selection, design, construction, and financial analysis. Land use controls, planning, and environmental constraints.
- 4381. Individual Problems in Finance (3).** Prerequisite: Senior standing, minimum 3.0 GPA in major, minimum overall cumulative GPA of 2.75, and consent of instructor. Independent problem research under guidance of a faculty member.
- 4382. Internship in Finance (3).** Prerequisite: 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.
- 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 II (3:3:1).** Prerequisite: FIN 5320, 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 5320 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 5321. 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.
- 5328. Options and Futures (3:3:1).** Prerequisite: FIN 5320 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: FIN 5320 and 5333 or equivalent. 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: FIN 5321, 5333, or equivalent. 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).** 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.
- 5338. Multinational Financial Management (3:3:0).** Prerequisite: FIN 5320 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.

French (FREN)

- 1501, 1502. A 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. A Second Course in French I, II (3:3:0 each).** Prerequisite: FREN 1501 and 1502 or 1507. Readings, cultural background, conversation, and composition. [FREN 2311, 2312]
- 3302. Major French Writers (3:3:0).** Prerequisite: FREN 2301 and 2302, or equivalent. A survey of major French writers.
- 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.
- 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 FurreEs*. May be repeated once for credit for purposes of study abroad.
- 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.
- 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.
- 5100. Advanced Problems in French Language and Literature (1).** An individualized research project course. Contents will vary to meet the needs of students.
- 5101. Teaching French in College (1:1:0).** Classroom organization and explanation as well as demonstrations of instructional techniques. Does not count toward the minimum requirement of a graduate degree. Must be taken pass-fail by all teaching assistants each semester.
- 5312. Medieval Literature (3:3:0).** Reading and philological interpretation of selected Old French texts.
- 5315. Studies in French Language and Literature (3:3:0).** This course concentrates on topics in French civilization, linguistics, and literature with content varying to meet the needs of students. May be repeated for credit.
- 5316. Sixteenth Century Literature (3:3:0).** Readings, analysis, and interpretation of selected works of the sixteenth century.
- 5317. Seventeenth-Century Literature (3:3:0).** Reading, analysis, and interpretation of selected works of the seventeenth century.
- 5318. Eighteenth Century Literature (3:3:0).** Reading, analysis, and interpretation of selected works of the eighteenth century.
- 5319. Nineteenth Century Literature (3:3:0).** Readings, analysis, and interpretation of selected works of the nineteenth century. Course content may vary. May be repeated for credit.
- 5320. Twentieth Century Literature (3:3:0).** Readings, analysis, and interpretation of selected works of the twentieth century. Course content may vary. May be repeated for credit.
- 5321. French Cinema (3:3:0).** Presentation of the major trends of French cinema from the beginnings to the present. Course content may vary. May be repeated for credit.
- 5327. French Civilization (3:3:0).** Historical, geographical, social, and artistic aspects of the development of the culture of France. Course content will vary. May be repeated for credit (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).

Geochemistry (G CH)

- 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. May be repeated for credit.
- 5307. X-ray Powder Diffraction Methods (3:2:3).** Fundamental and practical aspects of X-ray diffraction on polycrystalline substances such as minerals, rocks, and other solids.
- 5309. Clay Mineralogy (3:2:3).** Atomic structures of clay minerals in relation to physical, engineering, and colloid chemical properties of these materials. Instrumental methods of clay analysis such as X-ray diffraction and ion exchange methods.
- 5350. Isotope Geochemistry (3:3:0).** Principles of isotope chemistry as applied to the earth and solar system. Radioactive and stable isotope systematics.
- 5405. Inorganic Geochemistry (4:4:0).** Origin of elements and isotopes. Theory and application of isotopic systems, element mobility, thermodynamics, solution geochemistry, and geochemical cycles.

Geophysics (G PH)

- 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.
- 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.

General Studies (G ST)

- 2001. General Studies Abroad (V1-12).** Individual studies in interdisciplinary, international, and multicultural experiences.
- 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. Students should take the course the first long semester of the senior year. May be repeated for credit with the approval of Director of General Studies.

Cell and Molecular Biology (GANM)

- 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. May be repeated 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 (6:6:0).** Prerequisite: Consent of instructor. Topics include the 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).** The 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 and function of membranes and organelles, mechanisms of transcription and translation, and regulation of cellular processes including both endocrine and nonendocrine aspects.
- 7000. Research (V1-12).**
7101. Seminar (1:1:0). The student 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.
- 6127. Seminar in Cell Biology (1:1:0).** Prerequisite: Consent of instructor. May be repeated. Presentation of current research topics in the genetics and molecular biology of eukaryotic cells, and related areas: oncogenesis, differentiation, aging.
- 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.
- 6221. Human Intermediary Metabolism and Its Regulation (2:2:0).** Prerequisite: GBCH 5921, CHEM 4303, 4306, 4307, or equivalent. Consideration of normal and abnormal human intermediary metabolism with major emphasis on biosynthetic and catabolic pathways and on modulation and control.
- 6222. Medical Biochemistry Problem Solving (1:1:0).** 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.
- 6426. Advanced Human Genetics (4:4:0).** Prerequisite: A course in genetics and consent of instructor. Detailed consideration of population genetics, cytogenetics, molecular biology, and biochemistry as related to human heredity. Includes one hour discussion of papers from current literature.
- 6441. Cell Signaling (4:4:0).** Topics include structure and function of membranes and organelles, mechanisms of transcription and translation, and regulation of cellular processes including both the endocrine and nonendocrine aspects.
- 6522. Molecular Biology of Eukaryotes: Nucleic Acids (5:5:0).** Prerequisite: GBCH 5921 or equivalent and consent of instructor. An in-depth study of nucleic acid biosynthesis and gene expression and its control in eukaryotes, as well as the study and application of the 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 (GBTC)

- 5338. Biochemical Methods (3:1:6).** Provides integrated approach to modern biochemical techniques. Present methods used to manipulate a gene, purify and characterize the enzymatic properties of the encoded protein.
- 6000. Master's Thesis (V1-6).**
- 6101. Biotechnology Seminar (1:1:0).**
- 6301. Introduction to Biotechnology (3:3:0).** Broad coverage of topics with high current interest and utility to the medical and agricultural biotechnology industries. Emphasizes application of technologies.
- 7000. Research (V1-12).**

Geography (GEOG)

- 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).** 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).** 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.
- 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. Introduction to Research in Human Geography (3:3:0).** An introduction to research and research methods in geography.
- 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, GEOG 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. Physical Geography: Biogeography (3:3:0).** Prerequisite: Introductory physical geography or consent of instructor. Study of plants and animals in their spatial context, their functional interaction, and applied aspects of biogeography, especially as related to man's impact on the biosphere.
- 4357. Geography of Arid Lands (3:3:0).** Systemic and regional inquiry into the physical nature and the problems of human utilization of the arid and semiarid lands of the earth.
- 4369. Independent Research in Geography (3).** Conference course. May be repeated for credit.
- 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.
- 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 geog-

- raphy 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).**
- Geology (GEOL)*
- 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.
- 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.
- 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.
- 3402. Structural Geology (4:3:3).** 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.
- 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 Paleocology (4:3:3).** Classification, evolution, and paleobiology of invertebrate fossils. Applications of paleontological data in geological dating, correlation, and paleoenvironmental analyses.
- 4001. Problems in Geosciences (V1-6).** 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.
- 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.
- 5001. Problems in Geosciences (V1-6).** Independent study under guidance of a faculty member.
- 5101. Seminar (1:1:0).**
- 5211. Sedimentary Petrology (2:2:0).** Origin, classification, and diagenesis of siliciclastic and carbonate sediments and sedimentary rocks. May be repeated for credit.
- 5212. Sedimentary Petrology Methods (2:0:6).** Textural analysis, mineral separation, and thin section petrography of siliciclastic and carbonate sediments and sedimentary rocks. May be repeated for credit.
- 5300. Individual Studies in Geology (3:3:0).** A structured independent graduate studies course under the guidance of a faculty member. May be repeated for credit.
- 5303. Advanced Igneous Petrology (3:3:0).** Phase relations, geochemistry, and tectonic setting of igneous rocks. Emphasis on modern concepts of magma origin and differentiation. May be repeated for credit.
- 5305. Tectonic Evolution of Western North America (3:3:0).** Prerequisite: Consent of instructor. Survey of the geologic and tectonic evolution of the western margin of North America over the past 3 billion years.
- 5310. Advanced Quantitative Methods in Geology (3:3:0).** This class will emphasize computer methods of error analysis, data processing, and modeling of geological data. Applications to current research problems will be included.
- 5311. Micropaleontology (3:2:3).** Lectures and labs are designed to acquaint the student with basic lab techniques, morphology, and classification within the major microfossil groups, and to demonstrate the usefulness and importance of microfossils as biostratigraphic and paleoecologic tools.
- 5314. Problems in Stratigraphy (3:3:0).** Analysis of selected stratigraphic units emphasizing geometry, paleogeography, environments of deposition, depositional models, and theoretical problems.
- 5322. Sedimentary Processes (3:3:0).** Principles of fluid dynamics important in sedimentation, interpretation of primary sedimentary structures, and description of depositional environments.
- 5323. Depositional Systems and Basin Analysis (3:3:0).** Sedimentary Facies models for clastic and carbonate depositional systems and models for sedimentary basins in different tectonic settings.
- 5325. Petrophysics (3:3:0).** Physical properties of reservoir rocks, including porosity, permeability, composition, and texture. Interrelationships between rock characteristics and electric log responses in geologic exploration and exploitation.
- 5327. Problems in Paleontology (3:2:3).** Subjects include origin of life, Precambrian life, origin and relationships of fish, amphibians, reptiles, dinosaurs, pterosaurs, birds, and primates; mass extinction and impact cratering processes.
- 5340. Advances in Historical Geology (3:3:0).** Survey of currently important topics in earth processes and history for science educators, with an emphasis on how geologists interpret modern and past geologic events.
- 5341. Digital Imagery in Geosciences (3:2:3).** Introduction to digital image processing, visualization, and raster GIS modeling applied to geosciences. Involves computer lab exercises.
- 5342. Spatial Data Analysis and Modeling in Geosciences (3:2:3).** Introduction to vector GIS data manipulation, geostatistics, and spatial modeling applied to geosciences. Involves computer lab exercises.
- 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 geoinformation 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).**
- German (GERM)*
- 1501, 1502. A Beginning Course in German I, II (5:5:1 each).** Oral practice, elementary reading, and grammar. [GERM 1411, 1412]
- 1507. Comprehensive German Review-First Year (5:5:1).** Prerequisite: Two years of high school German. A comprehensive one-semester review.

- 2301, 2302. A Second Course in German I, II (3:3:0 each).** Prerequisite: GERM 1501 and 1502 or 1507. Reading, cultural background, grammar review, and conversation. [GERM 2311, 2312]
- 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.
- 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.
- 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.
- 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.
- 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.
- 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.
- 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).

Health Services Research (GHSR)

- 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).

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. (GPY 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.

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 courses. 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. Doctor's Dissertation (V1-12).**

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. For Ph.D. students.
- 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 will include receptors, second messenger systems, ion transport, pre-synaptic cellular biology, and anti-AIDS treatments. 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.
- 5613. Pharmacology (6:5:1).** A study of pharmacology with emphasis on mechanisms of drug action, drug interactions, and therapeutics. For Ph.D. students.
- 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. Doctor's Dissertation (V1-12).**

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.
- 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. Doctor's Dissertation (V1-12).**

Pharmaceutical Sciences (GPSC)

- 5101. Topics in Pharmacology (1:1:0).** Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
- 5201. Topics in Pharmacology (2:2:0).** Special topics in pharmaceutical sciences that are not normally included in other courses. May be repeated for credit with change in content.
- 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 Pharmaceuticals (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.
- 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.
- 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. Doctor's Dissertation (V1-12).**

Greek (GRK)

- 1301, 1302. A Beginning Course in Greek I, II (3:3:0 each).** [GREE 1311, 1312]
- 2301, 2302. A Second Course in Greek I, II (3:3:0 each).** Prerequisite: GRK 1301 and 1302, or equivalent. Review; selected readings from classical and biblical authors. [GREE 2311, 2312]
- 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.
- 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).**

Graduate School of Biomedical Science (GSBS)

- 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.

General Engineering Technology (GTEC)

- 1130. Technology Seminar (1:2:0).** Instruction for freshman and transfer students in topics tools for enhancing student productivity. Written communications for engineering technology that students use in their discipline is introduced and reinforced through assignments. Students acquire proficiency in use of Internet search, word processor, spreadsheet, and presentation software. Selected topics in engineering ethics and professionalism.
- 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. [ENGR 2304]
- 1312. Alternating and Direct Current Technology (3:2:3).** Prerequisite: MATH 1321; corequisite: PHYS 1307 and GTEC 1211. Principles of electrical and magnetic circuits and their application in the operation of electrical power equipment. [ENGR 2405]
- 2151. Introduction to Thermodynamics Lab (1:0:3).** Prerequisite: PHYS 1103, 1306; 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 1306, 1103; 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 1306, 1103, 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. Corequisite: MATH 1352 or 2323. A study of the elastic and plastic behavior of materials and structural elements. [ENGR 2332]
- 3412. Applied Mechanics III Fluids (4:3:3).** Prerequisite: GTEC 2311. Fluid statics and dynamics, flow of fluids in pipe and open channel. Laboratory: Study of fluid flow systems, pumps, and measurement.
- 4121. Technology Seminar (1).** Prerequisite: Advanced standing. Review of engineering technology fundamentals. Final is a mini-fundamentals of engineering type examination.
- 4131. Special Topics in Technology (1:1:0).** Prerequisite: Approval of chairperson. Individual studies in special areas of technology.
- 4300. Cooperative Education (3).** Prerequisite: Junior standing and approval of department chairperson. Practice in industry and written reports. Maximum of six semester credit hours may be earned and applied to degree requirements.
- 4322. Cost and Profit Analysis for Engineering Technologists (3:3:0).** Prerequisite: Senior standing or approval of option coordinator. Application of engineering economics to engineering technology disciplines. Factors of time, cost, profit, and risk are evaluated and when applicable integrated into the decision process. Ethical issues are examined.
- 4331. Special Topics in Technology (3).** Prerequisite: Advanced standing and approval of chairperson. Individual studies in special areas in technology. May be repeated for credit.
- 2303. Life Span Human Development (3:3:0).** 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).** 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).** 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).** Pre- or corequisite: 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, independents 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.
- 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.

Human Development and Family Studies (HDFS)

- 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.

- 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 psychologic 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.
- 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.
- 5354. Analysis of Multiple Dependent Variables (3:3:0).** Prerequisite: Research methods or introductory statistics. Introduction to both theoretical and practical aspects of quantitative methods for multiple dependent variables in human development, family studies, and marriage and family therapy.
- 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.
- 6363. Advanced Topics in Human Development (3:3:0).** Prerequisite: Consent of instructor. Current topics in human development across the life course. May be repeated for credit under various topics.
- 6370. Analyzing Developmental Data (3:3:0).** Prerequisite: Research methods, introductory statistics, or consent of instructor. Statistical methods for analyzing individual and family change over time and time ordered processes of interactional data.
- 6371. Practicum in Human Development and Family Studies (3:3:0).** Supervised experiences in professional positions. May be repeated for credit up to 9 hours.
- 6373. Advanced Topics in Family Studies (3:3:0).** Prerequisite: Consent of instructor. Current topics in family studies. May be repeated for credit under various topics.
- 6390. Program Development and Evaluation (3:3:0).** Reviews evaluation issues, critiques evaluation research, and undertakes planning and evaluation of original programs.
7000. Research (V1-12).
8000. Doctor's Dissertation (V1-12).
- ### History (HIST)
- Courses in U.S.; European; and African, Asian, or Latin American history are identified as (US), (E), and (AAL).
- 1300. Western Civilization I (3:3:0).** Western civilization from its dawn to the 17th century. Culture and the arts stressed alongside politics. (E) [HIST 2311]
- 1301. Western Civilization II (3:3:0).** The revolutionary transformations of European civilization in the 17th, 18th, and 19th centuries; world domination and the world wars; intellectual and cultural developments. (E) [HIST 2312]
- 1325. Introduction to Mexican American History (3:3:0).** A broad survey of Mexican-American life in the United States. Culture and economics stressed alongside politics. (US)
- 2300. History of the United States to 1877 (3:3:0).** This course and HIST 2301 satisfy the legislative history requirement. Most sections combine political, military, constitutional, and social history. Special sections emphasize technology, agriculture, business, and family life. (Honors section offered.) (US) [HIST 1301]
- 2301. History of the United States Since 1877 (3:3:0).** Continuation of HIST 2300. (Honors section offered.) (US) [HIST 1302]
- 2322. World History to 1500 (3:3:0).** Introduction to basic narrative and major themes in world history from origins to 1500. Satisfies university's humanities and multi-cultural requirements.
- 2323. World History Since 1500 (3:3:0).** Introduction to basic narrative and major themes in world history since 1500. Satisfies university's humanities and multi-cultural requirements.
- 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. Fall 2003
- 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) [HIST 2303]
- 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.
- 3384. History of Brazil (3:3:0).** Brazil from pre-conquest 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, public/private spheres. (US) (W S 4327)
- 4328. Citizenship, War, and Dissent (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines evolution of citizenship and the Bill of Rights through the study of political trials and Supreme Court decisions during periods of war and domestic conflict. (US)
- 4337. History of American Seapower (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines history of the American Navy, organizational and technological development, evolution of strategic planning, and impact on foreign relations. (US)

- 4341. Ancient Greece (3:3:0).** Prerequisite: Junior standing or consent of instructor. From the origins of classical Greek civilization to the Roman conquest. Tyranny and democracy, imperialism, the Hellenistic age. (E)
- 4342. Ancient Rome (3:3:0).** Prerequisite: Junior standing or consent of instructor. Imperialism and its consequences from the early Republic through the partial collapse of the Empire in the 5th century A.D.; Christianity and the Empire. (E)
- 4343. Alexander the Great (3:3:0).** This course is a detailed study of the rise of ancient Macedonia, the reign of Alexander the Great, and the Hellenistic world. (E)
- 4344. The History of Early Rome (3:3:0).** This course is a detailed study of the numerous problems surrounding the history of Rome's early institution and conquest of Italy. (E)
- 4347. History of the Medieval Church (3:3:0).** Prerequisite: Junior standing or consent of instructor. Origins of the Roman Church, the papacy, monasticism, scholastic and mystical theology, church-state relations, and the decline of medieval Christendom. (E)
- 4348. The Renaissance (3:3:0).** Prerequisite: Junior standing or consent of instructor. Cultural and political history of Italy, France, and England from 1300-1600; the "rebirth" of wisdom through art, architecture, literature, music, economy, and religion. (E)
- 4349. The Protestant Reformation (3:3:0).** Prerequisite: Junior standing or consent of instructor. Europe from 1517 to 1648. Religious revolt and the establishment of Protestantism; the age of religious wars; attempts at religious peace. (E)
- 4350. European Urban History 1300 to 1800 (3:3:0).** This course will explore social, economic, political, and cultural structures of Western European cities from the 14th to the 18th century. (E)
- 4353. The French Revolution and Napoleon (3:3:0).** Prerequisite: Junior standing or consent of instructor. The Old Regime and the Enlightenment. The Revolution and its drama, ideas, events, personalities, and complexities. Napoleon: heir, paladin, or liquidator of the Revolution? (E)
- 4355. Let's Talk Women; Let's Talk War: Women and Conflict in 20th Century Europe (3:3:0).** Prerequisite: Junior standing or consent of instructor. The course will examine the involvement and reactions of European women to situations of war and revolution in the 20th century. (E)
- 4357. France and Algeria: From the Colonial to the Postcolonial (3:3:0).** Prerequisite: Junior standing or consent of instructor. Ideological and cultural relationship between France and Algeria from 1800 to the present. (E)
- 4358. The Habsburg Monarchy in Grandeur and Decline (3:3:0).** Prerequisite: Junior standing or consent of instructor. History of this multinational dynastic state and its legacies in East Central Europe. (E)
- 4360. Germany Since 1945: A Divided Nation Confronts Its Past (3:3:0).** A comparative study of capitalism and communism in West and East Germany emphasizing problems of national unity and efforts to atone for Nazi crimes.
- 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 changes religious, political, constitutional, intellectual, and geographical that took place in England from 1450 to 1688. (E)
- 4374. Love, Death, and Magic in Europe, 1500-1800 (3:3:0).** Prerequisite: Junior standing or consent of instructor. Topics in social and cultural history. Underside of civilization, population, social structure, family and household, economic growth, and crisis. Attitudes toward love and death, popular religion and culture, witchcraft, violence, revolt. (E) (W S 4374)
- 4375. Social and Cultural History of Europe, 1800 to the Present (3:3:0).** Prerequisite: Junior standing or consent of instructor. Modernization, industrialization, urbanization, gender, household, new professions, old occupations, and labor unrest. Bourgeois and working-class culture, avant-garde and masses, war, genocide, Europe today. (E)
- 4376. History of the Italian Mafia (3:3:0).** This course discusses the origins and development of the Mafia in the context of Italian politics, economy, and society in the 19th and 20th centuries. (E)
- 4377. Twentieth Century Britain in Film (3:3:0).** Prerequisite: Junior standing or consent of instructor. Examines the history of Britain and British identities 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. [HIST 2341]
- 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.
- 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.
- 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. Required of all master's students.
- 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 all 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.
- 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.
- 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.
- 5340. Studies in Ancient History (3:3:0).** Study of selected topics in the political or intellectual history of Greece and Rome based upon a study of the 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).**
- 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).**

Health (HLTH)

- 1300. Patterns of Healthful Living (3:3:0).** A study of patterns of mental, physical, and social development of the individual including relationships of individual and community health. [PHED 1304]
- 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).** Examination of the structural and functional traits of sexuality and how they affect well-being; covers relationships, reproduction, and lifestyle alternatives. [PSYC 2306] (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. [PHED 1346]
- 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.

