Equal Educational Opportunity Statement

The University of Texas at Dallas is committed to an educational and working environment that provides equal opportunity to all members of the University community. In accordance with federal and state law, the University prohibits unlawful discrimination on the basis of race, color, religion, national origin, gender, age, disability, and veteran status. Discrimination on the basis of sexual orientation is also prohibited pursuant to University policy.

This catalog is a general information publication only. It is not intended to nor does it contain all regulations that relate to students. The provisions of this catalog do not constitute a contract, express or implied, between any applicant, student or faculty member and The University of Texas at Dallas or The University of Texas System. The University of Texas at Dallas reserves the right to withdraw courses at any time, to change fees or tuition, calendar, curriculum, degree requirements, graduation procedures, and any other requirements affecting students. Changes will become effective whenever the proper authorities so determine and will apply to both prospective students and those already enrolled.

The online version of The University of Texas at Dallas Graduate Catalog is the official version and takes precedence over the printed version. The online catalog will be updated periodically and will contain all major policy changes that occur during the 2006-2008 catalog cycle.

Students are held individually responsible for complying with all requirements of the rules and regulations of the University and the Board of Regents of The University of Texas System. Failure to read and comply with policies, regulations and procedures will not exempt a student from whatever penalties the student may incur.
The University of Texas at Dallas is accredited by the commission on Colleges of the Southern Association of Colleges and Schools (1866 Southern Lane, Decatur, Georgia 30033-4097: Telephone 404-679-4501) to award baccalaureate, master’s, and doctoral degrees.
Graduate Programs Available

School of Arts and Humanities
Humanities (M.A., M.A.T., Ph.D.) with majors in
- Aesthetic Studies
- History of Ideas
- Humanities Studies in Literature
- History (M.A.)
- Arts and Technology (M.A., M.F.A.)

Erik Jonsson School of Engineering and Computer Science
Computer Engineering (M.S., Ph.D.)
Computer Science (M.S., Ph.D.) with major in
- Software Engineering (M.S. only)
Electrical Engineering (M.S.E.E., Ph.D.) with major in
- Microelectronics
- Telecommunications
Geospatial Information Sciences (Ph.D)
Materials Science and Engineering (Ph.D)
Software Engineering (Ph.D)
Telecommunications Engineering (M.S.T.E, Ph.D)
Combination of Engineering and Management Graduate Degrees (M.S.)

School of General Studies
Interdisciplinary Studies (M.A.)
Graduate Instruction in Education

Teacher Development Center for General Studies
The University offers opportunities in selected fields for teachers and other school personnel to earn advanced degrees, additional certification, and certificate endorsements.

Students wishing to pursue an advanced degree should consider programs leading to the Master of Arts in Teaching (M.A.T.) degree in Humanities, Science Education, or Mathematics Education. Students enrolling for one of these degrees should consult the appropriate subject area in this catalog. Students pursuing coursework leading to additional certificate endorsement or initial certification should seek counsel in the Teacher Development Center early in their programs of study. Tel: (972) 883-2730.

School of Behavioral and Brain Sciences
Doctor of Audiology (Au.D.)
Cognition and Neuroscience (Ph.D.)
Communication Sciences and Disorders (Ph.D.)
Psychological Sciences (Ph.D.)
Human Development and Communication Sciences (Ph.D.)
Applied Cognition and Neuroscience (M.S.)
Communication Disorders (M.S.)
Human Development and Early Childhood Disorders (M.S.)
Evaluation Research (Certificate)

School of Management
Business Administration (MBA)

International Management Studies (M.A., Ph.D.)
Accounting and Information Systems (M.S.)
Combination of Engineering and Management Graduate Degrees (M.S.)
Information Technology and Management (M.S.)
Management and Administrative Sciences (M.S.)
Medical Management (M.S.) (Certificate)
Management Science (Ph.D.)
Project Management (Certificate)
Global Management (Certificate)
Professional Coaching (Certificate)
Supply Chain Management (Certificate)

School of Natural Sciences and Mathematics
Molecular and Cell Biology (M.S., Ph.D.)
Chemistry (M.S., Ph.D.)
Geosciences (M.S., Ph.D.)
Geospatial Information Sciences (M.S., Ph.D)
Mathematical Sciences (M.S., Ph.D.) with majors in:
- Applied Mathematics
- Statistics
Mathematical Sciences (M.S.) with majors in:
- Bioinformatics and Computational Biology
- Engineering Mathematics
- Mathematics
- Mathematics Education (M.A.T.)
- Physics (M.S., Ph.D.)
- Applied Physics (M.S.)
- Science Education (M.A.T.)
- Biotechnology (M.S.)
- Remote Sensing (Certificate)

School of Social Sciences
Economics (Ph.D.)
Geospatial Information Sciences (Ph.D)
Political Science (Ph.D.)
Public Affairs (MPA, Ph.D)
Public Policy & Political Economy (Ph.D)
Applied Economics (M.S.)
Applied Sociology (M.A., M.S.)
Geographic Information Sciences (M.S.)
Crime & Justice (Certificate)
Economic & Demographic Data Analysis (Certificate)
Financial Economics (Certificate)
Evaluation Research (Certificate)
Geographic Information Systems (Certificate)
Local Government Management (Certificate)
Non-Profit Management (Certificate)

For a detailed description of each graduate program, see page references in the Table of Contents.
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BOARD OF REGENTS
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The University of Texas at Dallas serves the Metroplex and the State of Texas as a global leader in innovative, high quality science, engineering, and business education and research.

The University is committed to (1) producing engaged graduates, prepared for life, work, and leadership in a constantly changing world, (2) advancing excellent educational and research programs in the natural and social sciences, engineering and technology, management, and the liberal, creative, and practical arts, and (3) transforming ideas into actions that directly benefit the personal, economic, social, and cultural lives of the citizens of Texas.

History of The University of Texas at Dallas

Prior to World War II, Eugene McDermott, Cecil Green and J. Erik Jonsson, the founders of Geophysical Services, Inc., were in the business of searching for natural resources. The war changed the focus of the company from searching for natural resources to creating instruments that aided in finding enemy planes and submarines. GSI spawned Texas Instruments and in 1958, TI employee Jack Kilby invented the integrated circuit that launched a new era for the company, for North Texas, and for the world.

During the expansion of Texas Instruments, the Founders were forced to import engineering talent from outside the state, while the region’s bright young adults pursued education elsewhere. McDermott, Green and Jonsson saw that Texas needed highly educated minds if the state were to remain competitive in the decades to come. They noted that, in 1959 alone, Columbia University conferred 560 doctoral degrees - more than the entire Southwest region. They wrote at the time, “To grow industrially, the region must grow academically; it must provide the intellectual atmosphere, which will allow it to compete in the new industries dependent on highly trained and creative minds.”

Therefore, they established the Graduate Research Center of the Southwest (later renamed the Southwest Center for Advanced Studies) in 1961. The center recruited some of the best scientific talent in the nation. The Texas Legislature concurred with the vision of the Founders and mandated in 1967 that science and technology educational opportunities needed to exist in North Texas. McDermott, Green and Jonsson decided to donate SCAS and its lands to The University of Texas System, and on June 13, 1969, Governor Preston Smith signed the bill creating The University of Texas at Dallas. The SCAS scientists formed the core of U.T. Dallas’s educational infrastructure.

By terms of its enabling legislation, U.T. Dallas offered only graduate degrees until 1975 when the addition of juniors and seniors increased enrollment from 408 in 1974 to more than 3,300 students. By the fall of 1977, the enrollment reached over 5,300. In 1986, U.T. Dallas established the Erik Jonsson School of Engineering and Computer Science. Today, the Jonsson School plays a critical role in providing a highly educated work force for the advanced technology industry.

In 1990, the Texas Legislature authorized U.T. Dallas to admit lower division students. U.T. Dallas’s first freshman class consisted of only 100 students. Despite its small size, this cohort’s achievements set the standard for future classes. Since then, freshman classes have grown in size while the university has maintained high enrollment standards. Nationally published data indicate that U.T. Dallas’s freshman class compares extremely well with those from many prominent national universities.

The Rise to National Prominence

The university’s ability to attract and retain these students has propelled U.T. Dallas into national prominence within a few short years. US News and World Report ranks U.T. Dallas as one of the three best public universities in the state along with U.T. Austin and Texas A&M. Kiplinger’s Personal Finance Magazine, in its October 2000 article “100 Best Values in Public Colleges”, ranked U.T. Dallas 60th among all public universities nationally. The quality of the students who attend U.T. Dallas has remained consistently high. Over forty percent of the incoming freshmen are in the top 10% of their high school graduating class and their average SAT scores place them in the top twenty percent of all college-bound students.

The addition of freshmen has accelerated the rise in the percentage of full-time undergraduates from 31% in 1986 to nearly 70% in 2006. Masters, doctoral and post-baccalaureate students currently comprise 36% of the student body. Given its location and mission, U.T. Dallas will continue to have significant numbers of professionals attending undergraduate or master’s courses part time.

The transition of the university from a part-time upper division school to a four-year university with an
emphasis on engineering, mathematics, the sciences, and the management of new technologies has been greatly facilitated by the university’s faculty. By retaining key faculty members and attracting more nationally and internationally prominent researchers and instructors, U.T. Dallas has enabled its faculty to provide quality instruction to an increasingly diverse student population while sustaining the university’s longstanding research tradition. In the past decade, the faculty has increased the level of external research funds substantially. During this same period, the university expanded its teaching mission, became a full-fledged institution, enhanced its areas of focused excellence, and became independently recognized as one of the top public universities in the nation.

University Libraries

The Eugene McDermott Library and Callier Library support the research, instruction, and community service programs of the University by providing access to information in print, microform and electronic formats. The libraries consist of over two million items, including more than 1,000,000 books, over 37,000 current periodical titles, as well as over one million government documents, microforms, and maps. The McDermott Library is a U.S. and Texas state depository. Special Collections include the Wineburgh Philatelic Research Library, the Belsterling Collection, and the History of Aviation Collection. The libraries provide an ever-expanding digital collection that is available to distance learners. Users connect to these resources through the library portal at http://www.utdallas.edu/library. Current students have unlimited access to the digital library.

The librarians and staff provide competent and cordial interactions with the people they serve. Librarians provide classroom and individual instruction on the use of the library. The library collections are enhanced by the Interlibrary Loan Service, which provides students with books or articles from a network of major libraries. Student research is facilitated by copiers available to duplicate from paper, microfilm, or microfiche. The libraries offer students with disabilities a range of services to encourage their independent research.

Facilities for Study and Instruction

Computing Services

Technology Customer Services, a branch of Information Resources, provides computing facilities for student, faculty, and staff use in instruction and research.