- 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.
- 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.

Heritage Management (HMG T)

- 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 with 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 cultural 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).**

Honors (HONS)

- 1300. Honors First-Year Seminar (3:3:0).** Prerequisite: Enrollment in the Honors College or approval from the Honors Dean. An introductory course for first-year honors students, emphasizing in particular the development of critical thinking and oral and written communication skills through various disciplinary frameworks. Topics vary.
- 2115. Honors Integrated Science Laboratory I (1:0:2).** Corequisite: HONS 2305. A lab designed to supplement HONS 2305.
- 2116. Honors Integrated Science Laboratory II (1:0:2).** Corequisite: HONS 2306. A lab designed to supplement HONS 2306.
- 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.
- 3115. Honors Integrated Science Laboratory III (1:0:3).** Corequisite: HONS 3305. A lab designed to supplement HONS 3305.
- 3116. Honors Integrated Science Laboratory IV (1:0:3).** Corequisite: HONS 3306. A lab designed to supplement HONS 3306.
- 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; corequisite: HONS 3115. An integrated study of ecology, including a 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; corequisite: HONS 3116. 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.

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]

Human Sciences (HUSC)

- 1100. Introduction to Human Sciences (1:1:0).** Overview of the College of Human Sciences and instruction on how to study within the college can help prepare a student for academic and personal success. Topics include personal and family relationships, personal finance, nutrition, academic advising, etc. Required first semester.
- 2000. Special Studies (VI-6).** A course for lower-level human sciences majors for individual study or special problems.
- 3214. Human Sciences Seminar (2:2:0).** Prerequisite: Human Sciences majors only, junior or senior standing. Recommended to be taken one year prior to anticipated graduation. Integrative approach and professional orientation to societal issues, including public policy, ethics, cultural diversity, and global interdependence.
- 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.
- 5311. Problems in Human Sciences (3:3:0).** May be repeated for credit.
- 6000. Master's Thesis (V1-12).**

International Business (I B)

- 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.
- 3361. Exporting and Market Entry (3:3:0).** 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.
- 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.

Interior Design (I D)

- 1380. Introduction to Interior Design (3:3:0).** A survey of basic principles and concepts including aesthetics and processes relevant to planning residential and nonresidential environments.
- 1382. Interiors I (3:1:4).** 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 I D 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, I D 3385 and 3386 or concurrent enrollment, and a 2.0 cumulative GPA; enrollment required in spring immediately preceding I D 4307. Emphasis on preparation for inter-

rior design internship, career opportunities, job search, and interview strategies.

- 3311. Textiles for Interiors (3:2:2).** Prerequisite: A grade of C or higher in ADM 2311. Characteristics and composition of contemporary textiles used in nonapparel products. (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).** 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 I D 3382. Introduction to furniture and interior elements from 18th, 19th, and 20th centuries. The evaluation of forms, relationships to previous periods, and implications for current and future designs are emphasized.
- 3385. Advanced Design Processes (3:1:4).** Prerequisite: A C or higher in I D 2383, 3381, 3387, ENGL 2311 or concurrent enrollment, and successful completion of sophomore portfolio review. Emphasis on problem formulation, programming, design conceptualization, design development, working drawings, specifications, schedules, furniture selection, layout and design presentation, universal design, life safety, and building codes. (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 senior standing in interior design. 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 I D 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 I D 3385. Advanced experiences in residential and nonresidential design that integrate problem solving skills, building systems, techniques of graphic expression, materials and specifications, and aesthetic sensibility.
- 4406. Collaboration Studio (4:1:9).** 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.

Industrial Engineering (I E)

- 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.
- 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.
- 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 psycho-motor capabilities for the design of systems for effective human use and control.
- 5306. Safety Engineering (3:3:0).** Prerequisite: Consent of instructor. Loss prevention principles, practice, and regulations; accident factors, models, costs, and analysis; systems safety; product safety; safety and health related workplace hazards.
- 5307. Loss Assessment and Control (3:3:0).** Prerequisite: 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 variates. Statistical tests for randomness in random number streams. Collection and analysis of data for input parameters and distributions. Detection and removal of transients in simulation model data. Computation of variance of simulation model output; variance reduction techniques.
- 5318. Operations Research Modeling with Spreadsheets (3:3:0).** Development of models for linear, integer, and nonlinear programming; problem formulation, solution, and analysis. Monte Carlo models; sampling methods; and accuracy. Software for current spreadsheet packages.
- 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.
- 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. Compounding 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 (3:2:3).** 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).** Interdisciplinary Studies (I S)
- 1100. Tech Transition: Freshman Seminar (1:1:0).** Introduces students to philosophy, history, and applications of higher education.
- 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 skills components including personal, athletic, academic, and career development.
- 1300. Professional Enterprise (3:3:0).** Studies the role and functions of society, emphasizing the profession within that system.
- 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).**

Information Systems and Quantitative Sciences (ISQS)

- 2341. Business Computer Programming (3:3:1).** Prerequisite: ISQS 2440 and a 2.5 adjusted 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.
- 2440. Introduction to Computer Systems in Business (4:3:2).** Prerequisite: A 2.75 GPA and at least a C in any college-level mathematics course. This course surveys computer principles, procedures, hardware, and business-oriented computer systems. Students gain hands-on exposure to programming, information, and communication tools such as the Internet.
- 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 2440 MATH 2345, and a minimum 2.75 GPA. An overview of the production and operations function in organizations with examples of the application of computer and quantitative skills to management problems. Both design and operating problems are discussed.
- 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.
- 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).** Prerequisite: ISQS 5137. E-commerce technology and business environment. E-commerce planning and implementation, Internet technologies, Multimedia on the Web. Web-based databases. Designing and building e-commerce site.
- 5341. Business Problem Solving and Information Technology (3).** Prerequisite: ISQS 5137. This course develops business problem solving skills using logic information technology. A programming language will be used to reinforce skills to solve business problems.
- 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, estima-

tion, testing, regression, forecasting, and quality control.

- 5347. Advanced Statistical Methods (3:3:0).** Prerequisite: ISQS 5345. Emphasis on application and interpretation of statistical methods. Design of experiments, analysis of variance, multiple regression, and nonparametric procedures. Use of statistical computer packages.
- 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 of regression analysis using least squares procedures; model formulation, stepwise regression, transformations; the major topics in regression from the business applications viewpoint.
- 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 C++.
- 6338. Systems and Information Concepts in Organizations (3:3:0).** Prerequisite: ISQS 5341 and ACCT 5401. Advanced study of systems and information concepts in organizations. Models for representing systems, information models, enterprise architecture, general systems theory, and decision making processes.
- 6339. Data Base Management Systems (3:3:0).** Prerequisite: ISQS 6338; prerequisite or corequisite: ISQS 6337. Treatment of data as an organizational resource, objectives of data management, survey of commercial systems, data models, data base design, client-server data bases, object-oriented data base design, and administration.
- 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 5137 and a programming language. 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 Telecom Technology (3:3:0).** Prerequisite: ISQS 6341. Focuses on state-of-the-art Telecom technologies as well as their applications to solve business problems and/or create strategic advantage.
- 6343. Advanced Telecom Network Design and Management (3:3:0).** Prerequisite: ISQS 6341. Advanced technical and managerial aspects of designing an integrated communications network. An in-depth treatment of integrating voice, video, and other data in a network.
- 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. The use of multivariate analysis for solving business problems. MANOVA, factor, cluster, and discriminant analysis techniques. Computer-assisted analysis and graphic techniques.
- 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. Methodologies for Management Information Systems Research (3:3:0).** Prerequisite: Doctoral standing or consent of instructor. In-depth examination of MIS research methods and issues. First of three doctoral seminars in MIS research.
- 7342. Advanced Topics in MIS (3:3:0).** Prerequisite: ISQS 6337 and 6338. 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. Human and Organizational Issues in MIS Research (3:3:0).** An exhaustive review of human and organizational MIS research. Particular attention is given to synthesis and conceptual development of these topics.
- 7347. Structural and Process-Oriented Issues in MIS Research (3:3:0).** An exhaustive review of structural and process-oriented paradigms in MIS research. Particular attention is given to synthesis and conceptual development of these topics.

Italian (ITAL)

- 1301, 1302. A Beginning Course in Italian I, II (3:3:0 each).** [ITAL 1311, 1312]
- 2301, 2302. A Second Course in Italian I, II (3:3:0 each).** Prerequisite: ITAL 1301 and 1302, or equivalent. Reading, cultural background, conversation, and composition. [ITAL 2311, 2312]
- 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.
- 7000. Research (V1-12).**

Japanese (JAPN)

- 1501, 1502. A Beginning Course in Japanese I, II (5:5:1 each).** Introduction and development of the four language skills: listening comprehension, speaking, writing, and reading. [JAPN 1411, 1412]
- 2301, 2302. A Second Course in Japanese I, II (3:3:0 each).** Prerequisite: JAPN 1501 and 1502. Reading, cultural background, grammar review, conversation, and composition. [JAPN 2311, 2312]
- 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.

Journalism (JOUR)

- 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).** Prerequisite: 2.0 GPA, C or better in ENGL 0301 (if required), 1301, and 1302, sophomore standing, and pass the grammar, spelling, and punctuation exam. The evaluation of news; news gathering methods and problems; discussion and exercises in writing leads, organizing stories, overcoming grammatical and structural problems; control lab. (Writing Intensive) [COMM 2311]
- 3312. Reporting (3:2:3).** Prerequisite: JOUR 2310, and a 2.5 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 2.5 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: 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.
- 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.
- 5315. Special Topics in Journalism (3:3:0).** Prerequisite: JOUR 3312 or consent of instructor. A course in the reporting of selected topics. Topics will rotate. Lecture and discussion implemented through off-campus reporting assignments. May be repeated once when topic varies.
- 6315. Special Topics in Journalism (3:3:0).** A rotating topics course examining theory and research into ethical, political and organizational issues affecting news gathering, reporting and journalistic performance. May be repeated twice when topics vary.
- 7000. Research (V1-12).**

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.
- 4300. Seminar in Latin American and Iberian Studies (3:3:0).** Interdisciplinary studies in selected Latin American and Iberian topics. Readings and lectures in English. May be repeated once for credit with permission of the director.
- 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.

Landscape Architecture (LARC)

- 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.
- 2200. Landscape Architecture Portfolio Preparation (2:1:2).** Introduction to professional portfolio development for landscape architecture and preparation of individual portfolio for faculty review. S.
- 2308. Computer-Aided Design in Landscape Architecture (3:1:4).** Prerequisite: LARC 1402, LA majors only or consent of instructor. Hands-on introduction to current computer-aided design technology most applicable to landscape architecture. F.
- 2309. Advanced Computer-Aided Design in Landscape Architecture (3:1:4).** Prerequisite: LARC 2308, LA majors only. Exploration of contemporary applications of 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 2200 and 2402. Site analysis and design as they apply to projects of various scale, scope, and resolution. F.
- 3402. Master Planning (4:1:6).** Prerequisite: LARC 3401 and LARC 2404. Comprehensive design problems integrating aspects of site design, planting design and construction. S.
- 3403. Planting Design (4:1:6).** Prerequisite: LARC 3401 and PSS 3318. Theory and practice including plants in site design, planting design techniques, planting plans and technical specifications. S.
- 3404. Landscape Architecture Site Construction and Development (4:2:4).** Prerequisite: LARC 2404. Complex grading and drainage, drainage structures, horizontal and vertical circulation alignment in large scale site development. S.
- 4000. Internship (V1-6).** Minimum 8 weeks and prior departmental approval.
- 4001. Landscape Architecture Problems (V1-4).** An investigation of a problem in the profession of special interest to the student. Open to all advanced students.
- 4100. Seminar (1:1:0).** Prerequisite: Senior standing. Assigned readings, informal discussions, oral reports, and papers. F.
- 4101. Proposal Writing in Landscape Architecture (1:1:0).** 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).** Prerequisite: RWFM 2302 or consent of instructor. 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 1402. Environmental management principles and procedures. An investigation of land planning, environmental law, resource economics, and public policy to achieve sustainable development. S.
- 4311. Professional Practice (3:3:0).** Prerequisite: Fifth-year standing. Methods, procedures, and ethics of professional practice of landscape architecture. F.
- 4401. Urban Design (4:1:6).** Prerequisite: LARC 3402, LARC 3403 and LARC 3404. Public urban spaces and their surrounding built edges. Organization, form, and character of streets, parks, and plazas. F.
- 4402. Regional Planning and Design (4:1:6).** Prerequisite: LARC 2309 and 4401. Regional landscape planning and design in landscape architecture based on natural and cultural resource factors. S. (Writing Intensive)
- 4404. Landscape Architecture Materials and Details (4:2:4).** Prerequisite: LARC 3404. Introduction of landscape architecture construction systems, materials, irrigation, retaining walls, lighting, structures, joining of materials, and implementation drawings. F.
- 4405. Landscape Architecture Senior Project (4:1:6).** Prerequisite: LARC 4406 and 4101. Individual design demonstration project representing comprehensive skilled synthesis of knowledge and professional skills developed in study of landscape architecture. S. (Writing Intensive)
- 4406. Collaboration Studio (4:1:9).** Prerequisite: LARC 2309 and 4402. An interdisciplinary studio for the design professions which address the process and skills necessary for collaboration and teamwork. F.
- 5001. Special Problems in Landscape Architecture (V1-4).** Selected problems based on student's needs and interests not included in other courses. May be repeated for credit with approval of department.
- 5302. Advanced Environmental Planning for Sustainable Development (3:3:0).** An introduction to environmental planning issues with emphasis on the integration of related disciplines to attain environmentally and socially sustainable development.
- 5303. Advanced Environmental Management for Sustainable Development (3:3:0).** Theory, principles, and strategies for public and private landscape protection.
- 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.
- 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.
- 5312. Planning Design (3:1:2).** Prerequisite: PSS 6001. The characteristics of plants with their forms in the landscape. Special emphasis on preparation of planting plan.
- 5314. Landscape Architecture Grading and Drainage (3:2:2).** Introduction to site grading and drainage, earthwork and runoff computations and site implementation drawing techniques.
- 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.
- 5316. Landscape Architecture Materials and Details (3:2:2).** Prerequisite: LARC 5315. The study of landscape architecture site construction and materials, products and their application and integration to the man-made environment.
- 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.
- 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.
- 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.
- 6102. Administrative Aspects of Landscape Architecture (1:1:0).** The methods, procedures, and organizational structure of professional practice in landscape architecture.
- 6203. Thesis Research, Preparation, and Organization (2:2:0).** Prerequisite: LARC 6301. Preparation of thesis project content, selection of the thesis committee, and the proposal submission to the Graduate Studies Committee for approval.
- 6301. Research Methodology for Planning and Design (3:3:0).** Introduction to the research process and methods used in the design-planning field.
- 6304. Regional Land Resource Analysis (3:1:4).** Principles and techniques of the environmental systems approach to inventory, analysis, and determination of land capability and suitability as a key determinant in the land use planning process. Identification of ecologically sensitive resource areas and sites desirable for open space, conservation, and recreational use. Methods of regional economic, transportation, governmental structure and operation, public services and communication systems analysis will be related to the land use planning process.
- 6306. Special Problems (3:3:0).** Prerequisite: Consent of instructor. Methods of interpretation of planning and designing projects that influence the historical, ethnic, and cultural aspects of a region.
- 6401. Urban Design (4:1:6).** Prerequisite: LARC 5402, LARC 5315. Analysis, planning and design of urban environments with emphasis on urban development theories, municipal regulations, and master plan development.
- 6402. Regional Landscape Planning (4:1:6).** Prerequisite: LARC 5308, LARC 6401. Theory of planning and design for large scale regional landscape, including an intensive geographic information system (G.I.S.) seminar.
- 6406. Collaboration Design (4:1:9).** Prerequisite: LARC 5308, LARC 6402. An interdisciplinary studio for landscape architects, architects, and interior designers addressing the process and skills necessary for collaboration and teamwork.
- 7000. Research (V1-12).**

Latin (LAT)

- 1501, 1502. A 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. A Second Course in Latin I, II (3:3:0 each).** Prerequisite: LAT 1501 and 1502 or 1507. Review; selected readings from standard authors. [LATI 2311, 2312]
- 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).** Content varies to meet students needs. May be repeated for credit with consent of instructor. Major works of selected Latin writers.
- 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, biography, and the novel. Topics may vary. May be repeated for credit.
- 7000. Research (V1-12).**

Library Research (LIBR)

- 1100. Introduction to Library Research (1:1:0).** Designed to teach students how to do basic research in a university library.

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.
- 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 linguistic 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).**
- Land-Use Planning, Management, and Design (LPMD)*
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**
- Mechanical Engineering (M E)*
- 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 1308. 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 1308. Properties of pure substances, ideal gas behavior, first and second law analysis, and applications to energy conversion and power cycles.
- 2464. Engineering Mechanics I (4:4:0).** Prerequisite: MATH 2352 and PHYS 1308. Corequisite: M E 2315. An introduction to statics and solid mechanics.
- 3164. Engineering Mechanics II Laboratory (1:0:3).** Corequisite: M E 3364. Introduces students to the use of finite elements software to perform load and stress analysis on mechanical components.
- 3165. Introduction to Design Lab (1:0:3).** Prerequisite: M E 3364, 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 2464 and 3311. Evaluating and reporting the characteristics of materials and mechanical systems.
- 3331. Dynamics (3:3:0).** Prerequisite: MATH 2350 and ME 2464 (or CE 2301). Kinematics and kinetics of particles and rigid bodies. [ENGR 2302]
- 3364. Engineering Mechanics II (4:3:3).** Prerequisite: M E 2464 and E GR 1306; 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 3364 and 3164; corequisite: M E 3165. Analysis, design, and evaluation of mechanical elements.
- 3370. Fluid Mechanics (3:3:0).** Prerequisite: ME 2322 and 2464 (or CE 2301). 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.
- 4331. Individual Study in Mechanical Engineering (3).** Prerequisite: ME 3364 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 3433. 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 3465. 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, 3465, 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 characteristic of 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.
- 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.
- 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.
- 5315. Mechatronics (3:3:0).** Prerequisite: M E 3433 and an ability to program computers. Electro-mechanical device interfacing, real-time programming, data acquisition, signal processing. Applications in automation, robotics, and other electro-mechanical systems.
- 5316. Advanced Vibrations (3:3:0).** Prerequisite: ME 3331, 3433, or consent of instructor. Vibration of single and multiple-degree of freedom systems, continuous systems, FE formulation, computer sided modal analysis, random vibrations.
- 5321. Thermodynamics (3:3:0).** Prerequisite: ME 3322 or consent of instructor. Classical macroscopic theory with an emphasis on availability concepts in nonreacting, reacting, single phase, and multicomponent systems.
- 5322. Conduction Heat Transfer (3:3:0).** Prerequisite: ME 3371 or consent of instructor. Fundamental principles of heat transmission by conduction. Multidimensional steady and transient analysis using various analytical and computational methods.
- 5323. Two-Phase Flow and Heat Transfer (3:3:0).** Prerequisite: ME 3371. Liquid-vapor two-phase flow hydrodynamics, boiling and condensation heat transfer, mechanisms and prediction methods.
- 5325. Convection Heat Transfer (3:3:0).** Prerequisite: ME 3371 or consent of instructor. Fundamental principles of heat transmission by convection; theoretical, numerical, and empirical methods of analysis for internal and external flows.
- 5326. Combustion (3:3:0).** Prerequisite: 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. Fundamental laws of motion for Newtonian viscous fluids in steady laminar and turbulent boundary layers. Utilization of analytical and approximate methods to obtain solutions for viscous flows.
- 5332. Potential Flow (3:3:0).** Prerequisite: M E 3370. The study of inviscid incompressible flows. Topics include stream functions and velocity potential, vorticity dynamics, and applications to aerodynamics.
- 5334. Gas Dynamics (3:3:0).** Prerequisite: M E 3370 or consent of instructor. Development of basic equations for compressible flow, normal and oblique shocks, flow-through nozzles and ducts, external flows.
- 5335. Mathematical Models of Turbulence (3:3:0).** Prerequisite: M E 5330. Nature of turbulence, the Reynold's equations, and the transport equations for Reynold's stresses. Different kinds of closure models and their application to boundary layer flows.
- 5336. Computational Fluid Dynamics (3:3:0).** Prerequisite: M E 5301 or equivalent. Simultaneous solution of momentum, heat, and mass transfer problems by applying various computational techniques.
- 5340. Plasticity (3:3:0).** Prerequisite: Consent of instructor. Stress-strain relations for plasticity and viscoplasticity, variational principles, finite element method, radial return algorithm, elements of limit analysis, and solutions of problems with elements of design.
- 5341. 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.

- 5342. Fracture and Failure Analysis (3:3:0).** Prerequisite: ME 5341. Engineering aspects of failure. Failure mechanisms and related environmental factors. Principles of fracture mechanics and fractography. Techniques for failure analysis and prevention.
- 5343. Continuum Mechanics (3:3:0).** Prerequisite: Consent of instructor. Basic balance equation in tensor form, as well as constitutive equations for elastic, viscous, plastic solids and liquids.
- 5345. Computational Mechanics I (3:3:0).** Prerequisite: One or more of the following courses M E 5311, 5340, 5341, 5343. Finite element method for elastic problems, Galerkin weighted residual and variational approaches to numerical solutions of mechanical problems, error estimates and adaptive FE refinement, iterative algorithms for nonlinear problems, static elastoplastic and elastoviscoplastic problems, general purpose finite element codes.
- 5346. Computational Mechanics II (3:3:0).** Prerequisite: One or more of the following courses M E 5311, 5340, 5341, 5343. Finite element method for dynamic elastic problems, time integration schemes for dynamic problems, iterative algorithms for nonlinear dynamic problems, heat transfer analysis, coupled thermomechanical problems, accuracy analysis, general purpose finite element codes.
- 5347. Phase Transformation I (3:3:0).** Prerequisite: M E 3311 and 5341. Shape memory effect, pseudoelasticity, pseudoelasticity. 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 5340 and 5347. Strain-induced phase transformations, transformation-induced plasticity. Continuum thermodynamics and kinetics of interaction between phase transformation and plasticity.
- 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 micro-system 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).**

Mathematics (MATH)

- 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.
- 1300. Contemporary Mathematics (3:3:0).** Prerequisite: Score on mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302. Quantitative literacy and problem solving with applications to finance, population dynamics, politics, and business. Only one course from among MATH 1300, 1320, and 1420 can be counted towards the mathematical and logical reasoning core requirements.
- 1320. College Algebra (3:3:0).** Prerequisite: Score on the mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302. Inequalities; determinants; theory of equations; binomial theorem; progressions; mathematical induction. Only one course from among MATH 1300, 1320, and 1420 can be counted towards the mathematical and logical reasoning core requirements. [MATH 1314]
- 1321. Trigonometry (3:3:0).** Prerequisite: Score on the mathematics placement examination of 4 or higher MATH 1320, or a grade of A in MATH 0302. Trigonometric functions; radians; logarithms; solutions of triangles; identities; trigonometric equations; complex numbers; De Moivre's Theorem. [MATH 1316]
- 1330, 1331. Introductory Mathematical Analysis (3:3:0 each).** Prerequisite for 1330: Score on the mathematics placement examination of 3 or higher or a grade of B or better in MATH 0302 or 1300. Prerequisite for 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, and mathematics of finance. MATH 1331 contains differential, integral, and multivariable calculus. [MATH 1324, 1325]
- 1350. Analytical Geometry (3:3:0).** Prerequisite: Score on the mathematics placement examination of 6 or higher and knowledge of basic trigonometry or MATH 1320 and 1321. Fundamental concepts of analytical geometry. [MATH 1348, 2312]
- 1351. Calculus I (3:3:0).** Score on the mathematics placement examination of 7, MATH 1350, 1550, or score on MPE of 5 and MATH 1321. Differentiation of algebraic and transcendental functions, applications of the derivative, differentials, indefinite integrals, definite integrals. (Honors section offered.) [MATH 2313]
- 1352. Calculus II (3:3:0).** Prerequisite: MATH 1351 or consent. Methods of integration, parametric equations, polar coordinates, hyperbolic functions, applications. (Honors section offered.) [MATH 2314]

- 1420. College Algebra With Review (4:3:2).** Prerequisite: MPE code 2 or higher or grade of B in MATH 0301. Review of topics from high school algebra, inequalities, functions and graphs, linear systems, sequences, mathematics induction. Only one course from among MATH 1300, 1320, and 1420 can be counted towards the mathematical and logical reasoning core requirements.
- 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).** 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. [MATH 1342]
- 2322. Analytical Geometry and Calculus for Engineering Technology I (3:3:0).** Prerequisite: Score on MPE of 6 or higher or MATH 1320 and 1321. This course is intended for students of engineering technology. It covers selected topics in analytical geometry and stresses the geometric and physical aspects of calculus.
- 2323. Calculus for Engineering Technology II (3:3:0).** Prerequisite: MATH 2322. This course is a continuation of MATH 2322.
- 2345. Introduction to Statistics with Application to Business (3:3:0).** Prerequisite: At least a C in MATH 1330. Statistics and probability for business. Data collection, description, interpretation, prediction, inference, and computer software.
- 2350. Calculus III (3:3:0).** Prerequisite: MATH 1352. Partial differentiation; functions of several variables; multiple integrals, line integrals, surface integrals, Stokes Theorem. (Honors section offered.) [MATH 2315]
- 2360. Linear Algebra (3:3:0).** Prerequisite: MATH 1352. Finite-dimensional vector spaces; linear transformations and matrices; eigenvalues and eigenvectors. [MATH 2318]
- 2370. Elementary Analysis I (3:3:0).** Prerequisite: MATH 1320, and sophomore standing. Analytic geometry and the real number system with applications. Not for engineering, science, or mathematics majors.
- 2371. Elementary Analysis II (3:3:0).** Prerequisite: MATH 1350 or 2370. Elementary differential and integral calculus with application. Not for engineering, science, or mathematics majors.
- 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.
- 3351. Higher Mathematics for Engineers and Scientists II (3:3:0).** Prerequisite: MATH 3350 or 3354. Partial differential equations and numerical methods. MATH 3351 and 4354 cannot both be counted toward a mathematics major or minor.
- 3354. Differential Equations I (3:3:0).** Prerequisite: MATH 2350 and 2360. Solutions of ordinary differential equations; geometric and physical applications. MATH 3350 and 3354 may not both be counted toward a mathematics major or minor.
- 3360. Foundations of Algebra I (3:3:0).** Prerequisite: MATH 2360. Fundamental concepts of abstract algebra. Primarily group theory. (Writing Intensive)
- 3370. Elementary Geometry (3:3:0).** Prerequisite: MATH 2370 and junior standing. Congruence and measures of plane and solid figures; similarity; areas; volumes; and a brief introduction to concepts in probability and statistics.
- 3371. Elements of Finite Mathematics (3:3:0).** Prerequisite: MATH 1331, 1351, or 2371. Combinatorics, probability theory, Bayes' Theorem, Bernoulli Trials. Probability distributions and statistics. Not for engineering, science, or mathematics majors.
- 3430. Computational Techniques for Science and Mathematics (4:3:2).** Prerequisite: MATH 2360. Emphasis on scientific computing and problem solving techniques using state-of-the-art mathematics software packages. Restricted to mathematics majors or students enrolled in a secondary mathematics teacher program.
- 4000. Selected Topics (V1-3).** Prerequisite: Consent of undergraduate program director. Selected topics in upper division mathematics. May be repeated for credit.
- 4310. Introduction to Numerical Analysis I (3:3:0).** Prerequisite: MATH 3350 or 3354, including an elementary knowledge of programming or consent of instructor. Interpolation, approximations, numerical integration, and differentiation.
- 4312. Introduction to Numerical Analysis II (3:3:0).** Prerequisite: MATH 2360, including an elementary knowledge of programming or consent of instructor. Numerical techniques in linear algebra.
- 4330. Mathematical Computing (3:3:0).** Prerequisite: Consent of the Director of Undergraduate Programs, Department of Mathematics and Statistics. Topics from 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.)
- 5101. Seminar in Algebra (1:1:0).** Discussion of current research and topics of interest in algebra. Must be taken pass-fail. May be repeated for credit.
- 5102. Seminar in Analysis (1:1:0).** Discussion of current research and topics of interest in analysis. Must be taken pass-fail. May be repeated for credit.
- 5103. Seminar in Control Theory (1:1:0).** Discussion of current research and topics of interest in control theory. Must be taken pass-fail. May be repeated for credit.
- 5104. Seminar in Statistics (1:1:0).** Discussion of current research and topics of interest in statistics. Must be taken pass-fail. May be repeated for credit.
- 5105. Seminar in Topology (1:1:0).** Discussion of current research and topics of interest in topology. Must be taken pass-fail. May be repeated for credit.
- 5106. Seminar in Applied Mathematics (1:1:0).** Discussion of current research and topics of interest in applied mathematics. Must be taken pass-fail. May be repeated for credit.
- 5107. Seminar in Biomathematics (1:1:0).** Discussion of current research and topics of interest in biomathematics. Must be taken pass-fail. May be repeated for credit.
- 5310, 5311. Principles of Classical Applied Analysis I, II (3:3:0 each).** Fourier series and integrals, discrete Fourier series, Laplace transforms, calculus of variations, Sturm-Liouville problems, integral equations, equations of fluids and solids, and ordinary and partial differential equations.
- 5312. Control Theory I (3:3:0).** Prerequisite: MATH 2360, 3354, 4351, or consent of instructor. Linear dynamical systems, stability, frequency response and Laplace transform, feedback, state-space description, and geometric theory of linear systems. (M E 5312)
- 5313. Control Theory II (3:3:0).** Prerequisite: MATH 5312, 5316, 5318, or consent of instructor. Quadratic regulator for linear systems, Kalman filtering, non-linear systems, stability, local controllability, and geometric theory of non-linear systems. (M E 5313)
- 5316. Applied Linear Algebra (3:3:0).** Prerequisite: Consent of instructor. Solution of linear systems, matrix inversion, vector spaces, projections, determinants, eigenvalues and eigenvectors, Jordan form, computational methods, and applications.
- 5318, 5319. Intermediate Analysis I, II (3:3:0 each).** The real number system, introduction to metric spaces, sequences, continuity, differentiation, Riemann integration, power series, functions of several variables, and differential forms.
- 5320, 5321. Functions of a Complex Variable I, II (3:3:0 each).** Prerequisite: MATH 4350 or 4356. Analytic functions as mappings; Cauchy theorems, Laurent series, maximum modulus theorems and ramifications; normal families; Riemann mapping theorem; Weierstrass factorization theorem; Mittag-Leffler theory; analytic continuation; and harmonic functions.
- 5322, 5323. Functions of a Real Variable I, II (3:3:0 each).** Prerequisite: MATH 5319 or equivalent. General measure and integration theory, Lp 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 semi-group 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).
- Microbiology (MBO)**
- 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.
- 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: MBO 3401. Anatomy and physiology of the bacterial cell: molecular approach.
- 4307. Industrial Microbiology (3:3:0).** Prerequisite: MBO 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: MBO 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 for 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: MBO 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: MBO 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: MBO 3401 or consent of instructor. The principles of genetic systems existing among microorganisms, with emphasis upon bacteria and bacteriophages.
- 5301. Advanced General Microbiology (3:2:3).** Prerequisite or parallel: Organic chemistry. Content is similar to that of MBO 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 MBO 3401. F, S.
- 5303. Microbe-Plant Interactions (3:3:0).** Prerequisite: MBO 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 MBO 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 MBO 4402 except that readings or research in one area of immunology is required. May not be taken for credit by students who have taken MBO 4402. S.
- 5404. Pathogenic Microbiology (4:3:4).** Prerequisite: MBO 3401 or 5301; may not be taken for credit by students who have received credit for MBO 4404. A detailed study of pathogenic microorganisms. S, odd years.
- 5408. Microbial Genetics (4:3:3).** Prerequisite: MBO 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 MBO 4406. F.
- 6000. Master's Thesis (V1-6).**
- 6302. Advanced Bacterial Physiology (3:3:0).** Prerequisite: MBO 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.

Mass Communications (MCOM)

- 1300. Introduction to Mass Communications (3:3:0).** A broad survey of communications in modern life with particular emphasis on print media, broadcasting, advertising, and public relations. [COMM 1307]
- 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, 2300, or 2345. Comprehensive overview of mass communications research focusing on planning, designing, conducting, analyzing, interpreting, and applying research to address communication issues and problems.
- 4000. Special Problems in Mass Communications (V1-3).** Prerequisite: Consent of instructor. Individual research on approved problems or projects in mass communications areas. May be repeated for 3 hours credit.
- 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 (V1-6).**
- 6050. Master's Report (V1-6).**
- 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 (V1-12).**

Marriage and Family Therapy (MFT)

- 5300. Introduction to Marriage and Family Therapy Practice (3:3:0).** Prerequisite: Consent of instructor. Analyses of and solutions for common problems in marriage and family therapy practice.
- 5301. Family Therapy I (3:3:0).** Prerequisite: Consent of instructor. Examination of structural, strategic, and systemic approaches to family therapy including the work of Minuchin, Haley, Mental Research Institute, and Milan Associates.
- 5302. Family Therapy II (3:3:0).** Prerequisite: Consent of instructor. Examination of transgenerational and object relations approaches to family therapy including the work of Bowen, Boszormenyi-Nagy, Whitaker, and Satir.
- 5304. Systemic Evaluation in Couple and Family Therapy (3:3:0).** Prerequisite: Consent of instructor. This course provides an in-depth examination of a systemic approach to clinical evaluations. Students receive training in administration and application of systemic assessment methods.
- 5322. Family Systems (3:3:0).** Application of general systems theory and cybernetics to family systems. 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).**

Management (MGT)

- 3370. Organization and Management (3:3:0).** Prerequisite: Minimum 2.75 GPA. The management function; basic principles, concepts, and practices in the operation of organizations.
- 3373. Managerial Communication (3:3:1).** Prerequisite: Junior standing, ISQS 2440, 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. Principles and methods in general personnel management and work force maintenance.
- 3376. Organizational Behavior (3:3:0).** Prerequisite: MGT 3370. 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. 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. 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. 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; 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; 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 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. 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; 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; 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; 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 majors or Honors College student. Offers interdisciplinary perspective on development of management knowledge.
- 4388. Change and Innovation Processes (3:3:0).** Prerequisite: MGT 3370; 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. Study and cases in social responsibility, business ethics, and other problems in the external environment of the business organization.
- 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 health care systems 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: ACCT 5401, MGT 5376, and MKT 5360. 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 strategy development for managing organizational stakeholders.
- 5375. Organization Theory (3:3:0).** Prerequisite: Consent of instructor. A study of basic organization theory concepts and application of these concepts to the analysis and structure of organizations.
- 5376. Executive Skills (3:3:1).** Prerequisite: Admission to the MBA program. Develop self-awareness of personal attributes and goals, enhance personal development, and impart skills needed to function as future executives.
- 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).** Management and business issues involved in running family firms. Emphasis is on entrepreneurial family firms.
- 5379. Global Entrepreneurship (3:3:0).** Exploration of organization and management issues in global enterprise.
- 5381. Managing Innovation and Change (3:3:0).** 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 Management (3:3:0).** Prerequisite: Completion of program core requirements or consent of advisor or instructor. Total enterprise integrative perspective based on general management consulting experience. For MSA or MBA entrepreneurial studies students.
- 5491. Strategic and Global Management (4:4:0).** Prerequisite: Completion of tool and intermediate core courses in MBA program. Global and local strategy formulation and implementation of corporate, business, and functional strategies. MBA capstone course.
- 6303. 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.

Military Science (MILS)

- 1101. Introduction to Military Subjects (1:1:1).** Designed to acquaint students with the basic customs, courtesies, and traditions of the Army. Training is introductory in scope and includes leadership, written and oral communications, physical fitness, and general military subjects to include land navigation, rappelling, marksmanship, and weapons safety. Student's role is principally one of becoming a good follower, team member, and peer leader.
- 1102. Introduction to Military Subjects (1:1:1).** Provides practical application of individual tactical techniques and skills. Classroom instruction and field training focuses on applied leadership and management techniques from the Army perspective.
- 2201. A Study of Military Organization and Affairs (2:2:1).** Prerequisite: MILS 1101 and 1102 or consent of instructor. Continues development of basic leadership and critical survival skills. Designed to build proficiency and confidence in the student's own leadership abilities. The student's role is principally one of team leader and assistant student instructor. Course places additional emphasis on physical fitness and applied management skills.
- 2202. Military Traditions and Basic Soldier Skills (2:2:1).** Prerequisite: MILS 2201 or equivalent. Intensified leadership training, with emphasis on leadership, ethics, operations and tactics, first aid, general military subjects and physical fitness.
- 2203. Individual Studies in Military Subjects (2).** Prerequisite: Consent of instructor. Individualized studies of military organization, affairs, traditions, and basic soldier skills.
- 3301. A Study of Senior-Subordinate Relations, Decision Making, and Military Skills (3:3:1).** Prerequisite: Lower division military science courses or equivalent or consent of department chairperson. The course is designed to prepare the student for a successful military career as a United States Army Officer. It studies proven leadership techniques, examines the Army decision-making and orders process, provides a basic understanding of small-unit tactics, and improves the student's understanding of basic soldiering skills. Physical training is required three days a week and a field training exercise is conducted to complement the classroom and lab training.
- 3302. Practical Applications of Military Leadership and Planning (3:3:1).** Prerequisite: Lower division military science courses or equivalent or consent of department chairperson. The course is designed to prepare the student for a successful military career as a United States Army Officer. It expands upon the student's knowledge of small-unit tactics, leadership techniques, and basic soldiering skills. The course focuses on the employment of platoon and squad size units and practices the military application of land navigation and basic rifle marksmanship. Physical training is required three days a week and a field training exercise is conducted to complement the classroom and lab training.
- 3303. Individual Studies in Military Leadership and Planning (3).** Prerequisite: Consent of Instructor. Individualized studies of military leadership and planning.

Marketing (MKT)

- 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 collection, analysis, and interpretation of data as applied to the solution of marketing problems.
- 4351. Retail Marketing (3:3:0).** Prerequisite: ACCT 2300 and at least a C in MKT 3350. Comprehensive introduction to an evaluation of retailing with emphasis on profit elements, pricing and merchandising policies, inventory and merchandising control.
- 4354. Market Promotion (3:3:0).** Prerequisite: MKT 3352. Management of the promotional mix of advertising, personal selling, and sales promotion. Emphasizes the interaction and coordination of these three elements and relates them to the other components of the firm's marketing strategy.
- 4358. International Marketing (3:3:0).** Prerequisite: At least a C in MKT 3350. A survey of international marketing principles, cultural differences, world markets, and political constraints.
- 4359. Sales Management (3:3:0).** Prerequisite: At least a C in MKT 3350. Problems and methods of organization and administration of sales departments, sales operations, sales control, sales promotion, and sales policies.
- 4360. Marketing in E-Business Environments (3:3:0).** Prerequisite: At least a C in MKT 3350. Overviews the Internet and marketing-related technological developments. Primary focus is on strategic issues in creating market advantages in electronic commerce.
- 4381. Individual Problems in Marketing (3).** Prerequisite: Consent of instructor. For students with high academic achievement who are interested in enhancing their degree program by pursuing individual research or study under the guidance of a marketing faculty member.
- 4382. Internship in Marketing (3).** Prerequisite: At least 6 hours of approved marketing courses and approval prior to employment. Internship must include at least 10 consecutive calendar weeks of full-time employment; compensation must be commensurate with the work assignment for the entire internship.

- 4383. Special Topics in Marketing (3:3:0).** Prerequisite: Consent of instructor. Examines specialized problems relating to marketing. May be repeated once for credit as topic varies.
- 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 Methods I (3:3:0).** Prerequisite: Consent of instructor. A survey of quantitative methods for and issues in the analysis of marketing data.
- 5356. Marketing Research for Decision Makers (3:3:1).** Prerequisite: ISQS 5345, MKT 5360. Marketing research methods with emphasis on data collection and analysis for solving marketing problems.
- 5358. Business-to-Business Marketing (3:3:0).** Prerequisite: MKT 5360. Designed to provide an overview of the many diverse facets of business-to-business marketing. Specific topics include selling to large businesses, buyer-seller relationships, supply-chain management, strategic alliances, and the effect of the Internet on business-to-business marketing.
- 5359. Individual Study in Marketing I (3:3:2).** Prerequisite: Consent of instructor. Directed individual study of advanced marketing problems varying with the need of the particular student. Can be repeated for credit if subject matter is different.
- 5360. Marketing Concepts and Strategies (3:3:0).** This course examines marketing functions, the institutions which perform them, and the study of marketing planning, strategy, and tactics. Includes the organization, execution, and control of the marketing effort.
- 5361. Marketing Administration (3:3:0).** Prerequisite: MKT 5360 or equivalent. A study of marketing planning and strategic issues related to the marketing effort.
- 5362. Multinational Marketing (3:3:0).** Prerequisite: 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. Research Methods II (3:3:0).** Prerequisite: Advanced graduate standing and MKT 5355 or consent of instructor. An in-depth examination of measurement issues, including latent constructs and data-gathering procedures in marketing.

Manufacturing Systems and Engineering (MSE)

- 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.

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.
- 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 Project Management and Quality Control (3:3:0).** Prerequisite: Consent of coordinator. Introduction to project management, including evaluation, planning, and implementation. The course also 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).** 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.

(Music) Student Teaching All-Level (MUAL)

- 4000. Student Teaching in Music All-Level (V1-12).** Prerequisite: Attainment of admission standards for student teaching. Supervised teaching involving a period of major responsibility for instruction and learning in an accredited school.