The Microcomputer Center, located in the McDermott Library building, provides a modern, networked computing environment with both PCs and Macs in five separate labs. In addition, a general-access microcomputer laboratory equipped with both PCs and Macs is available in the UTD Bookstore Building. The ground floor of the Jonsson Building also offers a lab of PC’s for student use.

Dedicated systems are also available to support such functions as campus information services, programming, research-related activities, and computationally intensive applications.

A sophisticated campus-wide network permits offices and laboratories direct access to extensive computing resources both on and off campus. Internet traffic volumes are high both from and to the campus. In addition, a high-speed connection to Internet2 is available.

The university is also providing wireless LAN access to the campus community in most areas. The Conference Center, most of the student apartments, large auditoriums, and common public areas are all part of the on-going deployment of wireless access. Students may utilize the campus network from several locations around campus using laptops with the appropriate wireless LAN 802.11b/g network cards. This is an increasingly popular service that is expanding rapidly across the campus.

Many of the schools, programs, and research centers operate their own computing facilities that are also available to students as appropriate. Details of these facilities can be found in the individual school/program sections of this catalog. For the latest information regarding computing facilities visit http://www.utdallas.edu/ir.

Help Desk and Other Services

The university Help Desk is located in the Jonsson Building and is open seven days a week throughout the regular semesters. Students, faculty, and staff may ask for assistance via telephone, email, web, or personal visit. A Live Chat service is also available at the web site http://www.utdallas.edu/ir/cs/helpdesk/index.htm. Other popular services include the publication of the Quick Guide to Computing Services (http://www.utdallas.edu/ir/cs/guide/) and the Campus Locator Map (http://www.utdallas.edu/ir/locator/) for quickly identifying all campus buildings and rooms.
Callier Center for Communication Disorders

The Callier Center is an internationally recognized institution that offers services to people who suffer from any type of communication disorder. Acknowledged for meeting the assessment, treatment, education, and social service needs of individuals with communication disorders, the center has programs in preschool deaf education, parent education, and child development. Its clinical services include audiology, speech pathology, language development, and adult deaf services; its research activities include psycho-acoustics, auditory neurophysiology, speech science, and audiology. Graduate classes are also conducted at the Callier Center.

Carolyn Lipsky Galerstein Women’s Center

The Carolyn Lipsky Galerstein Women’s Center was founded to foster an inclusive, safe, and open environment for the U.T. Dallas community, to promote a broad understanding of gender as a multi-faceted aspect of human existence, and to provide leadership in developing programs that facilitate institutional change. Named for a former Dean of the School of General Studies, it affirms the University’s commitment to advancing the status and success of women on campus. The Women’s Center offers confidential counseling, guidance, and support to students, faculty, and staff, with particular emphasis on gender-related issues. It also sponsors a series of speakers and seminars throughout the year and houses a resource library that includes materials on justice-related topics, self-help, and women’s studies. The Center maintains a computerized database for access to a broad range of community resources and is available for campus groups to meet, or just relax and study. The Women’s Center is located on the first floor, McDermott Library in room MC 1.204, (972) 883-6557.

Video Services

The Media Services office is responsible for classroom support, which includes the following:

- Supplying A/V equipment needed for classes and special events;
- Maintaining integrated A/V equipment in several rooms across campus.

Note: The UTD Library is responsible for maintaining the film, video, and audio collections. Some schools have their own media services staff and will utilize the central staff only as needed. You may check with the Dean’s Office in each school for more details.

Housing Information

The privately managed Waterview Park Apartments offer affordable on-campus apartment living for those who appreciate the advantage of being able to walk from their residence to class. Waterview Park Apartments are reserved for The University of Texas at Dallas students and offer a variety of floor plans and prices. Graduate students living on-campus must enroll in and complete a minimum of 3 hours each fall and spring semester. For more information contact: Waterview Park Apartments, (972) 454-5000, or visit [www.utdallas.edu/student/slife/res.html](http://www.utdallas.edu/student/slife/res.html). Students living off campus will find The University of Texas at Dallas accessible from the entire Metroplex.

Residential Life

Residential Life provides support with on-campus housing needs as they pertain to Waterview Park Apartments. If you need assistance with roommates or other Waterview Park issues please call (972) 883-6391. For additional information visit [www.utdallas.edu/student/slife/res.html](http://www.utdallas.edu/student/slife/res.html).
General Admission Requirements for Graduate Study

1. Submission of official university transcripts verifying that the applicant has an earned bachelor’s degree from a regionally accredited college or university in the U.S. or its equivalent from a university outside of the U.S. for admission to a master’s degree program. For admission to a doctoral program the applicant must provide official university transcripts showing an earned master’s degree from a regionally accredited college or university in the U.S. or its equivalent from a university outside of the U.S. Issues of equivalency are resolved by the Dean of Graduate Studies.

2. For admission to master’s degree programs, a grade average of B or better is expected on upper-division (junior and senior level) work as well as graduate work already taken in the student’s major field and related fields. Students not in academic good standing at a previously attended university will not be admitted. An applicant who has earned a baccalaureate degree under the “academic fresh start statute” (Texas Education Code, Section 51.931) will be evaluated only on the grade point average of the course work completed for that baccalaureate degree and the other criteria stated in this catalog.

3. Satisfactory current and official scores on the Graduate Management Admissions Test (GMAT) if applying to the School of Management or on the Graduate Record Examinations General Test (GRE) if applying to all other schools except the School of Arts and Humanities. Each degree program sets its own criteria for what constitutes a satisfactory score and students are advised to confer with the graduate advisor in the degree program to determine test score requirements. Scores must not be more than five years old. Applicants are also advised that GMAT or GRE scores are not the sole criterion for making an admission decision or terminating consideration of an application. Each applicant’s test scores are compared with those of other applicants of similar socioeconomic status. Only official reports from the appropriate testing agency are acceptable.

4. The ability to read, write, speak and understand English is essential for success in graduate studies at U.T. Dallas. An applicant whose native language is not English and who has been educated outside of the United States must submit an acceptable Test of English as a Foreign Language (TOEFL) examination score or an International English Language Testing System (IELTS) score. TOEFL is administered by the Educational Testing Services, ETS (http://www.toefl.org). IELTS is jointly managed by: University of Cambridge ESOL Examinations, British Council, and IDP: IELTS Australia (http://www.ielts.org). For more information about IELTS, visit http://www.ielts.org. At the time the student enrolls the test score must be less than two (2) years old. A minimum score of 80 (TOEFL IBT), 213 (TOEFLC), 550 (TOEFL) or 6.5 (IELTS) is required for unconditional, regular admission as a graduate student. Students with lower scores will be considered but are advised to improve their test scores and reapply.

5. Submission of the following supporting documentation:
   · Three completed ‘Request for Recommendation’ (available at http://www.utdallas.edu/student/admissions/prospective/request.pdf) forms from individuals able to judge the applicants probable success in graduate school.
   · A narrative from the applicant outlining academic interests, current or long-range interests in research, teaching or other professional objectives; describing publications or other scholarly endeavors; listing of academic and professional organizations and fellowships, scholarships, or other honors received.

6. Submission of a Graduate Application form to the U. T. Dallas Admissions Office. (see “Applying to the Graduate Programs”, below) and payment of all required application and credentialing fees.

Admission to U.T. Dallas as a Graduate Student Taking Only Undergraduate Courses

Students holding a bachelor’s degree from an accredited college or university may elect to take, or, based on their academic background be restricted to taking, only undergraduate courses. The applicant need only satisfy items 1 and 2 of the general admission requirements to apply. These students will be required to maintain the same scholastic standards as regularly admitted undergraduates and will receive academic guidance from the academic advisor in the school or from the Teacher Development Center. Students restricted to taking undergraduate courses may take graduate courses in a degree program only when they qualify for regular or conditional admission to that program. Students admitted as non-degree seeking or to take only undergraduate level courses may not be eligible for financial aid. Applicants should consult the UTD Financial Aid office prior to submission of their application for admission.
Admission to U. T. Dallas as a Non-Degree-Seeking Graduate Student

Students holding a bachelor's degree from an accredited college or university may elect to take, or, based on their academic background be restricted to taking, only undergraduate courses. The applicant need only satisfy items 1 and 2 of the general admission requirements to apply. These students will be required to maintain the same scholastic standards as regularly admitted undergraduates and will receive academic guidance from the academic advisor in the school or from the Teacher Development Center. Students restricted to taking undergraduate courses may take graduate courses in a degree program only when they qualify for regular or conditional admission to that program. Students admitted as non-degree seeking or to take only undergraduate level courses may not be eligible for financial aid. Applicants should consult the UTD Financial Aid office prior to submission of their application for admission.

Admission to U.T. Dallas as a Regular Degree-Seeking Graduate Student

A student wishing to take graduate level coursework without becoming a candidate for a graduate degree may apply for admission to U.T. Dallas as a non-degree-seeking graduate student. The applicant must satisfy the general admission requirements as noted above, but is not required to submit GRE or GMAT scores or letters of recommendation. Enrollment as a non-degree-seeking graduate student is subject to annual review and approval by the Dean of Graduate Studies. Students admitted as non-degree seeking or to take only undergraduate level courses may not be eligible for financial aid. Applicants should consult the UTD Financial Aid office prior to submission of their application for admission.

A non-degree seeking graduate student in good academic standing who wishes to apply for admission to a degree program must submit a new application. No more than 15 semester credit hours taken as a non-degree-seeking student at U.T. Dallas may be transferred to satisfy the coursework requirements of a graduate degree program, except with the permission of the Dean of Graduate Studies. Students not officially enrolled in a degree program require the consent of the Degree Program Office to enroll in graduate classes offered by that degree program.

NOTE: Students in the United States on an F1 or J1 Visa may only be admitted to a degree program and are not eligible for Non-Degree-Seeking Student status.

Admission to U.T. Dallas as a Conditional-Status Degree-Seeking Graduate Student

Upon review of the credentials of an applicant seeking regular admission to a U.T. Dallas degree program, the graduate studies committee of that degree program may recommend, and seek concurrence of the Dean of Graduate Studies, that the applicant be admitted subject to specific conditions being satisfied over a specified time period. Such conditions might include requiring additional semester hours to be taken, and/or a specific grade point average to be maintained. A student satisfying the conditional requirements within the specified time period will then qualify for regular admission. A student who does not fulfill the specified conditions within the time period specified at the time of admission will be barred from continued registration in the degree program.

Normally a student cannot remain in conditional status for more than one calendar year. Exceptions to the one-year limitation can be granted only by the Dean of Graduate Studies upon recommendation of the graduate program. Under no circumstances will the student be allowed to remain enrolled under Conditional Status for more than 15 semester credit hours or two consecutive years, whichever comes first. Within these limits, specified graduate level coursework taken as a conditionally admitted student can be applied to the degree program.