Applied Music (MUAP)

- Applied music instruction is offered in baritone, bassoon, carillon, clarinet, cornet or trumpet, double bass, flute, guitar, harp, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, tuba, viola, violin, violoncello, and voice.
- 1103,1104. Percussion (1:0:2 each).** Fundamentals of playing and teaching percussion instruments. Laboratory ensemble experience.
- 1105,1106,2105,2106. Keyboard Skills (1:0:2 each).** Sight reading and ensemble skills. Required of all piano majors for two semesters. Enrollment limited to piano majors, or by instructor consent.
- 1113,1114. Voice (1:0:2 each).** Correct posture and studies for breath control; development of resonance; study of vowel formation; vocalization. Simple songs. Laboratory ensemble experience. [MUSI 1183, 1184]
- 1123,1124. Group Keyboard Instruction I and II (1:0:2 each).** Beginning instruction in piano and electronic keyboards. Sight reading, harmonization and transposition, solo and ensemble repertoire, and playing techniques.
- 1303. Singers' Diction I (3).** Singers' diction in Latin, Italian, and English utilizing the International Phonetic Alphabet. Prerequisite for MUAP 1304.
- 1304. Singers' Diction II (3).** Prerequisite: MUAP 1303. Singers' diction in French and German utilizing the International Phonetic Alphabet.
- 2103,2104. Strings (1:0:2 each).** 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).** Beginning and intermediate instruction in guitar; basic left and right hand approaches of classical technique; basic chords and accompaniment styles. [MUSI 1192, 1193]
- 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. [MUSI 1168, 2168]
- 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. [MUSI 1263]
- 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. [MUSI 1166, 1167]
- 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).**
- 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 ap-

plied 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)

- 1201, 1202. Introduction to Contemporary Music (2 each).** 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.) [MUSI 1286, 1287]
- 2301, 2302. Music Composition (3 each).** For composition majors. Prerequisite: MUCP 1202 or the equivalent. Work in traditional forms and media and also electronic media, together with the principles of notation, layout, reproduction, and copyright. May be an individual study course.
- 3001. Projects in Electronic and Experimental Music (V2-4).** 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.
- 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)

- 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.
- 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)

- 1103. Marching Band (1:0:5).**
- 2100. New Music Ensemble (1:0:3).**
- 3101. Choir (1:0:3).** [MUSI 1141, 1151]
- 3102. Music Theatre (1:0:3).** [MUSI 1158, 1159]
- 3103. Band (1:0:3).** [MUSI 1127]
- 3104. Orchestra (1:0:5).** [MUSI 1129]
- 3105. Jazz Ensemble (1:0:3).** [MUSI 1121]
- 3106. Small Ensemble (1:0:1).** [MUSI 1131]
3110. Medium Ensemble (1:0:2).
- 3201. University Choir (2:0:5).** [MUSI 1241]
- 3202. Music Theatre (2:0:5).** [MUSI 1258, 2159]
- 3203. Band (2:0:5).** [MUSI 1227]
- 3204. Orchestra (2:0:5).** [MUSI 1229]
- 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)

- 1308. Music Appreciation (3:3:0).** Beginning course for nonmajors. Encourages appreciation of music through consideration of a variety of musical styles. [MUSI 1306]
- 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).** 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 and 2302. Topics may cover any historical period of music, music literature, or composers. May be repeated under a different topic.
- 4321. Constructs in Ethnomusicology (3:3:0).** Detailed examination of topics in ethnomusicology (the study of musical behavior in its original contexts) and its history, philosophies, methods and areas of study.
- 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)

- 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)

- 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)

- 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).** Basic elements of music with appropriate techniques and principles of singing, playing, 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).** [MUSI 2262] 5100. Teaching Music in College (1).
- 5310. Historical and Critical Perspectives in Music (3:3:0).** Historical and critical overview of the field including introduction to major theories and methodologies, study of particular artists, works or movements that provide insight into specific creative techniques, basic media and techniques of the field; and interdisciplinary relationships with the other arts. Not for music majors.
- 5314. Music in Contemporary Context (3:3:0).** Contemporary issues in the field including current artistic trends, theory and criticism, organization (e.g., funding, administration), and cultural policy (e.g., education, assessment, multicultural issues, censorship).
- 5341. Introduction to Technology for Musicians (3:3:0).** Introduction to technological resources for all aspects of the musical experience, primarily from the standpoint of the Macintosh operating system. Topics covered include computer-assisted instruction, music printing, MIDI sequencing, digital sampling, HyperCard software development, and nonmusic topics such as word processing, graphics, multimedia, and electronic communication.
- 5342. Advanced Technology for Musicians (3).** Prerequisite: MUSI 3341 or 5341 or consent of instructor. Intensive and extensive student-centered study topics to be selected from programming and software development in music, MIDI sequencing, multimedia development, advanced music notation, and digital sampling and synthesis.
- 7000. Research (V1-12).**
- 7301. Music Bibliography and Research (3).** Required of all doctoral students.
- 8000. Doctor's Dissertation (V1-12).**
- 8301, 8302, 8303, 8304. Doctoral Performance Projects I-IV (3 each).** Individual directed projects in music performance or composition.

Museum Science (MUSM)

- 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).**

Music Theory (MUTH)

- 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).** 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).** Prerequisite: Completion of MUTH 1303 and 1103 with a grade of C or better, or equivalent. Corequisite: MUTH 1304. Dictation, sight-singing, and keyboard skills.
- 1300. Songwriting (3:3:0).** A beginning course for nonmusic majors. A practical approach to music theory through songwriting. Includes aural training, notation, textual setting, melodic writing, and chord assignment. [MUSI 1300]
- 1301. Introduction to Music Theory (3:3:0).** Corequisite: MUTH 1101. An introduction to the elements of melody, rhythm, harmony, and sight-singing. [MUSI 1301]
- 1303. Elementary Music Theory I (3:3:0).** Corequisite: MUTH 1103. For music majors or with consent of instructor. Melody, rhythm, and diatonic harmony.
- 1304. Elementary Music Theory II (3:3:0).** Prerequisite: Completion of MUTH 1303 and 1103 with a grade of C or better, or equivalent. Corequisite: MUTH 1104. Melody, rhythm, and diatonic harmony.
- 2103. Intermediate Aural Skills I (1:0:2).** Prerequisite: Completion of MUTH 1304 and 1104 with a grade of C or better, or equivalent. Corequisite: MUTH 2303. Dictation, sight-singing, and keyboard skills.
- 2104. Intermediate Aural Skills II (1:0:2).** Prerequisite: Completion of MUTH 2303 and 2103 with a grade of C or better, or equivalent. Corequisite: MUTH 2304. Dictation, sight-singing, and keyboard skills.
- 2303. Intermediate Music Theory I (3:3:0).** Prerequisite: Completion of MUTH 1304 and 1104 with a grade of C or better, or equivalent. Corequisite: MUTH 2103. Diatonic and chromatic harmony.
- 2304. Intermediate Music Theory II (3:3:0).** Prerequisite: Completion of MUTH 2303 and 2103 with a grade of C or better, or equivalent. Corequisite: MUTH 2104. Diatonic and chromatic harmony; survey of twentieth-century techniques.
- 3303. Form, Analysis, and Synthesis (3:3:0).** Prerequisite: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. The analysis and synthesis of Classical, Romantic, Impressionist, and Contemporary styles, including harmonic and nonharmonic practices and the principles of both small and large part-forms. May be an individual study course.
- 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: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. A study of 16th century vocal counterpoint, beginning with the principles of melodic writing and concentrating upon the analysis and synthesis of polyphonic textures, as found in the motet and the mass.
- 4307. Tonal Counterpoint and Fugue (3).** Prerequisite: Completion of MUTH 2304 and 2104 with a grade of C or better or equivalent. The analysis and synthesis of 18th century counterpoint in two to four voices, concentrating upon the instrumental style and techniques of the invention and the fugue.
- 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).**

Natural History and Humanities (NHH)

- 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 tradition of the relationship between the sciences and humanities.
- 1302. Natural History and Humanities Seminar II: Personal Development of the Natural History and Humanities Tradition (3:3:0).** Prerequisite: NHH 1301. A reading and writing intensive course with special emphasis on learning to develop a personal approach to the natural history and humanities tradition. Outside assignments and projects are required.
- 2301. Natural History and Humanities Seminar III: An Introduction to Theories and Practices in Natural History and Humanities (3:3:0).** Prerequisite: NHH 1302. 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 science 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. Curriculum will be designed to meet the student's needs as they relate to the project to be completed during the Field Methods/Artist in Residence course and may include instruction on library research methods, field methods, photographic methods, etc.
- 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 4300. A continuation of NHH 3350.

Nursing (NURS)

- 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.

- 3050. Client Populations and Their Nursing Needs (V1-6).** The courses in this series focus on the characteristics of particular populations and the implications of these characteristics for nursing and health care.
- 3054. Foundations for Maternal/Infant/Gynecological Nursing (V1-6).** Includes changes in maternal/infant/gynecological nursing practice roles and the evolution of holistic nursing practice from the perspective of women, infants and mothers as depicted historically through art, literature and music. An aesthetic study of women, infants and mothers in various roles allows students to develop individual objectives for focus, course grade, and course value.
- 3060. Selected Roles in Nursing (V1-6).** The selected courses in this series offer the opportunity for in-depth exploration of some identified roles in nursing practice.
- 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 pathophysiological concepts to the recognition of pathologic 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.
- 3351, 3651. Nursing and Health Care in Rural Communities (3:1:6 or 6:2:12).** Designed to consider the unique features of rural communities as they affect health care of residents. Clinical activities include community assessment and practice in one or more rural health care facilities.
- 3356. Care of the Patient During the Perioperative Period (3:1:6).** This course focuses on the care of the patient during the perioperative period and the nursing responsibilities inherent in this case. Clinical practice includes activities in each of the preoperative, intraoperative and postoperative stages.
- 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.
- 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.
- 3375. Nurses and Technology (3:3:0).** Prerequisite: Consent of instructor and Associate Dean of Undergraduate Program. Explores the topic of nurses and technology from various perspectives. Content relates to the impact of medical technology on nurses and nursing practice (including a historical perspective), resulting ethical, legal, and social issues, and the integration of medical technology and nursing care. The process of technology assessment is emphasized as a means of evaluating the medical technology that nurses use and thus as a means of managing patient care technology at all levels of health care.
- 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 child-birth experience, traditional and alternative arrangements for the birth experience, techniques of nursing intervention, and evaluation.
- 3401. Mental Health Nursing (4:2:6).** 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. Emphasis is on 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.
- 4354. Caring for Aged Populations (3:3:0).** Interdisciplinary course provides basic content on geriatrics plus strategies for caring for elders-especially the frail elderly. Emphasis on knowledge and strategies, caring qualities needed by caregivers, and on psychosocial caring for elders who are experiencing motivational, nutritional, pharmacological, and/or psychological health problems.
- 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.
- 4801. Professional Nursing Practice (8:7.5:1.5).** Introduces nursing theories relevant to nursing practice and integrates the concepts of pathophysiology, pharmacology, informatics, nursing process, physical assessment, interdisciplinary holistic care, and critical thinking into professional nursing practice. Includes the influence of multicultural environments.
- 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. 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.
- 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. Includes study of family dynamics related to the extended family and identification of families at risk. Clinical practice focuses on provision of care in a variety of settings.
- 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.
- 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).** This course 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 pathophysiological concepts to the recognition of pathologic conditions and the management of clients with a variety of health problems across the life span.
- 5360. Clinical Research Management I: Introduction to Clinical Research Management (3:3:0).** 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.
- 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 patients with disorders of selected body systems. Clinical activities focus on enhancing history and physical skills, delineating differential diagnoses, and learning initial clinical management of clients experiencing acute and chronic health problems. Basic role components of the Acute Care Nurse Practitioner will be introduced.
- 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 business components of implementing a clinical trial including communication and team building. Site and time management systems will be introduced and used. Content also includes clinical research associate skills, adverse event reporting and clinical audits
- 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.
- 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
- 6221. Administrative Role Development: The Nurse Administrator as Leader (2:2:0).** An online seminar in contemporary issues in administrative circles. Explores issues from various professional, client, legal, ethical, policy and societal perspectives. Emphasizes leadership development.
- 7730. The Quality Imperative (3:3:0).** This elective provides an opportunity for doctoral students to study cutting edge issues in quality improvement and risk management in nursing.

Public Relations (P R)

- 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 2.5 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 prior to registration.
- 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.
- 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 (V1-6).**

Petroleum Engineering (PETR)

- 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 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 and CHEM 1308. 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 and CE 3305. A study of the physical properties of petroleum reservoir rocks as they relate to the production of oil and gas, including multiphase fluid flow in petroleum reservoirs.
- 3303. Petroleum Production Methods (3:3:0).** Prerequisite: PETR 2301 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 2301, 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. 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, and CE 3305. Rotary drilling systems, drilling fluids and rheology, drilling mechanism, well planning, blowout and well control, hole deviation, and directional drilling. (Writing Intensive)
- 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, EE 3302, MATH 3350, ME 2322; corequisite: 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 and structural geology elective, statistics elective; corequisite: PETR 4308. Economic, physical, analytical, and statistical evaluation of hydrocarbon-producing properties, emphasizing relative worth of investments based on engineering judgment, business strategy, and risk analysis using actual oil properties in team projects. Senior design project. (Writing Intensive)
- 4305. Natural Gas Engineering (3:3:0).** Prerequisite: PETR 3303, 3306, ME 2322; 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. Frontal-advance theory and application, mechanisms of water-flooding processes, and application to reservoir performance prediction.
- 4308. Well Testing and Analysis (3:3:0).** Prerequisite: PETR 3306. 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, ME 2322, and advanced standing. Problem course in analy-

- sis, design, and application of production and processing equipment, separator problems, emulsions, treating, and transmission systems.
- 4331. Special Problems in Petroleum Engineering (3).** Prerequisite: Advanced standing. Individual studies in advanced engineering areas of special interests. May be repeated for credit.
- 5000. Studies in Advanced Petroleum Engineering Topics (V1-6).** An individual study course. Nature of course depends on student's interests and needs. May be repeated for credit on different topics.
- 5121. Graduate Seminar (1:1:0).** Discussions of petroleum engineering research and special industry problems. Required each semester for all graduate students. May be repeated for credit.
- 5301. Teaching Experience in Petroleum Engineering (3:3:0).** Prerequisite: Admission to doctoral program. On-the-job training in teaching petroleum topics. Students prepare and present lectures, grade problem sets, and prepare laboratory experiments. Students and instructor evaluate performance.
- 5302. Petroleum Environmental Engineering (3:3:0).** Prerequisite: Consent of instructor. A unified treatment of all aspects of petroleum environmental well planning processes, pollution prevention and safety, management practices and self-assessment process, environmental oil and gas law.
- 5303. Advanced Drilling Techniques (3:3:0).** Prerequisite: PETR 3307 or consent of instructor. A unified treatment of all aspects of well planning and the optimization of oil and gas drilling processes.
- 5304. Advanced Well Log Analysis (3:3:0).** Prerequisite: PETR 3304 or consent of instructor. Methods of analyzing various types of well logs to obtain quantitative hydrocarbon reservoir parameters.
- 5305. Advanced Formation Evaluation (3:3:0).** Prerequisite: Must have graduate standing in petroleum engineering. Application of petrophysical core analysis to formation evaluation. Integration of special core analysis with well logs.
- 5306. Advanced Artificial Lift Methods (3:3:0).** Prerequisite: Consent of instructor. Study of the design and analysis of current mechanisms for lifting oil from the reservoir to surface facilities including optimization theory.
- 5307. Enhanced Oil Recovery (3:3:0).** Prerequisite: Consent of instructor. Fundamental relations governing the displacement of oil in petroleum reservoirs and methods for predicting oil recovery by miscible and immiscible displacement.
- 5308. Pressure Transient Analysis (3:3:0).** Prerequisite: MATH 3350, PETR 4308, or consent of instructor. Theory of transient fluid flow in petroleum reservoirs and applications of methods to interpret transient pressure behavior.
- 5309. Hydrocarbon Reservoir Simulation (3:3:0).** Prerequisite: MATH 3350 or consent of instructor. The development of unsteady state fluid flow equations for hydrocarbon reservoirs and the application of finite difference methods to obtain solutions to the equations.
- 5310. Advanced Simulation Techniques (3:3:0).** Prerequisite: PETR 5309. Treatment of advanced concepts of reservoir simulation for multidimensional, multiphase flow in hydrocarbon reservoirs.
- 5311. Thermal Oil Recovery (3:3:0).** Prerequisite: Consent of instructor. Study of the recovery of oil by thermal methods, including steam injection and in situ combustion.
- 5312. Simulation of Enhanced Oil Recovery Applications (3:3:0).** Prerequisite: Consent of instructor. Study of 1D, 2D, 3D, one-, two-, and three-phase simulation modeling of carbon dioxide and thermal recovery applications.
- 5313. Numerical Applications in Petroleum Engineering (3:3:0).** Prerequisite: Consent of instructor. Least squares, solving first and second order partial differential equations; backward, central, forward difference solutions, matrix, Gaussian, Adams, Rung-Kutta solutions.
- 5314. Nodal Analysis and Well optimization (3:3:0).** Prerequisite: Consent of instructor. Inflow performance relationships, well design, theory of

- the reservoir flow, flow restrictions, completion effects, multiphase phase flow, and use of computer programs for complex solutions.
- 5315. Horizontal Well Technology (3:3:0).** Prerequisite: PETR 3303, 3407, or consent of instructor. Topics include why horizontal, incremental cost, historical prospective, drilling change, completion modification, production difference, reservoir aspects, pressure transient, and analysis adjustment.
- 5316. Advanced Production Engineering (3:3:0).** Prerequisite: PETR 3303, 4309, or consent of instructor. Advanced study of production operations, well deliverability, inflow performance, gas lift design, production system analysis and optimization, downhole equipment and surface facilities design.
- 5317. Well Completion and Stimulation (3:3:0).** Prerequisite: Consent of instructor. Completion parameters, well design, fatigue failure, mechanical properties, hydraulic, acid, sandstone fracturing, well bore stability, proppants placement, skin damage, gravel packing, and workovers.
- 5318. Gas Production Engineering (3:3:0).** Prerequisite: Consent of instructor. Design of processing, transportation, distribution, and flow measurement systems; gas storage reservoirs, flow in porous media, tubing, and pipelines; phase behavior of gas condensates; and coal bed methane.
- 5319. Multiphase Fluid Flow in Pipes (3:3:0).** Prerequisite: Consent of instructor. Horizontal, vertical, and inclined flow in pipes and annuli; numerical methods correlations usage and development; empirical correlations correct usage and extrapolations potential; future of multiphase flow.
- 5320. Advanced Reservoir Engineering (3:3:0).** Prerequisite: Consent of instructor. Recovery prediction, tensor permeabilities, multiphase flow, drainage equations, flow potential, streamline-streamtube methods, injectivity, displacements in layered reservoirs, and line source solutions.
- 5321. Fluid Flow in Porous Media (3:3:0).** Prerequisite: Consent of instructor. Physics of petroleum reservoirs, unified mathematics approach to porous media, conservation equations, multiphase flow, transient analysis, wettability, capillary, imbibitions, and saturation paths.
- 5322. Computational Phase Behavior (3:3:0).** Prerequisite: Consent of instructor. Advanced PVT and EOS characterization, tuning EOS by regression, gas condensate reservoirs, use of laboratory experiments and correlation to obtain PVT data, psuedoization and use of PVT programs.
- 5323. Advanced Phase Behavior (3:3:0).** Prerequisite: Consent of instructor. Thermodynamics of equilibria, volumetric phase behavior, Gibbs and Helmholtz energy, chemical potential, phase diagram, modeling paraffins, asphaltenes, hydrates and mineral deposition, use of PVT software.
- 5324. Geostatistics for Reservoir Engineers (3:3:0).** Prerequisite: Consent of instructor. Flow in porous media, reservoir characterization, geostatistics, estimation, simulation, case studies, quantifying uncertainties, geological simulation, data integration, grid block properties, and geostatistics software.
- 5325. Water Flooding Techniques (3:3:0).** Prerequisite: Consent of instructor. Frontal advanced theory for multiphase flow, immiscible flow, capillary cross flow, psuedofunctions, streamlines, measures of heterogeneity, field case studies, pattern flooding, and use of black oil reservoir simulators.
- 5326. Miscible Flooding Techniques (3:3:0).** Prerequisite: Consent of instructor. Physics theories and methods for miscible projects, screening methods, gas injection processes, convection-dispersion equations, fingering and channeling, phase behavior and heterogeneity, characteristic methods.
- 5327. Streamline Simulation (3:3:0).** Prerequisite: Consent of instructor. Multiphase flow equations, displacements in layered reservoirs, streamline models, frontal advanced equation with gravity effects, volumetric linear scaling, streamlines with compositional effects.
- 5328. Advanced Property Evaluation (3:3:0).** Prerequisite: Consent of instructor. Statistical evaluation of hydrocarbon producing properties, risk analysis, economic analysis of production forecasts and reserve estimation, and cash flow analysis.
- 5329. Advanced Core Analysis (3:3:0).** Prerequisite: Consent of instructor. Rock properties relating to production of oil and gas, multiphase fluid flow, micro- and macro-interaction of fluids and reservoir rocks, Archie parameters and well logs, modeling saturations with permeability.
- 5380. Drilling Engineering Methods (3:3:0).** Prerequisite: Consent of instructor. Drilling equipment, components, description, operation; drilling fluids; hydraulic calculations; casing design; hole problem; cost control, penetration rate, well planning; pressure control; directional drilling; bit; cement.
- 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).**
- Personal Fitness and Wellness (PF&W)*
- 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).** Allows the student to explore the underwater in a warm, pristine environment. Scuba and snorkeling gear are provided. SSI. Certification is possible.
- 1142. Beginning Swimming (1:0:2).** Swimming principles, basic stroke mechanics, breathing technique, and conditioning for beginning swimmers.
- 1155. Special Topics in Fitness (1:0:2).** Skill development, conditioning, and strategies for various activities including in-line skating, ice skating, cycling, triathlons, and water polo. May be repeated once for credit.
- 1160. Varsity Baseball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1161. Varsity Men's Basketball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1162. Varsity Women's Basketball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1163. Varsity Cross Country (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1164. Varsity Football (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.

- 1165. Varsity Golf (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1166. Varsity Soccer (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1167. Varsity Softball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1168. Varsity Tennis (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1169. Varsity Track and Field (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 1170. Varsity Volleyball (1).** For the student listed on the official intercollegiate squad for this sport. Athletics department approval is required prior to enrollment. May be repeated for credit.
- 2113. Advanced Golf (1:0:2).** Improvement and refinement of stroke mechanisms. Seven full rounds of golf must be completed before the final. Class meets off campus. Extra fee required.
- 2118. Advanced Weight Training (1:0:2).** Advanced principles of weight training, individualized weight training programs, goal specific lifting, flexibility and cardiovascular fitness.
- 2125. Advanced Tennis (1:0:2).** Refinement of stroke mechanics, skill development, offensive and defensive strategies, flexibility, and conditioning for tennis. For players with varsity-level experience and ability.
- 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).** 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.

Personal Financial Planning (PFP)

- 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 2.5 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: 2.5 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 2.5, 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 2.5 and successful completion of PFP 1370, 2310, and completion or concurrent enrollment in ACCT 3307. A foundation course in family retirement planning and employee benefits. (Writing Intensive)
- 3375. Risk Management (3:3:0).** Prerequisite: GPA of 2.5 and successful completion of PFP 1370 and 2310. A foundation in family risk management.
- 3376. Asset Management I (3:3:0).** Prerequisite: 2.5 GPA and completion of PFP 1370, 2310, and ENGL 2311. 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 2.5 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: 2.5 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 2.5 and successful completion of PFP 3374, 3375, 3376, 3378, ACCT 3307, or FIN 4324. 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 2.5 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 2.5 and completion of PFP 3376 (or FIN 4324) 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 2.5 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: PFP 4370. Advance course work in professional software packages for financial planning and investment portfolio applications.
- 4396. Asset Management III (3:3:0).** Prerequisite: 2.5 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: All PFP 3000 level courses, ACT 3307, or FIN 4324 completed with a grade of C or higher. Supervised intern experiences in established career-related positions. May be repeated for credit.

Philosophy (PHIL)

- 1310. Reasoning (3:3:0).** Prerequisite: Freshman or sophomore standing. Basic methods of objective thinking. Considers elementary forms of reasoning, problem-solving techniques, and avoidance of common fallacies. Emphasis is upon developing skills in the practice of everyday logic. [ENGL 1313]
- 2300. Beginning Philosophy (3:3:0).** An introduction to philosophical thinkers, ideas, and methods. Satisfies the Core Curriculum Humanities requirement. [PHIL 1301]
- 2310. Logic (3:3:0).** Development of formal methods for evaluating deductive reasoning. Additional topics may include uses of language, definition, nondeductive inference. Satisfies the Core Curriculum Mathematics requirement (in conjunction with a mathematics course). [PHIL 2303]
- 2320. Introduction to Ethics (3:3:0).** 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. [PHIL 2306]
- 2350. World Religions and Philosophy (3:3:0).** Philosophical study of the doctrines and practices of the major world religions, including Hinduism, Buddhism, Christianity, Judaism, and Islam. Satisfies the Core Curriculum Humanities requirement. Satisfies the Core Curriculum 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 requirement. Satisfies the Core Curriculum Multicultural requirement. (Writing Intensive)
- 3302. Asian Philosophy (3:3:0).** Study of the major philosophical ideas originating in India and China, and developed generally in Asia. Satisfies the Core Curriculum 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. Considers, among others, 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 political 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).** 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. 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 (V1-3).** Prerequisite: Previous course work in philosophy or 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 courses 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 twenty-first century. May be repeated as topic varies.
- 5311. Issues in Logic and Epistemology (3:3:0).** A study of one or two questions about the justification of our knowledge of the external world, the mind, mathematics, or logic. May be repeated as topic varies.
- 5314. Contemporary Aesthetics (3:3:0).** Current problems in aesthetics: the nature of a work of art, of aesthetic experience and judgment; issues of interpretation and evaluation in the arts. May be repeated as topic varies.
- 5320. Seminar in Ethics (3:3:0).** Selected topics in ethical theory: relativism, moral reasons, the nature of moral value, deontological and teleological ethics. May be repeated as topic varies.
- 5321. Social and Political Philosophy (3:3:0).** Study of selected social or political philosophers or of selected topics such as justice, liberty, equality, liberalism, conservatism, and rights. May be repeated as topic varies.
- 5322. Law and Philosophy (3:3:0).** Study of works of legal philosophers 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).

Photography (PHOT)

- 2310. Principles of Photography (3:3:0).** Prerequisite: Sophomore standing and at least a 2.0 overall GPA. This course will cover the fundamentals of photography and photo appreciation. Students will need a 35mm SLR camera with manual capabilities. Not for photo majors.
- 3310. Photography I (3:3:2).** 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 and at least a 2.5 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 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 2310 and 3312 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 3310 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 3312. 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.
- 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).**

Physics (PHYS)

- 1101. Experimental Elementary Physics (Laboratory) (1:0:2).** Corequisite: PHYS 1303. Designed to introduce students to some experimental techniques and to complement the lecture course PHYS 1303. [PHYS 1105]
- 1103. Experimental General Physics I (Laboratory) (1:0:2).** Corequisite: PHYS 1306. Introduces students to laboratory techniques and to complement the lecture course PHYS 1306. [PHYS 1101]
- 1104. Experimental General Physics II (Laboratory) (1:0:2).** Prerequisite: PHYS 1103 and 1306; and corequisite: PHYS 1307. A continuation of PHYS 1103. [PHYS 1102]
- 1105. Principles of Physics I (Laboratory) (1:0:2).** Corequisite: PHYS 1308. Introduces students to experimental techniques and complements PHYS 1308 lectures. (Honors section offered.) [PHYS 2125]
- 1106. Principles of Physics II (Laboratory) (1:0:2).** Prerequisite: PHYS 1105 and 1308; corequisite: PHYS 2301. Continuation of PHYS 1105. (Honors section offered.) [PHYS 2126]
- 1303. Physics for Nonscience Majors (3:3:0).** Corequisite: PHYS 1101. Course intended to acquaint students with the basic laws and vocabulary of physics. A minimum of mathematics is used. With laboratory PHYS 1101, this course counts toward fulfillment of the natural science requirement in Arts and Sciences. [PHYS 1305]
- 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. [PHYS 1310]
- 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.
- 1306, 1307. General Physics (3:3:0 each).** Prerequisite: MATH 1320 and 1321. Corequisite: PHYS 1103 with 1306 and PHYS 1104 with 1307. A noncalculus introductory physics course designed to provide students with a background for further study in science and related areas. Covers mechanics, heat, sound, electricity and magnetism, light, and modern physics. With laboratories PHYS 1103 and 1104, this course may be counted toward fulfillment of the natural science requirement in Arts and Science. [PHYS 1301, 1302]
- 1308. Principles of Physics I (3:3:0).** Corequisite: MATH 1351 and PHYS 1105. Calculus-based introductory physics course. Mechanics, kinematics, energy, momentum, gravitation, waves, and thermodynamics. (Honors section offered.) [PHYS 2325]
- 1400. Fundamentals of Physics (4:3:3).** Prerequisite: MATH 1320. Development of basic concepts of physics: Astronomy, motion, density, sound, electricity, magnetism, atoms, light, and radioactivity. Not for engineering, science, or mathematics majors.
- 1406. Physics of Sound and Music (4:3:3).** A qualitative course 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.
- 2301. Principles of Physics II (3:3:0).** Prerequisite: PHYS 1308, 1105; corequisite: MATH 1352 and PHYS 1106. Calculus-based introductory physics. Electric and magnetic fields, electromagnetic waves, and optics. (Honors section offered.) [PHYS 2326]
- 2402. Principles of Physics III (4:3:3).** Prerequisite: PHYS 2301, 1106. Study of atomic, molecular, and nuclear phenomena. Relativity, quantum effects, hydrogen atom, many electron atoms, and some molecular physics. Includes laboratory. [PHYS 2427]
- 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 1308, 2301, 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.
- 3301. Optics (3:2:3).** Prerequisite: PHYS 1308, 2301. Geometrical and physical optics with emphasis on the latter. Waves, reflection, scattering, polarization, interference, diffraction, modern optics, and optical instrumentation.
- 3305, 3306. Electricity and Magnetism (3:3:0 each).** Prerequisite: PHYS 2301. Maxwell's equations, electrostatics, dielectric materials. Magnetic fields and materials. Electromagnetic waves, radiation. Relativity.
- 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 1308, 2301, 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 1308, 2301, 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. Schrodinger 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.
- 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.
- 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.
- 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).

Political Science (POLS)

1301. American Government, Organization (3:3:0). Constitutions and organization of the governments of the United States, the states in general, and Texas in particular. [GOVT 2301]

2302. American Public Policy (3:3:0). Completion of POLS 1301 not required but strongly recommended before enrolling in POLS 2302. The policy-making process in the governments of the United States, the states in general, and Texas in particular. [GOVT 2302]

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.

3323. Legislation (3:3:0). Factors involved in the framing and enactment of statutory law with emphasis upon the work of the Congress of the United States.

3325. Political Parties (3:3:0). Party history, functions, organization, finance, nominations, campaign methods, and elections.

3326. Women in Politics (3:3:0). A study of female political participation in the United States, including voting, campaign activity, interest group activity, and office holding. (W S 3326)

3327. The American Presidency (3:3:0). The presidency, its constitutional basis, structure, powers, functions, and responsibilities.

3330. Ancient and Medieval Political Theory (3:3:0). Political ideas of the great thinkers in the Western world from the time of the Golden Age of Greece until the rise of modern political thought.

3331. Introduction to Political Philosophy (3:3:0). Basic issues and concepts in political philosophy, including discussion of such topics as justice, freedom, equality, authority, community, and the nature of politics and the state. (PHIL 3320)

3332. Modern Political Theory (3:3:0). Major political thinkers starting with Machiavelli and Hobbes and movements such as liberalism, conservatism, utilitarianism, socialism, and communism.

3333. Contemporary Political Theory (3:3:0). Political thought since World War II; liberalism, conservatism, socialism, communism, and existentialism are examined and criticized. Attention is given to the roots of contemporary thought in the 19th century.

3339. Religion and Politics (3:3:0). Exploration of various aspects of the relationship between major world religions and politics, including questions of church and state.

3340. Fiscal Administration (3:3:0). Governmental budgeting and revenue raising, emphasizing theories, techniques, procedures, implementation, the political environment in which such activities take place, and possible alternatives to existing practices.

3341. The Administrative Process (3:3:0). A survey of the field of public administration. Principles of administrative organization; distribution of administrative functions together with the structure of government charged with the carrying out of public policy.

3346. Public Policy Analysis (3:3:0). The study of public policy formulation, implementation, and evaluation at various levels of government. Particular focus on health, social, and development policies. Attention to policy analysis skills and approaches used in government and consulting.

3350. Criminal Process (3:3:0). An introduction to the law and government in action when man and state are in conflict. Areas examined include the nature and rationale of punishment, legislative problems in defining criminal behavior, and judicial problems in adjudicating within the legislative framework.

3351. The Judicial Process (3:3:0). Analysis of the judicial process as part of the political process; judicial personnel and organization; sources and instruments of judicial power; judicial reasoning and behavior; and impact of judicial activity.

3352. Constitutional Law-Powers (3:3:0). A case study of American constitutional law emphasizing constitutional bases of governmental power. Leading cases demonstrating the principles of separation of powers, judicial review, taxation, commerce, and implied powers.

3353. Constitutional Law Limitations (3:3:0). Primarily a case study of American constitutional law emphasizing the constitutional limitations on government, with particular emphasis on personal, civil, and political liberties. The administrative process with particular emphasis on public law relating to the powers and procedures of administrative agencies having powers of adjudication and rule making.

3360. United States Foreign Policy (3:3:0). Examines the patterns and processes that shape U.S. foreign policy.

3361. International Politics (3:3:0). Introduction to global issues, actions and processes: north-south relations, post-cold war issues, the role of the state, and leading theories of international relations.

3363. International Organization (3:3:0). A comparative study of the major organizations of the League of Nations and the United Nations; approaches to peaceful settlement of disputes, collective security, disarmament, regional organizations, and the future of world order.

3364. Comparative Foreign Policy (3:3:0). Surveys theories that connect domestic politics with foreign policy and applies them to a variety of countries.

3365. War and Security (3:3:0). Considers the basic problem in international relations; how to survive. How do countries attempt to secure themselves against foreign threats?

3366. International Political Economy (3:3:0). Explores interaction of politics and economics in trade, investment, finance, and development.

3368. Transnational Issues (3:3:0). Survey of current politics of human rights, migration, environment, and technological change.

3371. Comparative Politics (3:3:0). The primary institutions (e.g., parties, groups, executives, legislatures) and processes (e.g., voting, instability) of politics as well as relevant social structures are viewed in various national settings. Questions of how and why to compare also are considered.

3372. Governments of Russia and the Commonwealth of Independent States (3:3:0). Examination of the politics, governments, and cultures of Russia and the republics of the former Soviet Union.

3373. Governments of Western Europe (3:3:0). Political culture, party systems, institutions, and behavior in selected countries of Western Europe. Primary attention paid to France, Germany, and Italy. Comparison between European and American political systems will be emphasized.

3374. Governments of Mexico and the Caribbean (3:3:0). Culture and constitutional development, ideologies, and functions of political par-

ties 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 faculty member. (May be repeated once for credit.)

5100. Colloquium in Political Science (1:1:0). Prerequisite: Consent of instructor. Presentations of current research and discussions of the political science profession by department and visiting faculty. Credit-no credit. May be repeated.

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. The American Political System (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.

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.

5356. Judicial Behavior (3:3:0). Political analysis of actors in the judicial decision-making arena.

5360. International Relations Theory (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. 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.
- 5381. Research Design (3:3:0).** Design and execution of political research.
- 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.
- 5482. Data Analysis (4:3:2).** Techniques of analyzing political data, including descriptive and inferential statistics and computer applications. Concurrent registration in 5482 lab required.
- 6000. Master's Thesis (V1-6).**
7000. Research (V1-12).
8000. Doctor's Dissertation (V1-12).

Portuguese (PORT)

- 1301, 1302. Elementary Portuguese I and II (3:3:1 each).** Introduction and development of the four language skills in Portuguese: Listening comprehension, speaking, reading, and writing.
- 1507. Intensive Portuguese for Spanish Speakers (5:5:0).** An intensive course of elementary Portuguese for Spanish speakers. Comparative aspects of Spanish and Portuguese. Topics in Lusophone culture. Covers the material of Portuguese 1301 and 1302. Admits to Portuguese 2301.
- 2301, 2302. Intermediate Portuguese I and II (3:3:0 each).** Reading, cultural background, grammar review, conversation, and composition.
- 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.
- 5307. Luso-Brazilian Civilization and Literature (3:3:0).** Examines the civilization and cultures of the Luso-Brazilian world through the study of representative literary, cultural, and journalistic texts. Topics range from 16th through the 20th centuries. Films will be screened to illustrate material. Taught in English. May be repeated for credit with different content.
- 5355. Readings in Luso-Brazilian Literature (3:3:0).** Advanced topics in Luso-Brazilian literature. May be repeated for credit.
- 7000. Research (V1-12).**

Pragmaticism (PRAG)

- 4000. Independent Research in Peirce Studies (V1-6).** Prerequisite: Consent of instructor. Directed study of selected interdisciplinary problems in Peirce Studies. May be repeated for credit.
- 5000. Independent Research in Peirce Studies (V1-6).** Prerequisite: Consent of instructor. Directed interdisciplinary inquiry in Peirce studies. May be repeated for credit.

Plant and Soil Science (PSS)

- 1321. Agronomic Plant Science (3:3:0).** Importance, distribution, and use of major world agronomic crops. Fundamentals of growth, structure, and improvements are also stressed. [AGRI 1307]
- 1411. Principles of Horticulture (4:3:2).** Principles and practices of growth and development, structure, nomenclature, use of horticultural plants and how they are affected by the environment. [AGRI 1415] Fulfills laboratory science requirement.
- 2130. Urban Soils Laboratory (1:0:2).** Prerequisite: PSS 2330 or concurrent. Discussion and practical experience with soils in the urban environment.
- 2210. Floral Design (2:1:2).** Floral design as a commercial enterprise. Emphasis on principles of floral design, patterns of arrangements, and elements of color composition. Field trips required.
- 2311. Vegetable Crops (3:2:3).** Principles and practices in home vegetable gardening, with an introduction to commercial production and marketing of major vegetable crops. Fulfills science and technology requirement.
- 2312. Propagation Methods (3:2:2).** Prerequisite: PSS 1411. Propagation techniques of commercial nurseries and greenhouse ranges; study of the physiological reaction and cutting material. (Writing Intensive)
- 2313. Herbaceous Plant Materials (3:2:2).** Prerequisite: PSS 1411. Study of the principal herbaceous plants and plant families, palms, roses, and subtropical landscape plants.
- 2330. Urban Soils (3:3:0).** Utilization of soils in urban environments with emphasis on nutrients, water management, and physical properties. (Credit not given for PSS 2432.)
- 2401. Introductory Entomology (4:3:2).** An introduction to the arthropods with major emphasis on the insects. Insect structure, function, identification, and relationships to man, plants, and animals will be discussed. [AGRI 1413]
- 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)
- 3304. Horticultural and Urban Arthropod Pests (3:2:2).** Prerequisite: PSS 2401. The life history, biology, and management of arthropod pests of ornamental, vegetable, and fruit crops and of households and industry.
- 3305. Field Crop Entomology (3:2:2).** Prerequisite: PSS 2401. Introduction to insects of agricultural importance, their identification, and management strategies. Pest sampling and recognition of damage to major crops will also be discussed.
- 3307. Insect Anatomy and Physiology (3:2:3).** Prerequisite: PSS 2401. A study of the structure and function of insect systems. (Writing Intensive)
- 3309. Turf Culture and Management (3:3:0).** Prerequisite: PSS 1411. Study of the principal turfgrass species and their cultural management. Field trips required.
- 3317. Interior Plants (3:2:3).** Selection and maintenance of interior plants and planting facilities.
- 3318. Woody Plants (3:2:2).** Prerequisite: PSS 1411. Discussion and selection of woody plants used for ornamental purposes in the landscape setting. The course will be divided between deciduous and evergreen plants.
- 3321. Forage and Pasture Crops (3:3:0).** The production and use of forage and pasture crops.
- 3322. Grain, Fiber, and Oilseed Crops (3:3:0).** History, distribution, use, plant form, growth and development, and cultural and production practices of important agronomic crops.
- 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.
- 3401. Insect Taxonomy (4:3:3).** Prerequisite: PSS 2401 or an introductory course in entomology. A study of the major families of insects with emphasis on their identifying features and biologies. An insect collection is required.
- 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. Utilization of writing and oral presentation skills. Continued enhancement of education skills and adherence to professional ethics.
- 4131. Soil Fertility Laboratory (1:0:3).** Prerequisite: PSS 2432 and concurrent enrollment in PSS 4335. Laboratory analysis of soil and plant samples; interpretation of fertility management data.
- 4301. Agricultural Compounds (3:3:0).** Prerequisite: PSS 2401 and CHEM 3303, 3103. Nature, mode of action, and uses of insecticides, fungicides, herbicides, and other pesticides.
- 4303. Insect Natural History (3:2:2).** A field-oriented study of insect habitats and behavior with emphasis on entomological techniques.
- 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.
- 4310. Ecology of Insects (3:3:0).** Prerequisite: PSS 2401 and 6 hours of math courses. Synthesis of insect development, chemical communication, organism through ecosystem functions, predator-type relationships, and applied insect modeling.
- 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 nonagricultural majors. Soil profile morphology. Classification systems with emphasis on the taxonomic system of the United States.
- 4335. Soil Fertility Management (3:3:0).** Prerequisite: PSS 2432. Nutrient availability as influenced by the properties of soils, use of fertilizers and soil amendments; methods and time of application of fertilizer.
- 4336. Soil Physical Properties (3:3:0).** Prerequisite: PSS 2432 and 6 hours of mathematics. Physical properties of soils: structure and movement of water, air, and temperature.
- 4337. Environmental Soil Science (3:3:0).** Prerequisite: PSS 2432. Physical, chemical, and biological properties and processes of soil as they relate to environmental quality.
- 4411. Principles of Floriculture (4:3:3).** Prerequisite: PSS 1411. Greenhouse construction, heating and cooling, growing media, pest management, nutrition and fertility, growth regulation, irrigation, post harvest handling, and marketing of floricultural crops. Required field trips.
- 4415. 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.
- 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.
- 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.
- 5305. Advanced Field Crop Entomology (3:2:2).** Prerequisite: PSS 2401. Introduction to insects of agricultural importance, their identification, and management strategies. Pest sampling and recognition of damage to major crops will also be discussed. F.
- 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 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 of 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 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).** In-depth study of seed and seedling anatomy, the sequence of events and factors affecting germination and emergence, and the characteristics of dormancy and vigor. S, odd years.
- 5327. Soil-Plant-Animal Interrelationships in Grazing Lands (3:3:0).** Ecological and nutritional principles of livestock grazing are established. Mineral cycling, antiquality factors, limitations to intake, and research methodology in forage-livestock systems are presented. 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.
- 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. Sight identification of over 200 families is stressed in laboratories. A specific taxon will be assigned for detailed study, and 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).**