Applying to the Graduate Programs

Application forms are available from the Office of Admissions on the World Wide Web at http://www.utdallas.edu/prospective-students-index.html. A form is included in the back of this catalog. Applicants are urged to plan ahead and apply as early as possible; prospective students should submit applications and supporting documents at least 45 days prior to the beginning of classes in order to assure enough time for review by graduate program admissions committees prior to the expected date of enrollment.
Statewide Common Application for Graduate Admission

Students may use the Common Statewide Graduate Application for Admission to apply to any public university in the state of Texas. The application is available on the Web at www.applytexas.org. Each public university in the State will accept the Common Application, which can be filled out one time, copied, and used to apply to as many universities as the student wishes.

While the U.T. Dallas application form in the back of this catalog follows the Common Application format, it is designed only to be submitted to U.T. Dallas. Please refer to the instructions accompanying the U.T. Dallas application form for information on completing the application, available majors, application fees and appropriate deadlines.

In addition to the application, applicants are required to provide supporting information, including the following, preferably all together in the same envelope:
- two copies of official transcripts (certified English translations required, degree certificates in English and original language, if applicable) from every college and university attended. Official transcripts should be sealed in envelopes by the issuing college or university.
- official copies of test scores
- three letters of recommendation
- a brief narrative outlining the applicant’s academic interests and goals
- $50.00 nonrefundable application fee
- $100.00 nonrefundable international document evaluation fee for any student who has been educated outside the United States.

For International Students (those who do not have a permanent resident visa):
- Financial affidavit and original bank statement
- TOEFL scores (see item 2 of “General Admission Requirements to Master’s and Doctoral Degree Programs”)

Application Deadline Dates
Applicants should have all necessary application materials, including supporting documents, to the Office of Admissions by the following dates:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall semester</td>
<td>July 1</td>
</tr>
<tr>
<td>Spring semester</td>
<td>November 1</td>
</tr>
<tr>
<td>Summer semester</td>
<td>April 1</td>
</tr>
</tbody>
</table>

FOR STUDENTS WHO ARE NOT CITIZENS OR PERMANENT RESIDENTS OF THE UNITED STATES:

<table>
<thead>
<tr>
<th>Semester</th>
<th>Deadlines</th>
</tr>
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<tbody>
<tr>
<td>Fall semester</td>
<td>May 1</td>
</tr>
<tr>
<td>Spring semester</td>
<td>September 1</td>
</tr>
<tr>
<td>Summer semester</td>
<td>March 1</td>
</tr>
</tbody>
</table>

Students seeking appointments as Teaching Assistants or Research Assistants should contact the appropriate academic program office for earlier application deadlines.

Application for Admission by International Students Who Do Not Have Permanent Resident Visas

International applicants are strongly urged to submit the application and supporting materials at least six months ahead of the intended date of enrollment. Evidence of financial support (financial affidavit and original bank statement) while studying in the United States must be provided to the University before an international student can receive the I-20 or other required documents needed for visa application.

International students on F and J non-immigrant visa status are required to maintain health insurance while enrolled at the University and must show proof of insurance coverage at the time of each registration. The coverage must be equal to or better than the coverage provided by The University of Texas at Dallas Student Health Insurance Plan. Where there is no evidence of insurance coverage shown by an international student, the student will be required to purchase the U.T. Dallas insurance plan at the time of registration.

International students are required to have a tuberculin skin test, administered and read by the UTD Student Health Center, during Orientation for the first semester they attend U.T. Dallas. Student Health Center, during Orientation for the first semester they attend U.T. Dallas.
Transcripts

The term “transcript” is understood to refer to the recorded results of the student’s academic work. This document will contain all the important facts pertaining to the student’s academic level, scholarship and degrees. Two copies (each) of official transcripts and/or marksheets and degree certificates from each college or university attended are required. While hand-carried transcripts will be accepted for admission purposes, official copies sent directly from each educational institution attended must be received by the Office of Admissions no later than Census Day of the semester for which the student first registers. Students who do not meet this deadline will not be permitted to register in subsequent semesters or to receive U.T. Dallas transcripts until the official transcripts are received. All materials submitted in the process of applying to the University become the property of the university and will not be returned to the applicant.

Section 4.29, Texas Education Code provides legal penalties for any alteration of academic records or transcripts with the intent to use such a document fraudulently or permit the fraudulent use of such a document. Falsifying or omitting information may result in withdrawal of any offer of acceptance, cancellation of enrollment, and/or disciplinary actions.

Students may obtain a copy of their official UTD transcripts from the Office of the Registrar at no charge. However, mailing charges for overnight and international mail are incurred. A student must clear all university holds before requesting an official transcript. All transcripts requests must be made in writing with the student’s signature. No partial or incomplete transcripts will be issued. Requests over the telephone are not accepted.

Transcripts may be ordered in person in the Office of the Registrar, online at https://www.utdallas.edu/SIS, by fax at (972)883-6335, email (transcripts@utdallas.edu), or mail. The mailing address is: Office of the Registrar, MC 11, The University of Texas at Dallas, P.O. Box 830688, Richardson, TX 75083.

Transcripts requested by email will be mailed only to a student at the address on file with the Office of the Registrar or to another university.

Office of Enrollment Services

The Office of Admissions, located in Hoblitzelle Hall, will assist prospective students in exploring the possibility of graduate study at The University of Texas at Dallas. For detailed admissions or academic advice, please contact the specific academic program.

Requests for applications and questions related to graduate admissions should be addressed to: Director of Admissions; The University of Texas at Dallas; P.O. Box 830688, M/S HH10; Richardson, TX 75083-0688. Telephone (972) 883-2270. Fax (972) 883-6803. A nonrefundable application fee of $50, payable by check, is required of all students applying for admission to The University of Texas at Dallas. An additional $100.00 international document evaluation fee is required for those who have educational documents from countries other than the United States.

Graduate Admission Examinations

The information about the GRE and GMAT examinations given below was current at the time this catalog was published. Applicants should be advised that both examinations are undergoing changes in format and design.

Graduate Record Examination (GRE)

The GRE general test is offered on a year-round basis at regional testing centers in a computer-based testing (CBT) format. Information on regional CBT testing may be obtained directly from Graduate Record Examination, Educational Testing Service, P.O. Box 6000; Princeton, New Jersey 08541-6000; by phone (609) 771-7670, via e-mail at gre-info@ets.org; or on the World Wide Web at http://www.gre.org. Applicants should specify by both institution and code that the test score be sent to The University of Texas at Dallas, Code R6897.

Graduate Management Admission Test (GMAT)

The GMAT is offered on a year-round basis at regional testing centers in a computer-based testing (CBT) format. Information on regional CBT testing sites may be obtained directly from Graduate Management Admission Test, Educational Testing Service, Box 6103, Princeton, New Jersey 08541-6103; by phone (609) 771-7330; via e-mail at gmat@ets.org; or on the World Wide Web at http://www.gmat.org. Applicants should specify by both institution and code that the test score be sent to The University of Texas at Dallas, Code 6897.
**Student’s Degree Program**

**Graduate Policies**

Detailed information on graduate policies can be found in the policy memorandum “Policy on Procedures for Completing a Graduate Degree.” Faculty and students should be familiar with the policies contained in this memorandum. Copies are on file in the Office of the Dean of Graduate Studies and in the academic department and program offices.

**Program of Studies**

Each student admitted to a graduate program will have a specific program of studies agreed upon in consultation with the Graduate Studies Committee or graduate advisor for that program, except in those Schools with standard degree plans. A complete Program of Studies Form will be filed in and approved by the Office of the Dean of Graduate Studies prior to the student’s registration for his or her 19th semester credit hour to be counted toward a master’s degree, or 50th semester credit hour taken beyond the bachelor’s degree to be counted toward a doctoral degree.

**Change of Program**

Students must be in good academic standing to change from their admitted graduate program to another one within their same graduate department. Students wishing to change programs within their same UTD School must see their advisor prior to registration and no later than the first day of classes of a semester/term. If the change of program is approved, the student will then be responsible for meeting all program requirements and course prerequisites of the catalog in effect at the time of the change. The student and advisor will prepare a new degree plan.

**Transfer of Credit**

A degree seeking student may petition to have graduate coursework taken at another institution be counted towards satisfying the master’s or doctoral degree requirements. All petitions for transfer of credit must be prepared by the student’s Graduate Program and submitted to the Dean of Graduate Studies for approval. The request must be accompanied by an official transcript and an official explanation of the course numbering system at the school where the credit was earned. To qualify for transfer of credit, the grade earned in the course must be a B or better from an accredited college or university, and the course must not be a correspondence or extension course. Also, the University does not award transfer credit for experiential learning, performance, or experience that occurs prior to enrollment. Courses delivered in a distance learning format will be considered by the Graduate Dean on a case-by-case basis. All petitions for transfer of credit for coursework taken prior to enrolling at U.T. Dallas should be submitted to the student’s Program Graduate Advisor by the student prior to filing a Program of Studies; however, acceptance of transfer of credit hours will not occur until after the student has completed 9 semester credit hours at U.T. Dallas with a grade point average of at least 3.0. All petitions must be processed and approved no later than the semester prior to anticipated graduation. Accordingly, requests to take courses at another institution during the semester a student plans to graduate cannot be approved because the grades may not be received in time to certify the student for graduation. Up to 15 semester credit hours of graduate courses taken elsewhere can be transferred towards a master’s degree. Up to one-half of the required hours for a doctoral degree can be transferred from another university.

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**English Requirements for Teaching Assistants**

Students are required to be able to speak and write English clearly and well. State law and regulations of the Texas Higher Education Coordinating Board require that international students appointed as Teaching Assistants (TA’s) be proficient in the use of the English language. An English Proficiency Interview conducted under the auspices of the office of the Dean of Graduate Studies will be used to screen for students requiring remedial help in the form of an English as a Second Language (ESL) course. International students must satisfy the proficiency requirement upon appointment or pass the ESL course within two semesters to be eligible for consideration of continued appointment as a TA. Regardless of test scores, students must meet the language requirements of their programs.
A degree-seeking student may petition to have graduate coursework taken at another institution counted toward satisfying the master’s or doctoral degree requirements as follows. Up to 15 semester credit hours of graduate coursework taken elsewhere may be transferred toward a master's degree; up to 36 hours of master's degree coursework taken elsewhere in the subject area or its equivalent may be transferred toward a doctoral degree; up to nine hours of doctoral (post master’s) coursework taken elsewhere may also be transferred toward a doctoral degree. No more than one half of the required credit hours of any degree may be transferred in to UTD. Some programs may have more restrictive transfer requirements. No more than 15 semester credit hours taken as a non-degree student at U.T. Dallas can be subsequently transferred to a degree program at U.T. Dallas. Some degree programs may have more restrictive transfer requirements.

**General Degree Requirements**

The student will be deemed to have completed the course work degree requirements when he or she completes the previously filed program of studies with acceptable grades.