Psychology (PSY)

- 1300. General Psychology (3:3:0).** Introduction to fundamental concepts in psychology. Emphasis on the physiological, social, and environmental determinants of behavior. (Honors section offered.) [PSYC 2301]
- 2301. Child Psychology (3:3:0).** A study of the developmental processes and environmental factors that shape the personality and affect the achievement of the child. [PSYC 2308, 2315]
- 2305. Adolescent Psychology (3:3:0).** A review of approaches to the understanding of the social behavior and development of the adolescent. Physical, mental, and emotional growth and adjustment are covered.
- 3301. An Introduction to the Psychology of the Arts (3:3:0).** An introduction to various psychological perspectives on artistic production and appreciation.
- 3304. Introduction to Social Psychology (3:3:0).** Prerequisite: PSY 1300. Study of individual experience and behavior in relation to social stimulus situations. Survey of experimental work and reports on current problems. [PSYC 2319]
- 3306. Personality (3:3:0).** Prerequisite: PSY 1300. Principles of normal personality structure. [PSYC 2316]

- 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.
- 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. [PSYC 2317]
- 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. 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. [PSYC 2306] (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. 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.
- 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. [PSYC 2314]
- 4331. Social Psychology of Groups (3:3:0).** Prerequisite: PSY 3304. Social psychology theory and research on topics in group dynamics, including group structure, influence, conflict, performance, decision making, and leadership.
- 4332. Health Psychology (3:3:0).** Prerequisite: PSY 3401. Introduces students to the contributions of psychology as a discipline to the understanding of health and illness.
- 4334. Introduction to Counseling and Psychotherapy (3:3:0).** Prerequisite: PSY 1300. Survey of current practice and theory in counseling and psychotherapy. Consideration of the research support for counseling and psychotherapy as an agent of change of behavior.
- 4336. Research in Personality and Social Psychology (3:2:2).** Prerequisite: PSY 3400, 3401 or MATH 2300, and junior standing. An in-depth examination of selected substantive research areas in experimental personality and social psychology. Surveys of current research literature and design and execution of empirical studies.
- 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 non-parametric inferential statistics.
- 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 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.
- 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.
- 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.
- 5345. Research Seminar in Clinical and Counseling Psychology (3:3:0).** Prerequisite: PSY 5347. Survey of methods and approaches to research in these areas.
- 5347. Advanced Correlational Methods and Factor Analysis (3:3:0).** Prerequisite: Consent of instructor. Comprehensive survey of multivariate analysis including multiple correlation and factor analysis and other correlational techniques. Review of analysis of co-variance.
- 5348. Advanced Multivariate Analysis for Psychologists (3:3:2).** Prerequisite: PSY 5347. Covers topics in multivariate analysis including canonical correlation, multiway frequency tables, MANOVA, profile analysis, discriminant analysis, logistic regression, and time series analysis.
- 5350. History and Systems of Psychology (3:3:0).** The nature of psychological systematics and theory construction, including cultural and other factors influencing system building; consideration of major systems from the Hellenic period to the present.
- 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.
- 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).

Public Administration (PUAD)

- 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.
- 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.
- 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.
- 5342. City Management (3:3:0).** The political implications and administrative functions of city government are examined. Contemporary issues of municipal management are emphasized.
- 5343. Public Personnel Administration (3:3:0).** Prerequisite: Consent of instructor. Description and analysis of the personnel function in public agencies.
- 5344. Public Budgeting (3:3:0).** Political aspects of the budgetary process as the central mechanism for public resource allocation and executive planning.
- 5345. Administrative Ethics (3:3:0).** Prerequisite: Consent of instructor. Considers applications of ethical systems and thinking in public organizations. Particular emphasis on the ethical dilemmas caused by administrative discretion and defining the public interest.
- 5346. Public Financial Management (3:3:0).** Prerequisite: PUAD 5344 or consent of instructor. In-depth study of government finance function emphasizing 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.
- Restaurant, Hotel, and Institutional Management (RHIM)*
- 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.
- 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 (3:3:0).** 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. MATH. Optimum use of human, financial, and material resources by managers. Laboratory experiences include commercial food preparation and service.
- 4000. Individual Policy (V1-6).** 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: RHIM 3322. 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)
- 5001. Internship in the Hospitality Industry (V1-6).** Prerequisite: Consent of instructor. Internship experience in career-related positions in the hospitality industry.
- 5100. Seminar (1:1:0).** May be repeated for credit.
- 5200. Graduate Colloquium in Hospitality Management (2:2:0).** Introduction to philosophies and processes involved in graduate study in the hospitality sector.
- 5308. Hotel Management (3:3:0).** An assessment of organizational and operational issues relating to the lodging industry. Students will examine current trends in the hotel industry and determine appropriate strategies for managing change.
- 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.
- 6000. Master's Thesis (V1-6).**
- 6001. Internship in Hospitality Administration (V1-6).** Prerequisite: Admission to doctoral program and consent of instructor. Internship experience in career-related position in the hospitality industry.
- 6300. Perspectives in Hospitality Administration (3:3:0).** Foundation concepts in hospitality management. May be repeated for credit. Does not apply toward graduate credit.
- 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 experiences with tourism organizations and agencies are components of the course.
- 6370. Advanced Food Systems Management (3:3:0).** An examination of current technologies and processes in food industry related operations with emphasis on the subsystems of concept, and product development, production, and marketing.
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Retailing (RTL)

- 1340. Introduction to Retailing (3:3:0).** Basic merchandising 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 2440. Introduction to numerical terminology, concepts, related calculations, and computer software involved in solving merchandise management problems mathematically.
- 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 2440, ACCT 2300. Advanced application of numerical terminology, concepts, and related calculations involved in solving merchandise management problems mathematically with focus on computer simulations.
- 4000. Individual Study (V1-6).** Prerequisite: Written consent of supervising faculty member prior to registration. Individual study or research under the guidance of a retailing faculty member to enhance the degree program. May be repeated for up to 6 hours credit.
- 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 merchandise 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.

Russian (RUSN)

- 1501, 1502. A Beginning Course in Russian I, II (5:5:1 each).** Introduction and development of the four language skills: listening comprehension, speaking, reading, and writing. [RUSS 1411, 1412]
- 2301, 2302. A Second Course in Russian I, II (3:3:0 each).** Prerequisite: RUSN 1501, 1502, or equivalent. Training in oral and written expression and in aural and reading comprehension, including optional work in the language laboratory. [RUSS 2311, 2312]
- 2303. 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.
- 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.
- 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.
- 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.
- 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.
- 7000. Research (V1-12).**

Range, Wildlife, and Fisheries Management (RWFm)

- 2301. Introductory Wildlife (3:3:0).** 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.
- 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.
- 3501. Range, Forest, Wetland Plants, and Plant Identification (5:3:4).** Native and naturalized forage plants of the U.S.; identification, distribution, ecology, plant communities, and economic value are stressed. F, S. Field trips are required.
- 4000. Internship (V1-12).**
- 4001. Undergraduate Research (V1-12).** Selected research problems according to the needs of the student. May be repeated.
- 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 to the management of upland game populations. Stresses population mechanisms and habitat management of selected species. Field trips required. S, odd years.
- 4309. Range-Wildlife Habitat Management (3:3:0).** Prerequisite: 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. (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 watershed. Relationship between land-use conditions and the water delivery character of watersheds. Watershed analysis, including techniques, collection of field data, and sources of information. F, S.
- 4315. Spatial Analysis in Natural Resource Management (3:2:3).** Introduction to geographic information systems and global positioning systems. Applications for inventory, planning, and management of natural resources are emphasized. S.
- 4320. Natural Resource Policy (3:3:0).** Prerequisite: 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 ZOO 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. 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)
- 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, poisson, 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. S, odd years.
- 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 Modelling (3:3:0).** The development and use of models to analyze and simulate ecological processes in fish and wildlife populations and communities. S, odd years.
- 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 utilization of techniques, and evaluation of landscape using aerial photographs. An introduction to the theories, technical and practical aspects, and considerations of computer based geographic information systems in landscape planning, design, and management. F.
- 6000. Master's Thesis (V1-6).**
- 6001. Selected Topics in Range Science (V1-6).** Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
- 6002. Selected Topics in Wildlife Science (V1-6).** Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
- 6003. Selected Topics in Fisheries Science (V1-6).** Advanced topics selected by departmental recommendation. May be repeated for credit in different subject areas.
- 6301. Research Methods (3:3:0).** A review of the philosophy of science, scientific methods, research activities, and the planning and execution of research programs. F, even years.
- 6303. Imagery Interpretation for Natural Resource Management (3:2:2).** Prerequisite: 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.
- 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).**

System Engineering (S E)

- 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.

Social Work (S W)

- 2301. Introduction to the Social Welfare Institution (3:3:0).** 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.
- Slavic (SLAV)*
- 2301. 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.
- Sociology (SOC)*
- 1301. Introduction to Sociology (3:3:0).** Human group behavior, influence on the individual, and relationships of individuals to each other as members of groups. [SOCI 1301]
- 1320. Current Social Problems (3:3:0).** Problems in basic social institutions as marriage and the family, community, economy, government, education, health and welfare, recreation, etc. [SOCI 1306]
- 2331. The Sociology of Marriage (3:3:0).** History, present status, and current problems of the marriage institution. [SOCI 2301] (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. Women in the Modern World (3:3:0).** Prerequisite: SOC 1301. Course treats women as group with unique sex role socialization, work, family, and political experience. Emphasis on women in contemporary United States. (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. Social Gerontology (3:3:0).** Prerequisite: Advanced standing for undergraduates. 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.
- 5303. Seminar in Contemporary Sociological Theory (3:3:0).** Study of contemporary approaches to society, including conflict theory, functionalism, symbolic interaction, and ethnomethodology.
- 5308. Seminar in the Origins of Social Theory (3:3:0).** Development of sociological theory in the nineteenth and early twentieth centuries. Topics may vary, but emphasis usually will be on the work of Marx, Durkheim, and Weber.
- 5311. Seminar in Criminology (3:3:0).** Critical review of theory and research on selected topics in criminology.
- 5312. Seminar in Urban Problems (3:3:0).** Extensive analysis of the process and consequences of urbanization, with emphasis upon causation and critiques of proposed solutions.
- 5313. Seminar in Minority Relations (3:3:0).** American and world patterns of interethnic relations are covered with emphasis on recent and current trends.
- 5315. Seminar in Social Change (3:3:0).** Linear and cyclical theories; analysis of the idea of progress, stage theories, dialectical materialism, and the lag hypothesis.
- 5316. Seminar in Social Gerontology (3:3:0).** Theory and research on aging, covering demographic, sociocultural, economic, individual, and societal factors. Interdisciplinary aspects are stressed.
- 5320. Social Psychology: Symbolic Interactionism (3:3:0).** Central ideas of social psychology are analyzed and integrated in a contemporary model of symbolic interactionism, with focus on affect.
- 5325. Seminar in Deviant Behavior (3:3:0).** Critical review of current theory and research in deviance.
- 5327. Seminar in Demography (3:3:0).** Theory and skills of population analysis including use of census data in sociological and social science research.
- 5331. Field Research (3).** Individual research project off campus, covering entire term or longer. Research plans must be approved in advance by the student's major advisor. May be repeated for credit with permission.
- 5332. The Research Organization (3:3:0).** Participation in campus-based organized research project. Required at least once of research assistants; open to other students.
- 5334. Quantitative Methods in Sociology (3:3:0).** Prerequisite: Undergraduate introduction to quantitative methods. Decision making skills (from test selection to inferences from data) for quantitative analysis in sociology.
- 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).**

Spanish (SPAN)

Generally it is recommended that students complete 6 hours of 3000-level courses prior to enrolling in the 4000 series.

- 1501, 1502. A Beginning Course in Spanish I, II (5:5:1 each).** [SPAN 1411, 1412]
- 1507. Comprehensive Spanish Review First Year (5:5:1).** Prerequisite: Two years high school Spanish. A comprehensive one-semester review.
- 2301, 2302. A Second Course in Spanish I, II (3:3:1 each).** Prerequisite: SPAN 1501 and 1502 or 1507. Reading, cultural background, conversation, and composition. (Honors section offered.) [SPAN 2311, 2312]
- 2607. Intensive Spanish Second Year (6:6:1).** Prerequisite: A minimum grade of B in SPAN 1507. Reading, culture, conversation, and composition. Equivalent to 2301 and 2302.
- 3303. Intermediate Spanish Conversation (3:3:0).** Prerequisite: SPAN 2301 and 2302 or equivalent. Designed to increase proficiency in oral Spanish for students who have had little or no extra academic experience in that language. Minors may take either 3303 or 4303. May not be taken following 4000-level work.
- 3305. Intermediate Spanish Grammar (3:3:0).** Prerequisite: SPAN 2301 and 2302 or equivalent. An overview of important Spanish grammar concepts.
- 3306. Introduction to Hispanic Life and Culture (3:3:0).** Prerequisite: SPAN 2301 and 2302 or equivalent. Origins, development, and characteristics of Hispanic life and culture. Conducted in Spanish.
- 3307. Introduction to Hispanic Literatures (3:3:0).** Prerequisite: SPAN 2301 and 2302 or equivalent. Introduction to Spanish and Spanish American literatures through selected works and authors. This course is highly recommended as a prerequisite to all 4000 level literature courses.
- 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.
- 4308. Business Spanish (3:3:0).** Oral and written Spanish with special attention to idiomatic expressions and cultural practices of business in the Hispanic world.
- 4309. Spanish Language Studies-Special Topics (3:3:0).** Study of diverse topics such as medical or legal Spanish, Spanish on the Internet, etc. May be repeated for credit with different content.
- 4320. Masterpieces of Hispanic Literature (3:3:0).** A study of selected works from Spanish and/or Spanish American literature. May be repeated for credit if different instructor and different content.
- 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.
- 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.
- 4325. Hispanic Short Story (3:3:0).** Study of short stories from Spain and/or Spanish America. May be repeated for credit.
- 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.
- 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.
- 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).** 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.
- 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.
- 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.
- 5345. History of the Spanish Language (3:3:0).** Prerequisite: One year of Latin or equivalent. The development of the Spanish language from its earliest forms to the present.
- 5347. Language Development (3:3:0).** Mastery of language skills through readings, compositions, and directed oral projects. Offered only in programs abroad each summer.
- 5348. Culture and Literature (3:3:0).** Analysis and interpretation of cultural and literary expressions of the host country. Offered only in programs abroad each summer.
- 5352. Methods of Literary Criticism (3:3:0).** Theories and practices of literary analysis and criticism.
- 5353. Bibliography and Methods of Research (3:3:0).** Systematic study of bibliographical materials, methods, and problems in the field of Hispanic research.
- 5354. Hispanic Literary Concepts (3:3:0).** A study of movements, genres, influences, forms, themes, and other concepts in Hispanic literatures from the Middle Ages to the present.
- 5355. Seminar in Hispanic Literature (3:3:0).** Advanced topics in Hispanic literature and literary theory. May be repeated for credit.
- 5361. Medieval Literature (3:3:0).** Spanish literature from its earliest monuments to the end of the Middle Ages.
- 5362. Golden Age Literature (3:3:0).** Selected authors, works, and genres.
- 5364. Nineteenth-Century Spanish Literature (3:3:0).** A history of Spanish literature in the nineteenth century.
- 5366. Twentieth-Century Spanish Prose (3:3:0).** A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
- 5368. Twentieth-Century Spanish Theatre and Poetry (3:3:0).** A comprehensive study of the principal literary currents, authors, and works with emphasis on the contemporary period.
- 5370. Colonial Spanish American Literature (3:3:0).** A study of this literature from the Pre-Colombian era to the end of the Spanish American baroque.

- 5374. Nineteenth-Century Spanish American Literature (3:3:0).** A comprehensive study of the principal literary currents, authors, and works of the nineteenth century.
- 5375. Modernism (3:3:0).** A detailed study of Spanish American Modernism.
- 5376. Twentieth-Century Spanish American Prose (3:3:0).** The development of prose fiction in Spanish America during the twentieth century.
- 5378. Twentieth-Century Spanish American Theatre and Poetry (3:3:0).** The development of the theatre and poetry in Spanish America during the twentieth century.
- 5381. Hispanic Literature of the Southwest (3:3:0).** The origin and development of Hispanic literature in the southwest, including Spanish literature (1539-1820), Mexican literature (1821-1848), and Mexican-American literature (1849-present).
- 5392. The Play in Spanish (3:3:0).** Prerequisite: Consent of instructor. Intensive analysis of a play and preparation for two public performances.
- 6000. Master's Thesis (V1-6).**
- 7000. Research (V1-12).**
- 8000. Doctor's Dissertation (V1-12).**

Statistics (STAT)

- 5302, 5303. Applied Statistics I, II (3:3:0 each).** Prerequisite: Consent of instructor. Graphical presentation of data, histograms, confidence intervals for binomial probabilities, one-sample and two-sample t-test, regression and correlation with two variables, hypothesis testing and confidence intervals; multivariate regression and correlation, partial correlation coefficients, analysis of variance and covariance, multiple comparison procedures. Emphasis on analysis of research data. Not for mathematics, statistics, engineering, or physical science majors; these students should take STAT 5384, 5385.
- 5326. Statistical Analysis (3:3:0).** Prerequisite: Calculus or consent of instructor. Descriptive statistics, testing and estimation in one- and two-sample problems, analysis of variance, multiple comparisons, linear regression and correlation, nonparametric methods.
- 5328, 5329. Intermediate Mathematical Statistics I, II (3:3:0 each).** Prerequisite: MATH 2350 or consent of instructor. Probability space; special families of distribution functions; expectations; conditional distributions; sampling distributions; point and interval estimation; hypothesis testing; distribution of functions of random variables; regression; nonparametric techniques.
- 5370. Decision Theory (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Game theory; statistical decision; Bayesian statistics.
- 5371. Regression Analysis (3:3:0).** Prerequisite: STAT 5326 and 5329. Estimation and testing in linear regression, residual analysis, influence diagnostics, multicollinearity logistic regression, nonlinear regression.
- 5372. Nonparametric Statistical Inference (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Statistical inference, rank order statistics; chi-square and slippage tests; Kolmogorov and Smirnov type tests; confidence intervals and bands; runs tests; applications.
- 5373. Design of Experiments (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 Principles of design and analysis of experiments; Latin squares; split plots; incomplete block designs; efficiency.
- 5374. Theory of Linear Statistical Models (3:3:0).** Prerequisite: MATH 4343 or STAT 5329. Multivariate normal; covariance matrix and operations; distribution of quadratic forms; general linear hypothesis of full and non-full rank; specific linear models.
- 5375. Statistical Multivariate Analysis (3:3:0).** Prerequisite: STAT 5329 or consent of instructor. Multivariate normal distribution; estimation of the mean vector and covariance matrix; distribution of sample correlation coefficients; the generalized T² statistic; classification; distribution of the sample covariance matrix.
- 5376. Advanced Statistical Methods (3:3:0).** Prerequisite: MATH 4343 or STAT 5329 or consent of instructor. Applied regression analysis; cluster analysis; factor analysis; modeling; special topics in designs; sensitivity analysis; non-linear estimation. May be repeated for credit.
- 5377. Statistical Sampling Theory (3:3:0).** Prerequisite: MATH 4343 or STAT 5329. Theory of simple random sampling; stratified random sampling; cluster sampling; ratio estimates; regression estimates; other sampling methods.
- 5378. Stochastic Processes (3:3:0).** Prerequisite: STAT 5329. Markov chains; Markov processes in discrete and continuous time; diffusion processes; Brownian motion and transformations of Brownian motion; non-Markovian processes.
- 5379. Time Series Analysis (3:3:0).** Prerequisite: STAT 5329 or consent of instructor. Stationary and nonstationary time series; finite linear models; identification, filtering, and diagnostic checks of such models; spectral analysis of time series data; forecasting and control.
- 5380, 5381. Advanced Mathematical Statistics I, II (3:3:0 each).** Prerequisite: STAT 5329; STAT 5380 is prerequisite for STAT 5381. Theory of estimation and tests of statistical hypotheses; sequential analysis.
- 5384. Statistics for Engineers and Scientists I (3:3:0).** Prerequisite: MATH 2350 or consent of instructor. Probability, descriptive statistics, distributions, estimation, hypothesis testing, nonparametric statistics, data analysis using the computers. Not for mathematics or statistics majors.
- 5385. Statistics for Engineers and Scientists II (3:3:0).** Prerequisite: STAT 5384 or consent of instructor. Continuation of STAT 5384; simple and multiple regression analysis; analysis of variance; nonparametric statistics; categorical data analysis; quality control; reliability; data analysis using the computer. Not for mathematics or statistics majors.
- 5386. Statistical Computing and Simulation (3:3:0).** Prerequisite: Consent of instructor. Methods of approximating functions and probabilities; computational methods in linear algebra; introduction to theory and applications of random number generation; testing generators.
- 6000. Master's Thesis (V1-6).**
- 6310. Master's Report (3).**
- 7000. Research (V1-12).**