**Required Semester Credit Hours**

The minimum semester credit hours required for the degree in a Program of Studies will be those shown in the catalog applicable to the student at the time of his or her admission or readmission to the program. In no case will a student be allowed to graduate with less than 30 approved graduate semester credit hours (including approved graduate transfer credit hours) for the master's degree. Enrollment in doctoral study at U.T. Dallas for a minimum of three, consecutive long terms and for a minimum of 18 doctoral semester hours are required for graduation with a doctoral degree. Additional requirements for the doctoral degree may be specified by the faculty of each program as described in the individual degree program sections of this catalog.

**Required Grade Point Average**

In order to qualify for graduation, unless stated otherwise in the degree requirements, students must maintain a minimum 3.0 grade point average in their degree program’s core courses.

The minimum acceptable University grade point average for graduation is 3.0 for all graduate courses taken in the student’s degree program at U.T. Dallas; however, individual programs may have more stringent grade point requirements in selected courses, which must be satisfied for graduation.

**Registration Requirements**

**Examinations or Proposal Presentation**

A student must be registered for at least three semester credit hours of graduate course work during the semester in which any major degree examination, such as the Qualifying Examination, Final Written Examination, or Final Oral Examination, is taken. A student must also be registered for at least three semester credit hours of graduate course work during the semester in which the Dissertation Proposal is submitted for approval.

**Time Limits**

All requirements for a graduate degree, including transfer credit, must be completed within the specified time period. Students exceeding the specified time limit will not be eligible for their degrees and will be dismissed from the graduate program. An approved leave of absence will not alter the time limits placed on graduate degrees. All requirements for the master’s degree must be completed within one six-year period. All requirements for the doctoral degree must be completed within one ten-year period. Students whose master’s degrees are accepted for full credit toward a Ph.D. must complete all requirements for the doctoral degree within one eight-year period. Work exceeding these limits, whether done at this university or elsewhere, will not count towards the degree. Individual programs may set shorter time limits. Exceptions to time limit specifications must be approved by the Dean of Graduate Studies.
Additional Master's Degrees

Students are encouraged to pursue additional master's degrees at The University of Texas at Dallas. To the extent that the requirements of some master’s degrees overlap, some of the credit hours taken in pursuit of previously earned master’s degrees at U.T. Dallas may be counted toward an additional master’s degree. The only limitation is that one-half of the credit hours for any master's degree earned at U.T. Dallas must be satisfied by new course work. Students are required to develop an approved plan of studies through the department or program offering the master’s degree prior to enrolling in that degree. Similarly, students wishing to earn two master’s degrees concurrently must develop an approved plan of studies through both relevant departments or programs. All coursework for any degree must meet the academic standards of that degree.

Supervising Committee for Thesis and Dissertation

A supervising committee will be appointed to approve a research topic, provide advice, and periodically assess progress and accomplishments for students pursuing degree options requiring a written master’s thesis, a doctoral dissertation or a research practicum report. The composition of the Supervising Committee must follow the guidelines contained in the U.T. Dallas policy memorandum, “Policy on Procedures for Completing a Graduate Degree (87-III.25-48)”, and must be submitted by the appropriate committee or administrator of the degree program to the Dean of Graduate Studies for approval. Students may obtain copies of this policy from their department or program office.

The Supervising Committee must meet at least once annually to assess the student’s progress, and send a written report to the Dean of Graduate Studies. This report should describe any problems which could delay the student’s research beyond its anticipated completion date. A copy of this report must also be sent to the student.

The student can request a meeting of the Supervising Committee through a written request to the appropriate committee or administrator of the degree program.

Admission to Doctoral Candidacy

The research potential and ability of each doctoral student to both understand and integrate previous coursework will be evaluated before a student can be formally admitted to doctoral candidacy. The format of this evaluation, hereafter referred to as a qualifying examination, varies amongst the degree programs and can be obtained from the student’s Graduate Program office. A student failing the Qualifying Examination is terminated as a doctoral student in that Graduate Program unless a two-thirds majority of the examining committee vote that a second examination be permitted. All committee members should have all evidence of the student’s academic record and Qualifying Examination performance prior to this vote. The second examination typically would be taken no sooner than six months after the first examination, and no later than one year. Students failing the second examination will not be allowed to pursue a doctoral degree in that program. Under no circumstances will a third examination be allowed. The student will have advanced to candidacy when she or he has:

• Passed the Qualifying Examination;
• Been assigned an approved Supervising Committee;
• Satisfied any other program or school candidacy requirements.

Candidacy must be achieved before a student is eligible to enroll in dissertation or in the chemistry internship practicum courses.

Doctoral Dissertation or Research Practicum Report

Each doctoral candidate must prepare and submit for examination a written Dissertation meeting the guidelines specified in the “Guide for the Preparation of Master’s Theses and Doctoral Dissertations.” A copy of the guide can be obtained from the office of the Dean of Graduate Studies or visit http://www.utdallas.edu/dept/graddean/.

The dissertation manuscript for the Doctor of Philosophy degree must demonstrate an independent research competence on the part of the candidate that substantially adds to knowledge in the candidate’s field with respect either to its intellectual substance or professional practice.

Final Oral Examination for Doctoral Candidates

The presentation and defense of the Dissertation will constitute the Final Oral Examination for the doctoral candidate. Specifics on the scheduling and conduct of the examination are contained in the “Guide for the Preparation of Master’s Theses and Doctoral Dissertations.” The initial phase of the examination will be open
to the public. Following the public presentation, the candidate will be examined by the members of the examining committee. This part of the examination is not open to the public. Depending upon the school’s policy, other members of the faculty may also attend that part of the examination. This portion of the examination will be chaired by the representative of the Dean of Graduate Studies. The examination will focus primarily on the candidate’s research contribution, although aspects of the general field in which the candidate’s research was conducted may also be covered.

One of five possible results of the examination will be reported: (1) passed the oral examination and manuscript accepted, (2) passed the oral examination and manuscript accepted pending specified revisions, (3) second oral examination required, but manuscript accepted or accepted with specified revisions, (4) major revisions of the manuscript and a second oral examination required, or (5) oral examination failed, manuscript not accepted and the committee recommends dismissal from the program.

If a recommendation for re-examination is made, the second Final Oral Examination must be taken between six months and one year after the first examination. In no cases will a third Final Oral Examination be given. See also Policy on Procedures for Completing a Graduate Degree (87-III.25-48), in the University’s Handbook of Operating Procedures and/or the “Guide for the Preparation of Master’s Theses and Doctoral Dissertation” or visit http://www.utdallas.edu/dept/graddean/.

### Required Copies of Dissertation/Thesis

#### Required Thesis Copies

Three official copies of theses are required. After final approved copies have been bound, one hard copy shall be available to the public in the university library; one copy shall remain in the archives; one copy will be sent to the supervising professor (binding is optional); and one copy will be sent to the program office.

#### Required Doctoral Dissertation

Three final approved copies are to be bound; one hard copy shall be available to the public in the university library, one copy will be sent to the supervising professor, and one copy will be sent to UMI Dissertations Publishing. UMI will publish and make their copy available to the public for purchase and will forward a microfilm copy to UTD that will be kept in the library. They will also return their hard copy which will then be sent to the specific program office.

### Intellectual Property Rights

In order to protect patent or other intellectual property rights, the Dean of Graduate Studies may, upon request, delay for a period of up to one year the binding, distribution, and/or publication in microform of the thesis, dissertation, or research practicum report. This request must be supported by a written recommendation of the Supervising Professor.

### Registration and Enrollment Requirements

#### Registration Required

Students must be registered for any session during which they are taking courses, or taking examinations, required in their degree program. A student requiring guidance in the preparation of a thesis or dissertation must be registered for a minimum of three semester hours in their degree program. Graduate students must be enrolled in 3 credit hours in the semester in which they graduate. The exceptions are the doctoral students who have missed the inabsentia deadline. They may register for a minimum of one credit hour during the semester following satisfactory completion of the final oral examination. This provision may be used only once during the graduate enrollment. Students must be registered and have paid all required fees in the semester in which they plan to graduate.

Continuing students in good academic standing may register in one of three ways: online, with the department or program office, or with the Office of the Registrar during walk-in registration. Continuing degree-seeking graduate students are eligible to register early to increase probability of enrollment in available courses.

The Office of the Registrar informs the instructor of the names of all students who are officially registered and have paid all required tuition and fees in each class. It is recommended that the students confirm with the instructor that their registration has been properly recorded within the first week of classes. It is the students' responsibility to ensure they are enrolled in and attending the correct courses for each semester they are enrolled. Students may not attend classes in which they are not registered in the above manner unless they have been approved to audit the course.
Continuous Enrollment Requirement

Unless on an approved leave of absence, graduate students in degree programs are expected to maintain continuous enrollment during the fall and spring (long session) semesters of each academic year. Students who fail to register in any given long session will be permitted to re-enroll through their program office in any two subsequent semesters provided they were in good academic standing at the time of last enrollment. A thesis/dissertation student must enroll in at least three thesis or dissertation hours some time prior to graduating. Once a student has enrolled in thesis or dissertation, that student must maintain continuous enrollment (not necessarily in thesis or dissertation) of at least three semester hours during consecutive long semesters unless granted a leave of absence. Some programs may require additional semester hours.

Leave of Absence

Students who formally request and are granted a leave of absence will be exempted from the readmission requirements. A request for a leave of absence must be made through the department or program to the Dean of Graduate Studies and is recorded on the student’s academic record by the Office of the Registrar. The leave of absence does not alter the time limits placed on graduate degrees.

Readmission

Students in academic good standing who find it necessary to suspend their academic activities or transfer to another institution for the duration of three long semesters (not including a summer session) must reapply to the program of intended degree. In that circumstance, a new review will be made to determine eligibility of enrollment under current standards for admission. An official transcript mailed directly by each institution attended after leaving The University of Texas at Dallas must be sent to the Office of Admissions, including any transcript of attendance at another university during a summer session. If accepted, the readmitted student will be bound by the catalog in force at the time of readmission.

In Absentia Registration for Graduation

In absentia registration for graduation (i.e., registration for no course work) may be arranged for candidates who have completed all degree requirements except for the submission of final approved copies of thesis or dissertation. A graduate student may not register in absentia with grades of Incomplete on their transcript (see related, nonrefundable fee).

Dates of Early, Regular and Late Registration

Registration dates and procedures are listed in the online Comet Calendar. This online resource contains important dates and information that will be useful throughout the semester. Failure to consult and be aware of these dates and procedures does not excuse students from information or regulations contained therein. The University reserves the right to make changes in this schedule at any time.

Paying Fees as a Part of Registration

Students are not registered or eligible to attend classes until they have paid all tuition and fees in full, or have arranged installment payment with the Bursar. If a student’s registration has been canceled for nonpayment, a reinstatement fee and a late fee will be charged (see online course schedule for current fees). Students who do not pay in full or arrange for installment payments by the payment deadline in the online Comet Calendar may have their registration canceled. Students who have not completed the payment of all tuition and fees by the end of the semester will be subject to one or more of the following actions at the university’s option: bar against readmission at this institution; withholding of grades, degree and official transcript; and all penalties and actions authorized by law.

Auditing Courses

Auditing allows a student to observe the instruction of a course without earning credit. Computer Science & Engineering courses, Geoscience courses, Physical Education courses, Foreign Language courses, and any course(s) that charges a lab fee may not be audited. A student may pick up an Audit Form in the Office of the Registrar beginning the first day of classes through census day. Please consult http://www.utdallas.edu/student/registrar/ for more detailed audit procedures and associated fees.
Identification Cards

The Comet Card is the official identification card for The University of Texas at Dallas. The card must be retained by the student throughout his/her affiliation with the University. The card is automatically activated when a student is registered for classes and deactivated when he/she is not enrolled. The Comet Card should be carried at all times when a student is on campus.

The Comet Card offers much more than identification and control of student privileges; there are two optional spending plans on the card, UTDollars and E-Bucks, and beginning Fall 2005 the card became a PIN-based debit card when linked to a Wells Fargo checking account.

UTDollars is an optional, on campus, pre-paid spending plan which can be used at all UTD dining services, Bookstore, Activity Center, Health Center, Info Depot and Bursar’s Office. E-Bucks is stored-value on the chip used for printing and copying on campus. Deposits to UTDollars can be made at the Info Depot or Bursar’s Office. Deposits to E-Bucks can be made at the Info Depot. If students link their card to a Wells Fargo checking account it can be used as a debit card at any location (on and off campus) that accepts PIN-based transactions.

The first Comet Card is issued at no cost. There is a fee for replacing the card (see Tuition and Fees).

Orientation

Orientation is designed to assist new students with an understanding of university rules and regulations and to provide information about registration procedures, academic programs, and student life. Attendance at Orientation is required for all international students and is strongly recommended for all new students as a means of efficient matriculation into the University. International students will not be allowed to register without an authorized International Student Orientation form. All TA’s are required to attend TA Orientation held immediately prior to fall and spring semesters.

Undergraduate Registration for Graduate Courses

Advanced undergraduates who are within 30 hours of completing the baccalaureate degree may petition their ADU to take graduate courses. Approvals will be subject to the conditions outlined in the following sections.

Graduate Courses Applied Toward an Undergraduate Degree

With the approval of the student’s ADU, up to 12 semester hours of graduate work taken as an undergraduate may be used for completing any baccalaureate degree at U.T. Dallas. Pass/fail grading will be permitted in this category but must be approved by the instructor prior to the start of class. The student must declare at the time of registration for the course, on a form provided by the ADU, how each approved course is to be applied.

Graduate Courses for Possible Future Use as Graduate Credit

Undergraduates may take up to 12 semester hours of graduate courses to reserve for possible application toward a graduate degree. To register, undergraduate students must obtain permission from the instructor and from the graduate advisor of the program in which the course is offered. Such courses with an earned grade of B or better will be eligible for application to the student’s graduate record when the student is admitted to a graduate program. Courses so taken will not apply to the student’s undergraduate record and will not affect the student’s undergraduate GPA.

Graduate Courses Taken in Fast Track Options

A number of programs at U.T. Dallas offer an accelerated Fast Track option that allows students to take graduate level classes while still undergraduates. Specific admission requirements for Fast Track programs can be found within descriptions of majors. Undergraduate students at U.T. Dallas who have been admitted to Fast Track programs at U.T. Dallas leading to baccalaureate/master’s degrees may, with the permission of the ADU and graduate advisor, take a maximum of 15 specified semester hours of graduate work as an undergraduate. The graduate hours may be used to complete the bachelor’s degree and also to satisfy requirements for the master’s degree. When this option is chosen credit for the fast track hours used for an undergraduate degree will not be computed in the graduate GPA. However, they reduce the total number of graduate hours required to earn the respective degree Exceptions to the 15-hour maximum may be granted by petition to the Deans of Graduate and Undergraduate Education submitted through the relevant program’s director of graduate studies.
Graduate programs at U.T. Dallas will accept admission to a Fast Track program as satisfying Graduate Record Exam (GRE) criteria for admission to the graduate program. The School of Management requires students to meet its graduate admission requirements including completion of the Graduate Management Admissions Test (GMAT) prior to receiving the baccalaureate degree.

**Course Numbering System**

All courses are identified by a four-digit number preceded by the name (or abbreviation) of the program. Courses beginning with a number 5 or greater are graduate courses. The second digit of the course number identifies the credit hour value. Courses with a V in the second position are variable credit hour courses.

The number of lecture hours per week and the number of laboratory hours are given in brackets following the course description: (2-4) means two hours of lecture and four hours of laboratory each week.

**Frequency of Course Offerings**

One of the following Frequency of Course Offering codes is found at the end of each course description in this catalog:

- **S** = at least once each long semester.
- **Y** = at least once a year.
- **T** = at least once every two years.
- **R** = based on student interest and instructor availability.

**Religious Holy Days**

The University of Texas at Dallas will excuse a student from class or other required activities for the travel to and observance of a religious holy day for a religion whose places of worship are exempt from property tax under Section 11.20, Tax Code, Texas Code Annotated.

The student is encouraged to notify the instructor or activity sponsor as soon as possible regarding the absence, preferably in advance of the assignment.

The student, so excused, will be allowed to take the exam or complete the assignment within a reasonable time after the absence: a period equal to the length of the absence, up to a maximum of one week. A student who notifies the instructor and completes any missed exam or assignment may not be penalized for the absence. A student who fails to complete the exam or assignment within the prescribed period may receive a failing grade for that exam or assignment.

If a student or an instructor disagrees about the nature of the absence [i.e., for the purpose of observing a religious holy day] or if there is similar disagreement about whether the student has been given a reasonable time to complete any missed assignments or examinations, either the student or the instructor may request a ruling from the chief executive officer of the institution, or his or her designee. The chief executive officer or designee must take into account the legislative intent of TEC 51.911(b), and the student and instructor will abide by the decision of the chief executive officer or designee.

**Grades and Grade Point Average**

The following grade scale is used in graduate course work at the university:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Grade Points per Semester Hour</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>Acceptable</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>Poor</td>
<td>2</td>
</tr>
<tr>
<td>F</td>
<td>Failure</td>
<td>0</td>
</tr>
<tr>
<td>X</td>
<td>Incomplete</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>Pass</td>
<td></td>
</tr>
</tbody>
</table>

The grades P and X do not produce grade points.

**Grade of X: Incomplete**

An Incomplete grade of X may be assigned, at the discretion of the instructor, for work unavoidably missed at the semester’s end. The student must obtain a Grade of Incomplete/Documentation Form in the office of the student’s degree program. The instructor assigning an incomplete grade must furnish a description of work required to complete the course. An incomplete must be completed eight (8) weeks from the first day of the subsequent long semester. The completed form must be signed both by the student and the instructor, and the appropriate
Associate Dean, Graduate Advisor, or Department/Program Head, and must be retained with the student’s academic record. If the required work to complete the course and to remove the grade of X is not submitted by the specified deadline, the grade of X is changed automatically to an F. Extension beyond the specified limit can be made only with the permission of the Dean of Graduate Studies. A student may not re-enroll in a course in which an X has already been assigned.

The instructor alone will be responsible for determining whether the requirements for completion are met and for assigning the grade in the course. If the instructor who assigned the incomplete is no longer associated with the University when the work is completed, the head of the department or program may assign a committee of appropriate faculty to evaluate the material and/or obtain any other information that may be required to assign the grade in the course. Upon completion of the evaluation of the required work, the symbol X must be converted into a letter grade (A, B, C, F, or P) by the instructor, head of the department or program, or Graduate Advisor as indicated above.

Pass/Fail Grading

The pass/fail option is intended to encourage students to take courses in topics outside their major area where they would be competing with a significant number of students who are majoring in these outside areas. Subject to the constraints stated below, a student may elect to take certain courses either by letter grade (A, B, C, F) or pass/fail grade (P/F). The pass/fail option should be exercised at the time of registration. In any courses in which letter grades are given to one or more students, any student wishing to take the course on a pass/fail basis must obtain the approval of the instructor and his/her graduate advisor on the Pass/Fail form. This completed form must be submitted to the Office of the Registrar no later than Census Day. No change of grade designation from grade to pass/fail or pass/fail to grade can be made after the Census Day designated in the online Comet Calendar.

A student may not elect to take the following types of courses on a pass/fail basis: core courses and their prerequisites required for the student’s degree; and elective courses in the student’s major area. No more than 20 percent of the hours earned at U.T. Dallas for any master’s degree (excluding casebook, internship, practicum, independent study, research, reading, thesis or dissertation requirements) may be taken on a pass/fail basis.

Only pass/fail grades are given for independent study, research and reading courses, and for thesis and dissertation.

Academic Good Standing

Registration in the graduate programs beyond the first semester (or summer session) is contingent on the student’s being in academic good standing based on three main factors:

1. Satisfactory progress in meeting admission conditions that were imposed at the time of admission.
2. Maintenance of a 3.0 cumulative grade point average in graduate courses in the degree program.
3. Satisfactory progress in meeting program degree requirements.

If, at the end of a semester, a student’s cumulative grade point average is below 3.0, the student will be placed on academic probation. The student must earn sufficient grade points during the next two semesters of registration to raise the cumulative grade point average to at least 3.0 exclusive of incomplete (X) grades. Failure to achieve this 3.0 cumulative grade point average will result in immediate dismissal from the University.

Course Load

The normal course load for a full-time graduate student during the long session is 12 semester hours. The minimum course load for a graduate student to be considered full time during long session is 9 semester hours; the maximum is 15 semester hours. The normal course load for a graduate student during the summer session is 9 semester hours. The minimum course load for a graduate student to be considered full time during the summer session is 6 semester hours; the maximum is 12 semester hours. Registration in excess of these maxima must have the recommendation of the graduate adviser and approval of the Dean of Graduate Studies and will be permitted only under exceptional circumstances. Students who are employed should consult with the graduate adviser about their combined course and work load. Course load requirements for graduate assistants are discussed in the section, Teaching and Research Assistantships.
Schedule Changes: Dropping, Adding and Withdrawing From Courses

Dates and time limits for schedule changes can be found in the online Comet Calendar. New students seeking to drop or add courses to their schedules must obtain permission from their graduate advisor in their degree program. Drop/Add forms may be obtained from advising offices. Drop/Adds may not be processed after Census Day. Any drops prior to and including Census Day will not show on the student’s transcript; withdrawals after Census Day will show as a W (withdraw) on the transcript. After the last day indicated in the online Comet Calendar for a graduate student to withdraw, the course withdrawal will be approved only on a documented emergency basis for reasons extrinsic to curricula matters. To secure such approval, the student must complete a Drop/Add form and obtain the signature of the instructor certifying that the student was passing at the time of the proposed withdrawal. The student should then submit the Drop/Add form and a written petition detailing the nature of the emergency with written documentation from employer or doctor, as appropriate, to the graduate advisor and then to the Dean of Graduate Studies. If the petition is approved, the grade assigned by the instructor on the Drop/Add form will determine the grade which will appear on the student’s transcript: a passing grade will appear as a W on the transcript; a failing grade will appear as an F. Students who cease to attend classes without securing approval in the manner prescribed above will receive the grade of F for that course. Courses may not be dropped after the last day of classes in the semester.