Telecommunications (TELE)

- 4375. Writing for Feature Films (3:3:0).** Prerequisite: EM&C 3310 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)
- 7000. Research (V1-12).**

Theatre Arts (TH A)

- 1101. Theatre Activities: Scenery and Properties (1).** Opportunity to participate extensively in theatre activities in scenery and properties. [DRAM 1120]
- 1102. Theatre Activities: Lighting and Sound (1).** Opportunity to participate extensively in theatre activities in lighting and sound. [DRAM 1121]
- 1103. Theatre Activities: Costume and Makeup (1).** Opportunity to participate extensively in theatre activities in costume and makeup. [DRAM 2120]
- 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).** Explores "freeing" the natural resources of the human voice with emphasis on characterization and vocal flexibility. [DRAM 2337, DRAM 1322]
- 1302. Movement for the Actor (3:3:3).** Explores the physical skills necessary for the actor with emphasis on individual physical creativity and imagination. Required of B.F.A. acting majors.
- 1303. Introduction to Theatre (3:3:0).** Introduction to theatre as a career and academic pursuit: basic concepts, practices, and values. Required of all theatre majors prior to admission to upper-level courses. Offered in fall semester only. For theatre majors and minors only.
- 2101. Stage Makeup (1:0:3).** [DRAM 1141]
- 2301. Introduction to Acting (3:3:0).** Fundamental principles of acting for nonmajors, with emphasis on establishing a working vocabulary and basic acting process. Applies toward Visual and Performing Arts requirement 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. [DRAM 1351]
- 2303. Theatre Appreciation (3:2:2).** Study and application of the various activities and methods of theatrical practice. Attendance at representative plays is required. Applies toward Visual and Performing Arts requirement.
- 2304. Introduction to Cinema (3:3:1).** A study of the cinematic art form. Applies toward Visual and Performing Arts requirement for the B.A. degree.
- 2305. Fundamentals of Oral Interpretation (3:3:0).** Major emphasis is placed on the appreciation of good literature and its effective oral interpretation from the printed page. [SPCH 2341]
- 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).** 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 theatre activities in stage management in University Theatre productions.
- 3101. Advanced Theatre Activities: Scenery and Properties (1).** Opportunity to participate extensively in theatre activities in scenery and properties with emphasis on leadership experiences.
- 3102. Advanced Theatre Activities: Lighting and Sound (1).** Prerequisite: 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. [DRAM 1330]
- 3304. Principles of Theatrical Lighting (3:2:3).** Prerequisite: THA 1303 and 3303 or equivalent. Study of the theory and practice of the 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. [DRAM 2361] (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. [DRAM 2362] (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)
- 4000. Projects in Theatre and Dance (V1-6).** Prerequisite: Junior or senior standing and 9 hours of theatre or dance and consent of instructor. Individual study under the guidance of a faculty member. Repeatable for credit.
- 4108. Scene Painting (1).** Prerequisite: THA 3303, and 3304. Study of the art and craft of scene painting styles and techniques. Repeatable for credit.
- 4208. Professional Career Management (2:2:0).** Prerequisite: Junior or senior standing. An overview of the various aspects of developing and managing a career in the performing arts including auditioning, resume writing, portfolio development, and contract evaluation.
- 4302. Stage Directing Methods (3:2:3).** Prerequisite: Junior 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. Repeatable 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. Repeatable for credit.
- 5300. Dramatic Analysis (3:3:0).** Study of dramatic structures and script analysis methods as a preparation for writing, directing, designing, performing, and criticizing plays.
- 5301. Playwriting I (3:3:0).** Prerequisite: TH A 5300. Basic graduate-level study in the theory and practice of playwriting, focusing on crafting the short play.
- 5302. Playwriting II (3:3:0).** Prerequisite: TH A 5301. Instruction and practice in crafting the full-length play script. May be repeated once for credit.
- 5303. Theatre Scene Design (3:0:9).** Advanced work in the process of designing for the stage. Includes work on models, sketches, renderings, and theatre drafting. May be repeated for credit.
- 5304. Theatre Lighting Design (3:0:9).** Advanced work in theatrical lighting design with an emphasis on the use of light as artistic expression. May be repeated for credit.
- 5305. Theatre Costume Design (3:0:9).** Advanced work in the total process of designing costumes for the stage through design projects for representative plays. May be repeated for credit.
- 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.
- 5341. Seminar in Dramatic Theory (3:3:0).** Prerequisite: An undergraduate major in theatre arts or consent of instructor. The consideration of a specific theoretical approach to the theatre or the comparative study of several theoretical approaches. Repeatable for credit.
- 5343. Seminar in Voice and Movement (3:3:3).** Intensive training in specific voice and movement techniques and methodologies culminating in a studio performance of improvisations, monologues, 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).**

Toxicology (TOX)

- 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.

Visual and Performing Arts (VPA)

- 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.

Vietnamese (VIET)

- 4300. Individual Problems in Vietnamese (3).** Content varies to meet the needs of students. May be repeated for credit.

Women's Studies (W S)

- 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.
- 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 Coordinator 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.

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. This 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. This class meets 6 hours a week.

Zoology (ZOOL)

- 2403. Human Anatomy and Physiology I (4:3:3).** 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. [BIOL 2401]
- 2404. Human Anatomy and Physiology II (4:3:3).** 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. [BIOL 2402]
- 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. 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: BIOL 1402, 1404, or consent of instructor. 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, 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: ZOOL 3405 or 3406, CHEM 1307, 1308; BIOL 3320, 3120 recommended. A comparison of physiological functions of animals in the major phyla.
- 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. 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.

Residency Status Determination

Each student has a duty to register under the proper residence and pay the correct tuition fees. The explanation below of what constitutes a nonresident is intended to assist students in properly determining whether they qualify as residents of the state for tuition purposes. If there is any possible question whether a student qualifies as a resident of Texas, he or she should consult the office of admissions. For each improper registration there may be a penalty of \$10 per semester in addition to the proper fee. There can be no change in residence status except upon express authorization by the Office of Admissions. *The following State Statutes and Coordinating Board's Rules and Regulations for Determining Residence Status are subject to change respectively by the State Legislature and the State Coordinating Board without notice.* Please refer to the last item of this section for a glossary that explains the terms used in residency interpretation.

General Residency Rules

Minors and Dependents

Statute: Section 54.052(a)(1)(2)(3) "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.

Section 54.052(b) For the purpose 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.

Section 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.

Section 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.

Section 54.0551 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.

Residence of a Minor or a Dependent. 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.

Custody by Court Order. If the custody of the minor has been granted by court order (e.g., divorce decree, child custody action, guardianship or adoption proceedings) to some person other than the parent, the residence of that person shall control; provided, however, that such grant of custody was not ordered during or within a year prior to the minor's enrollment in a public institution of higher education and was granted under circumstances indicating that such guardianship was not for the purpose of obtaining status as a resident student.

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, and the minor must have actually resided in the home of such person for two years immediately prior to enrolling in a public institution of higher education in Texas and such person must have provided substantially all of the minor's support. In the event that the *in loco parentis* relationship has not existed for the full two year period, a lesser period of time is acceptable in unusual hardship cases, such as death of both parents.

Orphans. Orphans who have lived for longer than a year in an established orphans' home in Texas operated by a fraternal, religious, or civic organization and have been graduated from the orphans' home shall be considered residents of Texas provided they reside in Texas from the time of such graduation until they enter an institution of higher education.

Emancipation. A minor who has been legally emancipated may establish their claim to residency following the rules applicable to independent individuals 18 years of age or older.

Married Minors. Minors who are married have the power and capacity of single persons of full age.

Dependents Whose Parents Moved to Another State or Foreign Country and No Longer Claim Residence in Texas. If both of the parents of dependents who have been enrolled as resident students move their residence to another state or foreign country, the dependents shall be classified as nonresidents at all subsequent registration periods.

1. Under the provisions of Texas Education Code 54.055, although classified as nonresidents, the dependents will be entitled to pay the resident tuition fee as long as they remain continuously enrolled in a state-supported institution of higher education. Such dependent students must enroll for the next available fall or spring semester immediately following the parents' change of residence to another state.
2. When the parents of dependents who have established their residence in another state or foreign country return and reestablish their residence in Texas the dependents must continue to be classified as nonresidents until the first registration after the parents have resided in the state for a 12-month period.

Dependents Whose Parents Moved to Another State or Foreign Country But Continue to Claim Texas Residence.

1. If both of the parents of dependents move to another state or foreign country, or reside outside the state or in a foreign country at the time the dependents enroll in an institution of higher education, but claim residence in Texas, conclusive evidence must be presented that the parents are still claiming residence in the State of Texas and that they have the present intent to return to the state. A certificate from the employer of the parents that the move outside the state was temporary (generally less than five years) and that there are definite plans to return the parents to Texas by a determinable future date will be considered in this connection.
2. Persons who resided in Texas for at least five years prior to moving from the state, and who have returned to the state for residence purposes before having resided out of the state for a year, shall be classified as residents. The parent(s) of dependents must return to the state to live in order for the dependent to be considered a resident.

Independent Individuals 18 Years of Age or Older

Statute: Section 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.

Section 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.

Section 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.

Establishment of Residence. Independent individuals 18 years of age or over who move into the state and who are gainfully employed within the state for a period of 12 months prior to enrolling in an institution of higher education are entitled to classification as residents. An individual who is self employed or employed as a homemaker within the home may be considered gainfully employed for tuition purposes. If such 12 months residence, however, can be shown not to have been for the purpose of establishing residence in the state but to have been for some other purpose, the individuals are not entitled to be classified as residents. Students enrolling in an institution of higher education prior to having resided in the state for 12 months immediately preceding time of enrollment shall be classified as non-residents for tuition purposes.

Establishment of Residence For Individuals 18 Years of Age or Older Whose Parents or Court-Appointed Legal Guardians No Longer Claim Them as Dependents For Federal Tax Purposes. If the parents or legal guardians of an individual 18 years of age or older move out of state and continue to claim the individual as a dependent for tax purposes, the individual continues to have the residence of the parents or guardians. If the individual remains in Texas, he/she may claim residency for tuition purposes as an independent student once 12 months have passed from the end of the last calendar year in which the parents or guardians claimed the student as a dependent.

Retention of Residence. If the parents of an individual 18 years of age or older move out of the state and immediately cease claiming the student as a dependent for federal tax purposes, the individual may retain his/her claim to Texas residency for tuition purposes if he/she remains in Texas and begins filing federal income tax returns as an independent student.

Married Students

Statute: Section 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.

Marriage of a Texas resident to a nonresident does not jeopardize the former's right to pay the resident tuition rate unless the resident has taken steps to claim the out-of-state residence of his or her spouse.

A nonresident who marries a resident of Texas must establish his or her own residency by meeting the standard requirements. (See section relating to Residence of Independent Individuals 18 Years of Age or Older or section relating to Married Minors.)

Foreign Students

Statute: Section 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 fee purposes under this Act 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.

Section 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.

Section 54.052(f) 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 residing 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.

Eligible Aliens. Aliens living in the United States under a visa permitting permanent residence, and aliens who are permitted by Congress to adopt the United States as their domicile while they are in this country, and aliens who have filed with the proper federal immigration authority a declaration of intent to become a United States citizen have the same privilege of qualifying for Texas resident status for tuition purposes as do citizens of the United States. The Immigration and Naturalization Service has identified the following categories of foreign students as being eligible to establish domicile in the United States, however, if an individual provides proof from the Department of Justice or 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:

- Is living in this country under a visa permitting permanent residence, or
- Is permitted by Congress to adopt the United States as his or her domicile, or
- Has applied to or has a petition pending with the Immigration and Naturalization Service to attain lawful status under federal immigration law, or
- Has met coordinating Board requirements for being treated as a permanent resident.

A foreign individual who enters a Texas institution or higher education in fall 2001 or later is a resident of Texas if he or she:

- Attended a public or private high school while residing with a parent or legal guardian,
- Graduated from the high school or received the equivalent of a high school degree in Texas,
- Resided in Texas for at least three (3) consecutive years as of the date he/she graduated from high school or received the equivalent of a high school degree,
- Registers as an entering student no earlier than fall 2001, and
- 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 coordinating Board web site at www.theccb.state.tx.us.

Family Unity Program. A noncitizen residing in Texas under the Immigration and Naturalization Service's (INS) Family Unity Program may qualify to pay the resident tuition rate. A noncitizen is eligible to apply for benefits under the Family Unity Program if he or she entered the United States on or before May 5, 1988 and has been residing in the United States since that date; and if he or she was the spouse or unmarried child of a legalized alien as of that date and continues to be so. An individual proving his or her eligibility should provide an institution two Immigration and Naturalization Service forms I-797, one of which indicates an INS-approved "Application for Voluntary Departure under the Family Unity Program," and the other which must indicate either an INS-approved "Immigration Petition for Relative" or a "Visa Petition for Spouse". Since INS may cancel eligibility for the Family Unity Program at any time, it is necessary that institutions confirm the student's current INS status each time he or she registers. To comply with the provisions of the Family Unity Program and qualify to pay resident tuition rates at Texas Institutions, the parent or spouse must have established a domicile in the State of Texas.

*Students holding I688A and I688B cards are not eligible to establish domicile in the United States.

Reclassification

Section 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 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.

Reclassification. Persons classified as nonresidents upon first enrollment in an institution of higher education are presumed to be nonresidents for the period during which they continue as students. Students classified as nonresident students shall be considered to retain

that status until they make written application for reclassification in the form prescribed by the institution and are officially reclassified in writing as residents of Texas for admissions and 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. If such nonresident students withdraw from school and reside in the state while gainfully employed for a period of 12 consecutive months, upon reentry into an institution of higher education they will be entitled to be reclassified as residents for tuition purposes if other evidence indicates they have established a domicile in the State of Texas. Accumulations of summer and other vacation periods do not satisfy this requirement. If such nonresident students enroll while gainfully employed for a period of 12 consecutive months, they shall be considered for reclassification as residents for tuition purposes if other evidence indicates they have established a domicile in the State of Texas. Material to the determination of the establishment of a domicile in Texas are business or personal facts or actions unequivocally indicative of a fixed intention to reside permanently in the state. Such facts shall include, but are not limited to:

- The length of residence and employment prior to enrolling in the institution,
- The nature of employment while a student,
- Presence in Texas as a part of a household transferred to the state by an employer or as part of a household moved to the state to accept employment offered in Texas,
- Purchase of a homestead, or
- Dependency upon a parent or legal guardian who has resided in Texas for at least 12 consecutive months immediately preceding the student's enrollment.

All of these facts are weighed in the light of the fact that a student's residence while in school is primarily for the purpose of education and not to establish residence, and that decisions of an individual as to residence are generally made after the completion of an education and not before. A person who moves to Texas as the spouse of an individual transferred here by the military (see section relating to Military Personnel, Veterans, and Commissioned Officers of the Public Health Service), through the state's plan for economic development and diversification (see section relating to Economic Development and Diversification Employees) or as a part of a household moved to the state to accept employment offered in Texas, is considered not to have come to Texas for the purpose of going to school. Therefore, once he or she has physically resided in Texas for 12 consecutive months, even though the student may have been enrolled full time, the person may be considered a resident if he or she has otherwise established a domicile in the state.

Loss of Residence. Residents who move out of state will be classified as nonresidents immediately upon leaving the state, unless their move is temporary (generally less than five years) and residence has not been established elsewhere. Conclusive evidence must be provided by the individuals supporting their

present intent to return to the state. Among other things, a certificate from the 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. Internship programs as part of the academic curriculum that require the student to return to the school may qualify as proof of the temporary nature of the time spent out of state.

Reestablishment of Residence. Persons who resided in Texas for at least five years prior to moving from the state, and who have returned to the state for residence purposes before having resided out of the state for a year, shall be classified as residents.

Application for Reclassification. Students classified as nonresident students shall be considered to retain that status until they make written application for reclassification in the form prescribed by the institution and are officially reclassified in writing as residents of Texas by the proper administrative officers of the institution.

Reclassification as a Nonresident. Persons who have been classified as residents of Texas shall be reclassified as nonresident students whenever they shall report, or there is found to exist, circumstances indicating a change in residence to another state. 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.

Reclassification as a Resident. If students have been erroneously classified as nonresident students and subsequently prove to the satisfaction of the appropriate officials of an institution of higher education that they should have been classified as resident student, they shall be reclassified as residents of Texas 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 current term.

Exceptions to Basic Residency Rules

Military Personnel, Veterans, and Commissioned Officers of the Public Health Service

Statute: Section 54.058(a) Military personnel are classified as provided by this section.

Section 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 such 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 such 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.

Section 54.058(c) As long as they reside continuously in Texas, the spouse and children 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 are entitled to pay the tuition fees and other fees or charges provided for Texas residents.

Section 54.058(e) A Texas institution of higher education may charge to the United States Government the nonresident tuition fee for a veteran enrolled under the provisions of a federal law or regulation authorizing education or training benefits for veterans.

Section 54.058(f) The spouse and children of a member of the Armed Forces of the United States who dies or is killed are entitled to pay the resident tuition fee, if the wife and children become residents of Texas within 60 days of the date of death.

Section 54.058(g) If a member of the Armed Forces of the United States is stationed outside Texas and his spouse and children establish residence in Texas by residing in Texas and by filing with the Texas institution of higher education at which they plan to register a letter of intent to establish residence in Texas, the institution of higher education shall permit the spouse and children to pay the tuition, fees, and other charges provided for Texas residents without regard to length of time that they have resided within the State.

Legal Residence—General Rule of Domicile For Members of the Military.

Persons in military service and commissioned Public Health Service officers are presumed to maintain during their entire period of active service the same domicile which was in effect at the time of entering the service. Persons stationed in a state for or Public Health Service are presumed not to establish a domicile in that state because their presence is not voluntary but under military or Public Health Service orders.

Change of Domicile. It is possible for members of the military service or Public Health Service to abandon the domicile of original entry into the service and to select another, but to show establishment of a new domicile during the term of active service, there must be clear and unequivocal proof of such intent including evidence of abandonment of domi-

cile of original entry, evidence of establishment of a domicile in Texas, and proof that Texas has remained the individual's domicile when stationed outside of Texas after having established Texas as his or her domicile. Abandonment of domicile of original entry is evidenced by the establishment of a domicile in Texas. Establishment of a domicile in Texas requires 12 consecutive months assignment to the state, during which the military member must simultaneously file the appropriate documentation to change his or her military records to reflect Texas as the state of legal residence. Other actions may be considered in determining whether a domicile has been established in Texas. If four of the following actions have been taken by the military member at least 12 consecutive months immediately prior to the date of enrollment and continue to be in effect, the member has established a domicile in Texas:

- Purchasing a residence and claiming it as a homestead,
- Registering to vote and voting in local elections,
- Registering automobiles in Texas and paying personal property taxes thereon,
- Maintaining a Texas driver license,
- Maintaining checking accounts, savings accounts, or safe deposit boxes in Texas,
- Having wills or other legal documents that indicate residence in Texas,
- Having membership in professional organizations or other state organizations, and/or
- Establishing a business in Texas.

To prove Texas has remained as his or her domicile when stationed outside of Texas, and individual must provide evidence that he or she was a Texas resident upon entry into the service and that Texas continues to be his or her state of record with the military. If he or she has established a domicile in Texas while in the service in accordance with the above conditions, the member must currently meet at least three of the following criteria in order to qualify to pay the resident tuition rate at a public institution of higher education:

- Owning a residence in Texas and claiming it as a homestead;
- Registering to vote and voting in Texas elections;
- Registering automobiles in Texas and paying personal property taxes thereon;
- Maintaining checking accounts, savings accounts, or safe deposit boxes in Texas;
- Maintaining a Texas driver's license; and/or
- Having wills or other legal documents indicate legal residence in Texas.

Eligibility of Nonresident Military Personnel, Commissioned Public Health Service Officers, and Their Spouses and Dependents.

Eligibility of nonresident military personnel, commissioned Public Health Service Officers, and their spouses and their dependents. Certain military and Public Health Service personnel, spouses and dependent children classified as nonresidents are entitled to pay the resident tuition regardless of their length of residence in Texas if they comply with the following provisions of the statute.

Status of Military Personnel, Commissioned Public Health Service Officers, and Their Spouses and Dependents Stationed in Texas. Education Code 54.058(b) provides that military personnel assigned to duty within the state of Texas, their spouse and their dependent children, shall be entitled to pay the same tuition as a resident of Texas regardless of the length of their physical presence in the state. To be entitled to pay resident tuition, such military personnel shall submit at least once per 12 month academic year as defined by the institution a statement from an appropriately authorized officer in the service certifying that they are then assigned to duty in Texas and that same will be in effect at the time of such enrollment in a public institution of higher education. This same provision also applies to commissioned Public Health Service officers and their spouses and their dependents. This subsection also provides that nonresident members of an out-of-state National Guard unit who are temporarily training with a Texas National Guard unit will not be entitled to pay the resident tuition.