Students who habitually withdraw from a significant fraction of their schedules may lose the right to withdraw or may be dismissed from the university for failure to make adequate academic progress.

Any student on a Teaching/Research Assistantship wishing to drop a course at any time during the semester must secure the signature of the Dean of Graduate Studies.

The Office of the Registrar, upon recommendation of the instructor and with the approval of the Dean of Graduate Studies, may require a student to drop a course for which the student has not satisfied the prerequisite. UTD operates multiple sessions with different academic calendar and Census dates. If a student registers in a shorter session, it is the student’s responsibility to review the online Comet Calendar and deadlines that affect the drop/add/withdrawal procedures. The same holds true for the summer session.

Military Training Awarded as Academic Course Credit

The University of Texas at Dallas shall consider whether to award lower division (1000 or 2000 level) academic course credit toward a degree to admitted students when a student has completed and provided all of the following documentation to the Registrar’s Office:

1) an official military record presented to the institution by the student that describes the substance of the training completed by the student and verifies the student’s successful completion of that training,
2) a detailed description of the course of instruction,
3) all required texts and author,
4) any method of evaluation and,
5) the course syllabus.

All documentation must be submitted to the Registrar’s Office by Census Day (12th class day) of the first semester admitted. All requests for academic credit will be reviewed by the appropriate discipline using established university transfer credit policies. Notification to the student by the Registrar of approved credit will occur prior to registration of the following long semester. All decisions are final.

Military Service Activation Interruption of Education

A reservist or member of the National Guard called into duty as a result of U.S. military demands, receiving activation orders after the start of a semester, has three options for the treatment of tuition and fees paid to The University of Texas at Dallas and transcript notation. According to state statutes and Coordinating Board rules, The University of Texas at Dallas, at the student’s request:

1) the Bursar’s office shall refund the tuition and fees paid by the student for the semester in which the student withdraws and records “withdraws-military” (WM) on the student’s transcript; or
2) the Registrar’s office may grant a student, who is eligible under The University of Texas at Dallas guidelines (see “Incomplete Grades” section of the catalog for eligibility), an incomplete grade in all courses by designating “incomplete-military” (XM) on the student’s transcript. Please note, resolution of the XM grades must occur within one year from “release from active duty” date on military orders; or
3) the student may petition the instructor to assign an appropriate final grade or credit for the course after successfully completing a substantial amount of course work and having demonstrated sufficient mastery of the course material.

NOTE: There are no provisions for refunds for active duty service members who are deployed as a result of military
orders or for individuals who chose to enter into the service. The provisions listed above apply only to reservists or members of the National Guard called into active military service.

**Readmission:** Students called to active duty in the National Guard (not including routine National Guard training) may be readmitted without reapplication or payment of additional application fees within one year of the “release from active duty” date on military orders. Applicable students will retain academic standing and financial eligibility if the student meets current eligibility requirements other than continuous enrollment or other timing requirements.

**Withdrawal (Resignation) from the University**

A student who wishes to withdraw entirely from the University must complete the proper withdrawal form and procedures in the Office of the Registrar. The grade assigned by the instructor on the withdrawal form will determine the grade which will appear on the student’s transcript: a passing grade will appear as a W on the transcript; a failing grade will appear as an F. Withdrawal after the final drop date requires the same procedures as listed in the previous paragraphs on Schedule Changes.

**Repeated Course Work**

Students who wish to repeat a course must complete a Repeated Course Adjustment form in the Office of the Registrar.

Up to three courses may be repeated; however, no course may be repeated more than once. When a course is repeated, the earlier grade will remain in the student’s record and will be included in any transcript. The second grade will be used in computing the grade point average or credit hours for purposes of graduation or determination of probationary status. A notation beside the first grade will indicate that the course has been repeated.

**Change of Address, Email, or Name**

For name changes, students must fill out the name change form in the Office of the Registrar. Students must also bring a copy of their driver’s license or their marriage certificate for proof of name. Change of address and email may be completed online.

Electronic communication is the preferred means of communicating important academic information. Students are encouraged to set up their UT Dallas email account upon registration in their first term, and ensure their UT Dallas email account is kept current.

Most university administrative offices send all electronic correspondence only to a student’s UTD email address and require that all official electronic correspondence be transmitted from the student’s UTD email account. This requirement allows university personnel to maintain a high degree of confidence in the identity of the individual corresponding with a university official and in the security of the transmitted information.

**Graduation**

**Graduation Under a Particular Catalog**

General and specific requirements for degrees in graduate programs may be altered in successive catalogs. Provided the requisite courses continue to be offered, the student is bound by the course work requirements of the catalog in force at the time of admission. With the approval of (1) the relevant Department Head, Associate Dean, or Director of Graduate Studies, and (2) the Dean of Graduate Studies, the student may instead elect to be bound by a subsequent catalog. This regulation applies only to the specific course work and the number of semester credit hours required for the academic degree.

Administrative requirements such as minimum grade point requirements for core courses can change for all students with the issuance of a new catalog. The student should be aware that operating regulations, procedures, tuition and fees can be changed at any time. These are not bound by any catalog.

**Application for Graduation**

Students must apply for graduation online [https://gradapp.utdallas.edu](https://gradapp.utdallas.edu/) by the date specified in the Comet Calendar in order to graduate at the end of a given semester. Students must complete a separate application for graduation for each semester in which they attempt to graduate. Students who expect to receive more than one degree in a single semester must complete a separate application for each degree. Applicants who apply late for graduation will incur an additional fee (refer to the Comet Calendar). In order to receive a diploma, a student must pay all accounts due the university.
Graduation Under In Absentia Registration

In absentia registration for graduation (i.e., registration for no course work) may be arranged for the candidate who has completed all degree requirements including final oral examination, but have not yet submitted final approved copies of thesis, dissertation or other required report. Such candidates may, for a nominal fee and with the approval of their graduate advisor, the Dean of Graduate Studies, and submission of the approved in absentia registration form, register during the semester or summer session in which the degree will be received. If the final copies of the dissertation or thesis have not been approved by the supervisory committee and received and approved by the Dean of Graduate Studies before the census day in a given semester, in absentia registration is not acceptable for that semester. This arrangement is not permissible for a candidate who is removing an incomplete (X) grade. All in absentia registration requests must be submitted for approval of the Graduate Dean prior to the first day of classes in the semester for which it will apply and the degree will be received.

Graduation Ceremonies

Graduation ceremonies are held at the conclusion of each semester. Students who graduate in the summer or fall may elect to participate in the ceremony at that time or wait until the spring graduation. Summer and fall graduates who elect to participate in the following spring graduation must file a written notice to the Registrar’s Office via email to graduation@utdallas.edu upon completion of degree requirements.

General Property Deposit

Every student must make a general property deposit of $10.00. This deposit is subject to charges for property loss, damage or breakage, or violation of rules in any University Library or laboratory; for failure to return keys furnished by the University; or for damage to, or loss of, any other University property. Students having charges in excess of the deposit must pay the excess immediately upon notice. Pending payment, the student will be subject to a bar against readmission; withholding of grades, degree, and official transcript; and all penalties and actions authorized by law.

This deposit, less charges, will be returned upon written request at the end of the student’s career at The University of Texas at Dallas. A general property deposit that remains without call for refund for a period of four years from the date of last attendance at the university shall be forfeited, and the deposit shall become part of the Student Property Deposit Scholarship Fund.
Tuition and Required Fees

As a state-supported institution of higher education, The University of Texas at Dallas is required to comply with all state laws in the assessment and collection of tuition, fees, and deposits. The tuition, fees, and deposits listed herein are subject to change by state law. Pursuant to Chapter 54, Texas Education Code, each student who registers is required to pay tuition and fees appropriate to the student’s residence classification and according to the number of semester hours for which he or she has registered. It is the student’s responsibility to establish, prior to census day, the correct residence classification through the Office of the Registrar. Likewise, any student wishing to request a change of residence status for tuition purposes should do so through the Office of the Registrar. This will require completion of a residency questionnaire and the provision of documents to support the claim of Texas residency. Rules and regulations for determining residency are found in Appendix III of this catalog. Final authority of appeal for review of residence decisions rests with the Registrar and Director of Academic Records.

In accordance with state laws, students are not entitled to enter a class or laboratory until they have registered and all tuition, fees, and deposits have been paid. The University cannot accept personal checks for amounts in excess of the total registration cost.

The Designated Tuition is specified by the legislature for use by the university in making its buildings and facilities available to students and to support activities and operations of the institution. The Information Technology Fee is to defray a portion of the cost of providing and supporting computer-based information technologies for student use. The Instructional Infrastructure Fees provide funds for the acquisition, replacement, maintenance, repair and upgrading of instructional apparatus. The International Education Fee is used to assist student participation in international student exchange or study abroad programs. The Library Acquisition Fee assists in the purchase of books and periodicals. The Medical Services Fee provides for the staffing, operation, programs, and services offered to students by the Student Health Center and the Student Counseling Center. The Records Processing Fee will help defray costs for processing of U.T. Dallas transcript requests, drop or withdrawal forms, and certifications of enrollment to lending institutions. The Recreational Facility Fee is to finance the construction, equipping, operation and maintenance of new and existing recreational sports facilities and programs. The Student Services Fee is specified by the legislature to support student activities, cultural events, athletic activities, and other authorized student services and activities. The Student Union Fee provides funds for the construction, operation, and maintenance of student union facilities. These mandatory fees are shown in the tuition and fee tables.

Tuition for Excessive Doctoral Hours

For doctoral students enrolling for the first time in Fall 1999, Section 54.012, Texas Education Code, establishes a maximum number of doctoral hours that a doctoral student may attempt while paying tuition at the rate provided for Texas residents. Attempted hours include all doctoral hours taken at a Texas institution of higher education for which a student was registered as of Census Day, including, but not limited to, courses that have been repeated, failed, and courses from which the student withdrew. The maximum is 99 doctoral hours. A student who exceeds the maximum hours may be charged tuition at the rate charged nonresident doctoral students. The higher tuition rate applies only to those doctoral semester credit hours that exceed 99 hours.

Tuition Installment Payments

Students may elect to pay tuition and fees for the fall and spring semesters and 12-week summer session under the installment payment plan (Section 54.007, Texas Education Code). A $25.00 fee per semester will be assessed each student who elects to pay by installments. Additionally, a late payment fee of $30.00 for delinquent payment will be assessed each time an installment is not paid by the date it is due.
Cooperative Arrangements

The University of Texas System

Concurrent Enrollment

Cooperative arrangements among component institutions of The University of Texas System have been authorized by the Chancellor and the Board of Regents. The University of Texas at Dallas has active arrangements with The University of Texas Southwestern Medical Center at Dallas and The University of Texas at Arlington for graduate students who wish to enroll concurrently. At the time of registration, a concurrent enrollment form obtained from the home registrar’s office will be completed by the student and submitted to the home campus fee assessor; the host campus registrar will enroll students upon receipt of the concurrent enrollment form. Students will pay all mandatory student fees (including the Student Union Fee) to the home campus. Such fees are waived at the host campus (Sec. 54.503(g), Texas Education Code). Students wishing to take advantage of student services (including use of the host library) may elect to do so by paying the mandatory Student Services Fee for the hours enrolled at the host campus.

Visiting Student Program

The U.T. System Visiting Student Program is designed to allow graduate or professional students enrolled in an institution of the U.T. System to take courses or engage in research at another institution within the System during a regular semester or summer session. A U.T. Dallas graduate student, who has been admitted to a degree program at U.T. Dallas, must have completed a minimum of 15 semester credit hours at U.T. Dallas and be in academic good standing in order to be eligible to participate in the visiting student program. Courses to be taken under this visiting student program must have prior approval of the student’s degree program advisor. An approved Leave of Absence also is required. Visiting students register and pay tuition and required fees at their home institutions and are given normal privileges associated with available student services at the exchange institution. Visiting students are subject to the rules and regulations of both institutions. Each U.T. System institution has designated an individual to coordinate and approve graduate or professional visiting students. Interested U.T. Dallas students should contact the Office of the Dean of Graduate Studies for additional information (Phone 972-883-2234; World Wide Web http://www.utdallas.edu/dept/graddean/). Students at other U.T. System schools wishing to take courses at U.T. Dallas under this visiting student program should contact and work through the graduate dean at their home institution.

Texas A&M University System

A cooperative arrangement between The University of Texas System and the Texas A&M University System allows a graduate student at one institution to use unique facilities or courses at the other institution with a minimum of administrative paperwork. The graduate student registers and pays tuition and fees at the home institution.

Partial Tuition and Fee Exemptions

As a state sponsored institution of higher education in Texas, U.T. Dallas is authorized to award partial tuition and fee exemptions to students who qualify based on statutory criteria. Exemptions are available to certain students who have been in foster or other residential care in the state of Texas; certain students who received Aid for Dependent Children benefits during their senior year of high school; children of prisoners of war or persons missing in action; Texas residents who graduate from a public high school within 36 months of original enrollment and completed all years of high school in Texas; residents of Texas who have served in the armed forces of the United States; Texas residents classified by the U. S. Department of Defense as prisoners of war on or after January 1, 1999; students from other nations of the western hemisphere; blind or deaf students; military personnel and dependents; children of disabled/deceased firefighters and peace officers; children of Texas veterans; surviving spouse and minor children of certain police, security or emergency personnel killed in the line of duty; and certified educational aides. Senior citizens who are age 65 or older as of Census Day may be exempted from tuition for up to six semester credit hours each semester or summer term if space is available. Individuals who feel they may qualify under this section are requested to contact the Office of Records (972) 883 2342.
Nonpayment of Debt

A student who fails to provide full payment of loans, tuition, and fees, including late fees assessed, to the university when the payments are due is subject to one or more of the following actions at the university’s option:

- Bar against registration and/or readmission to the institution;
- Withholding of grades, degree, and official transcript; and
- All penalties and actions authorized by law.

Refund of Tuition and Fees

For the Long Term (Fall and Spring Semesters) and 12-Week Summer Session

1. Prior to the first day of a given semester, 100 percent
2. During the first five class days, 80 percent of the applicable portion of the tuition and applicable fees
3. During the second five class days, 70 percent
4. During the third five class days, 50 percent
5. During the fourth five class days, 25 percent
6. After the fourth five class days and thereafter, nothing

For the 6- and 8-Week Summer Sessions

1. Prior to the first class day of a given session, 100 percent
2. During the first, second, and third class day, 80 percent
3. During the fourth, fifth, and sixth class day, 50 percent
4. Seventh class day and thereafter, nothing

Separate withdrawal refund schedules may be established for other fees and charges. Refer to the ‘Other User Fees’ section for refund information.

Cash refunds will not be made to students who request refunds; instead, refund checks will be mailed to the current local address.

A student who registers before receiving grades from the previous semester, and who is required to withdraw because of failure in the work of the previous semester, will have all fees for the current semester refunded.

No refunds will be granted unless application is made within one year after official withdrawal.

All policies regarding the payment or refunding of tuition, fees, and charges are approved by the Board of Regents of The University of Texas System and comply with applicable state statutes. If a person desires clarification of any matter relating to payment or refund of such charges, he or she should contact the office or administrative unit from which the charge or refund originated.

Refunding for Students in Title IV Programs

As an institution participating in programs under Title IV of the Higher Education Act of 1965 as amended ("Act"), U.T. Dallas is required to refund unearned tuition, fees, room and board, and other charges to certain students attending the institution for the first time who have received a grant, a loan, or work assistance under Title IV of the Act or whose parents have received a loan on their behalf under 20 U.S.C. Section 1087-2. The refund is required if the student does not register for, withdraws from, or otherwise fails to complete the period of enrollment for which the financial assistance was intended. No refund is required if the student withdraws after a point in time that is sixty percent of the period of enrollment for which the charges were assessed. A student who withdraws prior to that time is entitled to a refund of tuition, fees, room and board, and other charges that is the larger of the amount provided for in Section 54.006, Texas Education Code, or a pro rata refund calculated pursuant to Section 484B of the Act, reduced by the amount of any unpaid charges and a reasonable administrative fee not to exceed the lesser of five percent of the tuition, fees, room and board, and other charges that were assessed for the enrollment period, or one hundred dollars. If the student's charges were paid by Title IV funds, a portion or all of the refund will be returned to these programs.
The Academic Common Market

Texas is one of fifteen states participating in the Academic Common Market, an interstate agreement for sharing state-supported graduate programs. Residents of member states who are accepted for admission into selected out-of-state graduate programs may enroll on an in-state rather than out-of-state tuition basis. Programs are selected by the states annually. Information about U.T. Dallas graduate programs selected for the ACM by other states is available from the Office of the Dean of Graduate Studies. After acceptance into an ACM program, it is necessary to obtain certification of residency from the Texas Coordinator for the Academic Common Market: Assistant Commissioner, Universities Division, Texas Higher Education Coordinating Board, P. O. Box 12788, Capitol Station, Austin, Texas 78711.

For residents of Texas, a number of programs are available at in-state tuition rates (those in-state rates applicable to the state where the graduate program is offered). For a listing of these programs, or for more information, write to the Texas Higher Education Coordinating Board; P. O. Box 12788, Capitol Station; Austin, Texas 78711 or visit their web site at http://www.thecb.state.tx.us/.

Internship/Cooperative Education Program

The Internship/Cooperative Education Program (Internships) places students in work assignments related directly to their fields of study. As an integral part of the established curriculum, the experience provides students with an opportunity to apply what they learn in the classroom to practical settings while responding to the immediate needs of employers. In addition, students are able to stay in school and earn money to defray college expenses, clarify academic interests, and target specific job markets.

Internships may be taken for credit depending on the student’s degree program requirements. U.T. Dallas has a flexible program and arrangements include the following plans:

1. Parallel: full- or part-time work and full- or part-time school.
2. Summer: full- or part-time summer employment.
3. Alternating Semesters: full-time work alternating with semesters of full-time school.

For more information about the program, contact the Career Center in McDermott Library 1.312. (Phone: 972-883-2943, Web: www.utdallas.edu/student/career, Email: careercenter@utdallas.edu).

Learning Resources

The Learning Resource Center offers assistance to students in the areas of reading, writing, mathematics, and study skills. These services are available through individual appointments, group workshops, short courses, and audio and video tapes. The Writing Lab offers one-to-one assistance with writing assignments and general writing skills. Appointments are required. The Math Lab gives short-term and semester-long support for a variety of mathematics courses. Students may drop in or visit these labs on a regular basis. The Supplemental Instruction program offers facilitated group study sessions as a supplement to many U.T. Dallas courses. Students should check with the center for availability of individual tutoring in specific subjects. The Learning Resource Center also offers developmental math, reading, and writing classes. These classes are for credit, but they do not count toward graduation.

Assistance is also available in study skills, notetaking, writing, test taking, algebra, and preparation for the TASP (required for teacher certification), GRE, GMAT, and LSAT. In addition, students can receive help with time management, basic mathematics improvement, test-anxiety reduction, and various other study techniques and strategies. All students enrolled at the university are eligible for these services. The center may be contacted at 972-883-6707.
### 2006 - 2007
**Graduate Tuition and Fees for Regular Terms**

**Graduate Tuition and Fees for Resident, Non-Resident and Foreign Students**

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**NOTE:** The following fees are not included in the totals listed above.

**Property Deposit:**
A $10.00 property deposit is charged to all first-time students.

**Oklahoma Residents:**
For residents of Oklahoma, tuition is the Texas resident rate shown plus $30.00 per semester credit hour. Students must apply for this waiver through the Office of the Registrar. This exemption is only for continuing students working towards their first undergraduate degree.

**Utility Fee:**
A temporary fee assessed to defray the anticipated cost of delivery of utilities services above the legislative appropriations for utility costs. This fee will be assessed to each student, per each semester. **$120.00**

**School/Program Course Related Fees:**
- School of Electrical Engineering & Computer Science
  - Distance Learning Fee per semester credit hour.......................... **$50.00**
  - ECS Supplemental Designated Tuition Fee per semester credit hour $30.00
- School of General Studies
  - Student Teaching Supervisory Fee per semester credit hour........... **$250.00**
- School of Management
  - Distance Learning Fee per semester credit hour........................ $80.00
  - MGT Supplemental Designated Tuition Fee per semester credit hour... **$30.00**
- School of Natural Sciences and Mathematics
  - Field Trip Fees - See fees for specific course on the Course Listing... **various**
  - Recreational Sports Course Fees (per course)............................................ **$25.00**
  - Curricular Practical Training Fee (International Students per term)........... **$100.00**

*Tuition and fees are subject to change by legislative action. Changes in tuition or fees will be effective upon date of enactment and will be reflected in fees and tuition charged. Specific tuition and fees for each term can be found in the Class Schedule. The student fees assessed above are authorized by state statute; however, the specific fee amounts and the determination to increase fees are made by the university administration and the University of Texas System Board of Regents. Students taking courses in the School of Brain & Behavioral Sciences may be required to purchase professional liability insurance if they are in certain clinical experiences.