Status of Spouses and Dependents of Military Personnel or Commissioned Public Health Service Officers Reassigned Out-of-State. Texas Education Code 54.058(c) provides that if they reside continuously in the State of Texas, the spouse and dependent children of members of the armed forces previously assigned to active duty in Texas, but reassigned to duty outside the state of Texas may pay resident tuition rates. This provision also applies to spouses and dependents of commissioned Public Health Service officers.

Status of Spouses and Dependents of Military Personnel or Commissioned Public Health Service Officers Stationed in Out-of-State Locations. Texas Education Code 54.058(g) provides that the spouse and dependent children of members of the armed forces who are assigned to duty outside the State of Texas may be entitled to pay the resident tuition if they reside in Texas and file with the public institution of higher education at which a child or spouse plans to register a letter of intent, an affidavit, or other evidence satisfactory to the institution stating they intend to become permanent residents of Texas. This provision also applies to commissioned Public Health Service officers and their spouses and their dependents.

Status of Spouses and Dependents of Military Personnel or Commissioned Public Health Service Officers Once Stationed in Texas But Now Stationed in Out-of-State Locations. Texas Education Code 58.058 (d) provides that 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 12-month period, is entitled to pay the tuition fees and other fees or charges provided for Texas residents at a state institution of higher education if the member:

- 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.
 - B. Designates Texas as the member's place of legal residence for income tax purposes.
- Has been registered to vote in Texas for the entire year preceding the first day of the term or semester.
 - Satisfies at least one of the following:
 - 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.

Status of Spouses and Dependents of Military Personnel or Commissioned Public Health Service Officers Who Die While in Service. Texas Education Code 54.058(f) provides that members of the immediate family (which includes spouse or dependent children) of members of the armed forces who die while in military service or public health service may qualify to pay the resident tuition if they become residents of Texas within 60 days of the date of death. To qualify under this provision, the students shall submit to the institution of higher education satisfactory evidence establishing the date of death and residence in Texas. This provision also applies to commissioned Public Health Service officers and their dependents.

Nonresidents Attending College Under Federal Benefits Programs for Veterans. Texas Education Code 54.058(e) provides that the public institution of higher education may charge the nonresident tuition fee for nonresident veterans to the United States government under the provisions of any federal law or regulation authorizing educational or training benefits for veterans.

Residence Classification Upon Separation From Military or Public Health Service

Waiver of Nonresident Tuition for Veterans or Commissioned Public Health Service Officers Upon Separation from Military or Public Health Service. 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 has retired or been honorably discharged from the Armed Forces and has complied with the requirements of subsection 21.28 (f)(4) of this section.

Students Enrolled in ROTC Programs. A nonresident student who is a member of an ROTC unit will be required to pay nonresident tuition rates until such time the student has signed a contract which cannot be terminated by the student and which obligates the student to serve a period of active military duty.

NATO Forces Stationed in Texas. Nonresident aliens 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 at public institutions of higher education as residents of Texas.

Other Federal Employees. The privilege of paying resident tuition rates described in this section is restricted to persons in the military service and commissioned officers of the Public Health Service, and is not extended to other federal employees.

Civilian Employees of the Military. The privilege of paying resident tuition rates described in this section is restricted to persons in the military service and commissioned officers of the Public Health Service, and is not extended to civilians employed by the military or the Public Health Service.

A nonresident who marries a resident of Texas who is in the military must establish his or her own residency by meeting the standard requirements as stated in this title (relating to married students).

Teachers, Professors, and Their Dependents

Statute: Section 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.

Teachers and professors employed at least half time on a regular monthly salary basis (not an hourly employee) by any Texas public institution of higher education may pay the same tuition as a resident of Texas for themselves, their spouses, and their dependent children, regardless of the length of residence in the state. 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 to the college they attend. It is the intent of this rule that employment be for the duration of the period of enrollment for which a waiver is awarded.

Students Employed as Teaching or Research Assistants

Statute: Section 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.

Students employed as teaching or research assistants employed at least half time by any public institution of higher education in a degree program-related position may pay the same tuition while attending any public institution of higher education as a resident of Texas for themselves, their spouses, and their dependent children, regardless of the length of residence in the state. The institution which employs the students shall determine whether or not the students' jobs relate to their degree programs. If the spouse or children attend an institution other than the one employing the research or teaching assistant, they must provide proof of his or her current employment to the college they attend. It is the intent of this rule that employment be for the duration of the period of enrollment for which a waiver is awarded.

Scholarship Recipients

Statute: Section 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.

Section 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.

Statute: Section 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.

Competitive Academic Scholarship Recipients. Certain students receiving competitive scholarships may be exempted from paying nonresident tuition rates.

Approved Procedures for Awarding Scholarships. Each institution awarding nonresident tuition waivers based on competitive scholarships shall have in the appropriate office of the institution a memo from the institution's administration granting the scholarship committee the authority to award schol-

arships which hold a nonresident tuition waiver option. In addition, the scholarship committee shall maintain records which verify that residents as well as nonresidents were eligible to compete for the scholarship and the criteria used to select scholarship recipients. To qualify for exemption from paying nonresident tuition rates students nonresidents (including citizens and permanent residents of the U.S. and all foreign students) must be awarded competitive scholarships totaling at least \$1,000 for the academic year, the summer session or both by an official scholarship committee or committees of the public institution of higher education they are attending. If nonresidents or foreign students in competition with other students, including Texas residents, obtain these competitive scholarships, the students may pay the same tuition as a resident of Texas during the registration period in which the competitive scholarship is in effect. In order for a competitive scholarship to qualify a student to pay the resident rate, both the funds and the selection process must be under the control of the institution. At the time the competitive scholarship is made, the institution must designate the term or terms of the current 12-month academic year as defined by the institution in which the scholarship will be in effect. Scholarship funds need not be disbursed in each term covered by the scholarship and waiver, but documentation for the scholarship must define the relevant time period for the scholarship. The waiver's time period will be the same as that of the scholarship. If the scholarship is terminated for any reason, the waiver shall also cease as of the end of the enrollment period in which the scholarship is terminated. An institution shall not waive nonresident tuition on the basis of competitive scholarship for more than five percent of its total enrollment in the corresponding semester or term of the previous academic year. If the recipient of the scholarship is concurrently enrolled at more than one institution, the waiver of nonresident tuition is only effective at the institution awarding the scholarship.

Beginning with awards for fall 1998, institution of higher education that offer competitive scholarships shall adopt a written policy describing the factors to be used by the institution or unit making an award. A policy adopted under this section shall be published in the institution's or unit's catalog and shall be made available to the public in advance of any deadline for the submission of an application for a competitive scholarship to which the policy applies.

A nonresident or foreign student is eligible to pay the fees and charges required of Texas residents if the 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. 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 and who pays the fees and charges required of Texas residents at one of the institutions as provided by the Texas Education Code, Section

54.064 because the student holds a competitive scholarship is entitled to pay the fees and charges required of Texas residents at each public institution of higher education in which the student is simultaneously enrolled under the program.

Economic Development and Diversification Program

Section 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.

Economic Development and Diversification Employees. Nonresidents, (including citizens and permanent residents of the U.S. and foreign students eligible to domicile in the United States, 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 form 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 Coordinating Board web site at www.collegefortexans.com.

Special Programs

Residents of a State Bordering Texas

Statute: Section 54.060(a) Resident of Bordering State or Nation: Tuition. 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, Lamar State College-Orange, Lamar State College-Port Arthur, a 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 by 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 situ-

ated 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.

Section 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, who registers in any general academic teaching institution, as defined in Section 61.003(3) of this code, or component of the Texas State Technical College System in a county immediately adjacent to the nation in which the foreign student resides or who registers for lower division courses at a community or junior college having a partnership agreement pursuant to Subchapter N, Chapter 51, of this code, with an upper-level university and both institutions are located in the county immediately adjacent to the nation in which the foreign student resides, or who registers in Texas A&M University-Kingsville, or Texas A&M University-Corpus Christi, and, except as provided by this subsection, and who demonstrates a financial need after the financial resources of the foreign student and the student's family are considered. The foreign student described in this subsection shall pay tuition equal to that charged Texas residents under Sections 54.051 and 54.0512 of this code. The Coordinating Board shall adopt rules governing the determination of financial need of students under this subsection 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.

Section 54.060(f) 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 as defined by Section 61.003, 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.

Residents of a Bordering State. Nonresidents who are residents of a state of the United States bordering Texas and who register in a public upper-level institution of higher education, two-year institution in the Lamar University System, or in any Texas public technical college or public junior college situated in a county immediately adjacent to the state in which the nonresident student resides are entitled to pay an amount equivalent to the amount charged a Texas student registered at a similar school in the bordering state. However,

the amount paid by the nonresident for tuition may not be less than the amount charged Texas residents to attend the Texas institution. Nonresidents who are residents of New Mexico or Oklahoma and who register in a public technical college that is situated in a county within 100 miles of the state in which the nonresident student resides are entitled to pay an amount equivalent to the amount charged a Texas student registered at a similar school in the bordering state. However, the amount paid by the nonresident for tuition may not be less than the amount charged Texas residents to attend the Texas institution.

The admitting Texas public junior college, public technical college, public senior upper-level institution, or two-year institution in the Lamar University System must have on file a copy of a letter from the Chief Executive Officer of the comparable neighboring state institution which certifies that eligible Texas residents are entitled to pay in-state tuition at the comparable neighboring institution. To be valid, the certifying letter must have been issued no longer than two years before the start of the involved enrollment period; also, a copy of the letter must be filed with the Texas Higher Education Coordinating Board.

Citizens of Mexico. 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. A citizen of Mexico who registers for instruction offered by a general academic teaching institution or component of the Texas State Technical College System in a county bordering Mexico or who registers for lower division courses at a community or junior college having a partnership agreement pursuant to Texas Education Code 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, or who registers at Texas A&M University-Kingsville or Texas A&M University-Christi is eligible to pay tuition equal to that charged Texas residents provided the student demonstrates a financial need after the resources of the student and the student's family have been considered.

General academic teaching institutions other than Texas A&M University-Kingsville and components of the Texas State Technological College System, located in counties which are not adjacent to Mexico, may allow a limited number of citizens of Mexico who demonstrate financial need to register and pay the Texas resident rate at their institution. The number of such students each institution may enroll in any one term is not to exceed two (2) eligible students per thousand of enrollment of the institution's total enrollment in that term. Institutions with fewer than 5,000 students may enroll up to ten (10) eligible students.

Residents of Adjacent Counties of Bordering States. 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 a

Texas public institution of higher education, the governing board of which has agreed to admit the student at the resident tuition fee prescribed by this chapter, shall pay tuition equal to that charged residents of this state at the institution. 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 admitting Texas institution must have on file a copy of a letter from the Chief Executive Officer of a neighboring state public institution which certifies that eligible Texas residents are entitled to pay in-state tuition at the neighboring state institution or, a copy of a memorandum from the board that such a letter has been provided by a Texas institution and is on file at the board. To be valid, the certifying letter must have been issued no longer than two years before the start of the involved enrollment period; also, a copy of the letter must be filed with the Texas Higher Education Coordinating Board. For the Coordinating Board memorandum to justify a waiver, the student's enrollment period must fall within the eligibility period indicated in the memorandum by the board.

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.

Junior College Tuition Waivers for Ad Valorem Tax Payers

The governing board of a public junior college district may allow a person who resides outside the district and who owns property subject to *ad valorem* taxation by the district, or a dependent of the person, to pay tuition at the rate applicable to a student who resides in the district.

The governing board of a public junior college district may allow a person who resides outside the district and in the taxing district of a contiguous public junior college district to pay tuition and fees at the rate applicable to a student who resides in the district.

The governing board of a public junior college district may allow a person who resides outside the district to pay tuition and fees at a rate less than the rate applicable to other persons residing outside the district, but not less than the rate applicable to a student who resides in the district, if the person:

- Resides within the service area of the district,
- Does not reside in an independent school district that meets the criteria of the coordinating board for the establishment of a junior college district under the Texas Education Code, Section 130.013.
- Demonstrates financial need in accordance with rules adopted by the Texas Higher Education Coordinating Board.

Responsibilities of Students and Schools

Student Responsibilities

Statute: Section 54.0521 Oath of Residency. (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.

Section 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.

Section 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.

Oath of Residency. When completing the oath of residency portion of an application for admission process, the student is responsible for registering under the proper residence classification and for providing documentation as required by the public institution of higher education. 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 in which they are enrolling for official determination. Students classified as Texas residents must affirm the correctness of that classification as a part of the admissions procedure. 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 will result in disciplinary action.

Responsibilities of the Public Institutions of Higher Education

Review of Enrollment and/or Registration Forms. Each public institution of higher education is responsible for reviewing enrollment and/or registration applications for errors, inconsistencies or misclassifications of residency status. Institutions should obtain written documentation to resolve any problems noted during the review of forms.

Affirmation of Residence for Returning Students. When independent students classified as residents have been out of school for 12 months or more, an institution may continue the students' classification as residents upon receipt of affirmations from the students that they have not changed their state of residence since their last enrollment at that institution, provided the institution has documentation of residence status on file. When dependent students classified as residents have been out of

school for 12 months or more, an institution may continue the students' classification as residents upon receipt of affirmations from the students that their parents or legal guardians have not changed their state of residence since the student's last enrollment at that institution, provided the institution has documentation of residence status on file.

Oath of Residency. Each public institution is responsible for incorporating a core of residency questions and an oath of residency into its student application for admission process. The required core of questions will be developed by the Coordinating Board staff with the assistance of an advisory committee. Answers to the questions should then be reviewed to determine the student's proper residency classification. If any of the answers raise questions as to the appropriateness of classification, the institution must file and maintain a copy of one or more appropriately dated documents which will certify that the student classified as a resident has legal right to such classification as of the official census date of the semester or term for which enrolling. However, documents which cannot legally or conveniently be reproduced should be observed by an official of the institution and pertinent information about the document should be noted and signed by the observing officer. Such notations should be maintained in the school's records for audit purposes. Documents acceptable for this purpose include, but are not limited to:

- Texas high school transcript for the full senior year immediately preceding the full semester enrolled.
- Texas college or university transcript (in conjunction with other documents from the institution).
- Employer statement of date of employment.
- Permanent driver's license (at least one year old). The license expiration date minus date of enrollment should not exceed three years.
- Texas voter registration.
- Lease agreement which includes student's name and period covered.
- Property tax payments for the year preceding enrollment.
- Canceled checks.
- Utility bill for the year preceding enrollment.
- A signed, dated, and notarized comprehensive residence questionnaire.
- (For aliens) Proof of permanent residence classification which is eligible for the establishment of a domicile in Texas.
- 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.
- A current credit report which documents the student's length and place of residence.
- Other third party documentation which confirms residency status for the 12-month period preceding enrollment.
- For a homeless individual, documentation may consist of written statements from the office or 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.

Penalties

Statute: Section 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 Act. 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.

Section 54.061 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 boards concerning nonresident fees a penalty not to exceed \$10 a semester.

Student Compliance With Institutional Rules and Regulations. Each institution has been authorized by statute to assess and collect from nonresident students failing to comply with the provisions of the tuition statute and with these interpretations concerning nonresident fees a penalty not to exceed \$10 a semester. In addition, if students have obtained residence classification by virtue of deliberate concealment of facts or misrepresentation of fact, they may be subject to appropriate disciplinary action, in accordance with the rules and regulations that may be adopted by the governing boards of the respective institutions of higher education.

Glossary

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise:

Competitive Scholarship. A scholarship which is designated as competitive by the institution, whose sum either singularly or in combination with other competitive scholarships totals the amount named in Texas Education Code 54.064, that is publicized and open to all students including Texas residents, and which has been selected by the institution to be a basis for the waiver of nonresident tuition charges.

Conclusive Evidence. Proof which 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 which imply a fixed intent to remain in Texas.

Dependent. An individual (minor or 18 years of age or older) who is claimed as a dependent for federal income tax purposes by a parent or guardian the year of enrollment and 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.

Foreign Students. Aliens who are not permanent residents of the United States or have not been permitted by Congress to adopt the United States as their domicile while they are in this country.

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 (for instance, through a public assistance program).

Homeless Individual. 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. For this purpose, a homeless individual is defined by 42 U.S.C. Section 11302, which states, "the term homeless" or "homeless individual" or "homeless person" includes:

- An individual who lacks a fixed, regular, and adequate night time residence; and
- An individual who has a primary night time residence that is
 - A. A supervised publicly or privately operated shelter designed to provide temporary living accommodation;
 - B. An institution that provides temporary residence for individuals intended to be institutionalized; or
 - C. A public or private place not designated for, or ordinarily used as, a regular sleeping accommodation for human beings.

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 service to the homeless individual over the previous 12-month period.

Independent Student. A student 18 years of age or older or an emancipated minor who is not claimed by a parent or a guardian as a dependent for federal income tax purposes during the tax year including the enrollment period.

Minor. An individual 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 and 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. For other length programs, consult the Reporting and Procedures Manual, published by the Educational Data Center of the Coordinating Board.)

Out-of-District Student. A Texas resident who does not physically reside within the geographic boundaries of the classifying public junior college district.

Prior to Enrolling. Prior to or including the official census date.

Public Institution of Higher Education. State-supported institutions of higher education, including public junior and community colleges, public senior colleges and universities, public health science centers and the Texas State Technical Institutes.

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, and who has otherwise met the state requirements for establishing residency for tuition purposes.

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 Reserve 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.

Students Enrolled in Radiological Sciences. United States military 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 a military base in Texas.

Appeals to the Texas Higher Education Coordinating Board. In the event two or more Texas public institutions of higher education determine a different residency status for members of the same family with identical evidence of residency currently enrolled at each institution, the individuals who were the subject of the residency determination may appeal the unfavorable decision to the Commissioner for Higher Education. Before making an appeal to the Commissioner, the student classified as a nonresident must exhaust all appeal processes available at the institution level. A decision by the Commissioner as to one family member's residency status will apply to each family member with identical evidence of residency at any institution of higher education he or she attends.

Students Who Are Beneficiaries of the Texas Tomorrow Fund. 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.

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2. Administrative Support Center - A9
3. Agricultural Education - E11
4. Agricultural Pavilion - E11
5. Agricultural Sciences - E12
6. Animal Science - E11
7. Architecture - F9
8. Art - F9
9. Athletic Ticket Office - A13
10. Athletic Training Center - B13
11. Biology - D11
12. Biology Auditorium - D11
13. Bledsoe Hall - C13
14. Business (Rawls College of Business) - E9
15. Carpenter/Wells Complex - C10
16. Central Warehouse - C9
17. Chemical Engineering - B12
18. Chemistry - D11
19. Chitwood Hall - F8
20. Child Development Research Center - E13
21. Civil Engineering - C12
22. Clement Hall - G9
23. Coleman Hall - G8
24. Credit Union - G4
25. Dairy Barn - F10
26. Dan Law Field - B11
27. Doak Hall - F13
28. Drane Hall - F13
29. Electrical Engineering - C11
30. Electrical Engineering Addition - C11
31. Engineering Center - B11
32. Engineering Lab - B12
33. English/Philosophy/Education Complex - F10
34. Exercise Sciences Center (Men's Gym) - B12
35. Fish and Wildlife Research - E10
36. Food Technology - E11
37. Foreign Language - F10
38. Frazier Alumni Pavilion and Plaza -A12
39. Gaston Apartments - B10
40. Gates Hall - G10
41. Goddard Range, Wildlife and Fisheries Management - F10
42. Gordon Hall - C12
43. Health Sciences Center - B2
44. Holden Hall - C12
45. Horn Hall - F13
46. Hulen Hall - G10
47. Human Sciences - E12
48. Industrial Engineering - B12
49. International Cultural Center - B5
50. Jones SBC Stadium - A13
51. Knapp Hall - F12
52. KTXI-TV - E4
53. Lady Raider Softball Field - D2
54. Law - G6
55. Livestock Arena - E4
56. Lubbock Municipal Auditorium/Coliseum - A10
57. Mass Communications - D11
58. Mathematics and Statistics - D11
59. McClellan Hall - F12
60. Meat Lab - E5
61. Mechanical Engineering - B12
62. Memorial Circle/Pflugger Fountain - D12
63. Merket Alumni Center - G13
64. Murdough Hall - D64
65. Museum/Moody Planetarium - A6
66. Music - F12
67. National Ranching Heritage Center - A7
68. Parking Garage - G9
69. Petroleum Engineering - C11
70. Physical Plant - C8
71. Plant Science - E10
72. PrintTech - D8
73. Psychology - F11
74. Science (Geosciences and Physics) - D11
75. Seismological Observatory - D11
76. Sneed Hall - D13
77. Southwest Collection/Special Collections Library - F11
78. Speech and Hearing Clinic - F10
79. Sport Studies Center (Women's Gym) - G12
80. Stangel Hall - E10
81. Student Union - F12
82. Student Recreation Center (Robert H. Ewalt SRC) - E7
83. Tennis Courts - E8
84. Theatre (Charles E. Maedgen, Jr., Theatre) - G10
85. Thompson Hall - C9
86. Track (Robert B. "Bob" Fuller Track) - C10
87. United Spirit Arena - F6
88. University Greenhouse - E5
89. University Library - F11
90. University Medical Center - C2
91. University Police Department - A10
92. Urbanovsky Park - F8
93. Wall Hall - G11
94. Weeks Hall - E13
95. West Hall - D12
96. Weymouth Hall - F8
97. Wiggins Hall - F7
98. Experimental Sciences Research Building
99. Marsha Sharp Center for Student Athletes
100. Football Training Facility

Buildings Under Construction