Other User Fees for Courses and Services*

* The following information is not intended to be comprehensive and is subject to change. Tuition and fees are subject to change by legislative or regental action, and changes become effective on the date of enactment. The Texas Legislature does not set the specific amount for any particular student fee. The student fees assessed below are authorized by state statute; however, the specific fee amounts and the determination to increase fees are made by the University administration and The University of Texas System Board of Regents. Fees can be found in the Class Schedule for each term.

Advising Fee: An additional advising fee is assessed to support professional academic advisors in the graduate schools. The Schools of Engineering & Computer Science and Management assess $10.00 per semester credit hour. The School of Social Sciences assesses $10.00 per semester credit hour for graduate POEC courses. The School of Brain and Behavioral Science assesses $20.00 per semester credit hour for specific graduate courses – AUD7V80, AUD8V97, COMD6630, HCS 7380, HDCD7V20 and HDCD7350. Education courses are assessed $5.00 per semester credit hour.

Application Fee: A nonrefundable application fee of $50.00 is required of all students applying for admission to The University of Texas at Dallas. An additional $100.00 international document evaluation fee is required for those who have educational documents from countries other than the United States.

Arts Course Fee: A fee of $75.00 per course is required to defray costs associated with Art courses.

Audit Fee: Students at The University of Texas at Dallas may, with the approval of the instructor and of the Office of Records and Registration, audit courses. Auditing grants only the privilege of hearing and observing and does not grant credit. When approval has been granted, the applicant pays a fee of $25.00 per course if currently enrolled for course work and $100.00 per course if not currently enrolled for course work at the university. A student may withdraw from an audit course, but the fee will not be refunded. Persons 65 or over are permitted to audit without paying a fee. They must, however, qualify otherwise complete the audit form, and have the consent of the instructor. Audit registration is permitted only during the late registration period of each semester or term.

Check Cashing Fee: A $0.25 fee to cash a personal check of $25.00 or less. University checks up to $150.00 will be cashed for 1% of the total check (minimum charge of $0.25)

Computer Consumables Fee: An additional fee in increments of $10.00 will be charged for those students who exceed basic allotments covered by the Information Technology Fee.

Curricular Practical Training Fee: A $100.00 per semester fee to assist in funding the administrative and clerical expenses required to review records and process the forms required by the Immigration and Naturalization Service to certify international students for placement in a practical training assignment.

Dance Course Fee: A fee of $75.00 per course is required to defray costs associated with Dance classes.

Diploma Late Fee: A $100.00 non-refundable, non-transferable fee is assessed when an approved application for graduation is received after the deadline.

Diploma Mailing Fee: A $5.00 fee is required to mail a diploma to a student.

Diploma Replacement or Duplicate Fee: A $10.00 fee is required to defray costs of preparing replacement or duplicate diplomas.

Dissertation Fee: A fee of $100.00 is required to defray costs of microfilming and filing with the national registry.

Distance Learning Fee: A fee per SCH to enroll in distance education courses offered over the Internet. Resident and non-resident students taking courses offered by the School of Management are charged $80.00 per semester credit hour. Courses offered through the U.T. TeleCampus by the School of Engineering and Computer Science are assessed $26.00 per semester credit hour for resident students and $37.00 per semester credit hour for non-resident students. Other schools may charge varying rates.

Drama Course Fee: A fee of $50.00 per course is required to defray costs associated with Drama courses.

Engineering and Computer Science Industrial Practice Program Fee: A fee of $6.00 per semester credit hour for each Engineering and Computer Science course is assessed to provide co-op and career placement services.

Field Trip Fee: This fee is assessed to cover the costs of transportation, food, and/or lodging associated with a field trip. The amount of the fee varies depending on the destination and duration of the field trip. Every effort will be made to advise students of the field trip costs associated with a particular course at the time of registration, and the appropriate fee will be assessed at that time. Refund provisions do not apply to this fee.

Health Insurance Fee: A variable fee to pay the student’s premium for the approved U.T. Dallas student health insurance plan is required for international students holding F and J nonimmigrant visas.

In Absentia Registration: A student who registers in absentia shall pay a registration fee of $50.00.
Industrial Research Agreement Fee: A $100.00 per semester fee to help fund the expenses of negotiating agreements, reviewing records and processing forms necessary to implement the industry agreement.

Installment Tuition Fee: A $10.00 fee to cover costs of providing a payment option in the fall and spring semesters.

Institutional Loan Delinquency Fee: A late charge of $10.00 per month ($30.00 maximum per note) will be assessed to students who do not repay their loans in accordance with the terms of the note.

International Document Evaluation Fee: A nonrefundable processing fee of U.S. $50.00 is required for the individualized credential evaluations needed in foreign student admissions decisions. This fee is in addition to the $50.00 Application Fee required of all students.

International Student Special Services Fee: A $85.00 per semester fee for on-going review and certification of students with non-immigrant visa status in accord with federal regulations.

Instructional Infrastructure Fee: An additional fee of $4.00 per semester credit hour is charged for courses in the schools of Engineering & Computer Science, Management and Natural Science and Math.

Laboratory Fees in Engineering and the Sciences: A fee of $30.00 is assessed for each laboratory course in engineering and in the sciences.

Late Course Add Fee: A $100.00 per course fee is assessed when a registered student adds a course after Census Day.

Late Registration/Late Payment Fee: A nonrefundable charge in increments of $50.00 for every four days past the regular registration payment deadline is required to defray costs associated with extending registration times.

Library Fines and Charges: Services offered by the library and the charges for these services are:

<table>
<thead>
<tr>
<th>Service</th>
<th>Charge Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interlibrary Loans</td>
<td>Varies according to the institution from which material is borrowed</td>
</tr>
<tr>
<td>Lost Books</td>
<td>Cost plus $25.00 plus any overdue fines</td>
</tr>
<tr>
<td>Thesis /Dissertation/Practica Binding</td>
<td>$10.00 per copy</td>
</tr>
</tbody>
</table>

In addition, there is a $0.50 per day per item fine for late return of materials checked out of the library to a maximum of $30.00. Copies of the fine schedule can be obtained at the McDermott Library Circulation/Reserve Desk. Individuals who fail to return overdue library materials may be subject to criminal action for theft.

Management Advanced Placement Test Fee: A $30.00 fee to assist paying costs associated with offering an advanced placement test in the School of Management.

Management Career Placement Fee: A fee of $10.00 per semester credit is assessed for each School of Management course to provide career placement services.

Management Computer Competency Exam Fee: A $30.00 fee to pay a portion of the costs of administering an optional exam for Master’s degree students in the School of Management.

Music Course Fee: A fee of $75.00 per course is required to defray costs associated with music courses.

Network Access Fee: An optional service that allows remote access to the campus network for $30.00 per semester ($20.00 per summer).

Parking Fees: A vehicle parked on campus must display a current U.T. Dallas parking decal. Students may purchase any of the following decals at registration or in the Decal Office, PG 1.204.

<table>
<thead>
<tr>
<th>Type</th>
<th>Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>$75.00</td>
</tr>
<tr>
<td>Gold</td>
<td>$125.00</td>
</tr>
</tbody>
</table>

Waterview parking – A parking decal is required for all resident of Waterview apartments. The cost is $30.00 per vehicle per year.

Parking decals are nonrefundable with the following exceptions:

- Classes are canceled and/or the reason for withdrawal lies with the university.
- Decal is returned to the Decal Office within three (3) working days following regular registration.

A student who wishes to register two vehicles in his or her own name must present proof of ownership of both vehicles.

Students may check with the university police department for carpool parking information. The Dallas Area Rapid Transit System (DART) provides bus service to the campus from the Richardson transfer terminal. Contact DART for schedule information.

For information and/or registration of one vehicle by mail, contact the Decal Office at (972)883-2331.

Recreational Sports Course Fees: A $15.00 per course fee will be assessed for each physical instruction course taken.
Recreational Sports Locker Rental Fee: An optional locker rental fee of $5.00 - $15.00 per semester.

Recreational Sports Towel Service Fee: An optional towel service of $5.00 per semester.

Reinstatement Fee (Prior to Census Day): After the payment deadline for each semester, all registration for which tuition and fee payments have not been received will be canceled. If a student requests that the courses be reinstated before Census Day, a $15.00 reinstatement fee will be charged in addition to a graduated late registration fee (minimum credit hour fee is required to defray the costs of courses taken at the Universities Center at Dallas.

## Student Financial Aid

### Teaching and Research Assistantships

Teaching Assistantships are available on a limited basis in most graduate programs. Also, many faculty members have research projects which provide Research Assistantships. These Teaching and Research Assistantships normally involve half-time employment and are awarded on the basis of merit. Students holding these assistantships must be enrolled for a minimum of nine semester hours for each regular semester in which the assistantship is awarded. The Dean of each school designates the minimum semester hours for a summer session. A student on a Teaching/Research Assistantship who is enrolled in the minimum number of hours and wishes to drop a course must obtain the signature of the Dean of Graduate Studies. Students on probation will not be supported on an assistantship. Applications should be made to the appropriate Graduate Program office at least 60 days prior to the date of registration.

Prior to their appointment as Teaching Assistants, international students must meet the English requirements described in the “English Requirements for Teaching Assistants” section. All TA’s are required to attend TA Orientation held immediately prior to fall and spring semesters.

### Student Financial Aid Office

The Student Financial Aid Office is available to assist students in obtaining funds to attend the university. Aid is available in the form of loans, grants, and part-time employment or any combination of those programs. Limited numbers of scholarships are available. The total amount of aid the student receives depends on the level of financial need, submission of appropriate financial information and applications, academic records, and the availability of funds.

Students are encouraged to contact the Financial Aid Office to obtain appropriate application materials and to determine eligibility for the various forms of aid available. The Financial Aid Office is located in the lower level of McDermott Library.

Students may also apply for financial aid, check the status of their application, or visit [http://financial-aid.utdallas.edu/](http://financial-aid.utdallas.edu/).

### Eligibility for Financial Aid

Most of the aid listed in this catalog is awarded on the basis of financial need. Students are encouraged to determine the amount of resources that they can provide toward their education and to compare it with the average cost of attending the University. Student budgets are reviewed annually in accordance with federally accepted guidelines. Federal guidelines outline what can be included in student budgets. The costs of tuition, fees, books, supplies, room and board, in-city transportation, and a limited amount for other personal expenses are the basic components of student budgets. Unusual expenses, such as childcare costs or the student's medical disability, will be considered when they have been properly documented.
Financial need is defined as the difference between the cost of attending the university and the amount a student and family can reasonably provide. The amount of the expected family contribution is based on federal guidelines reflecting total family income, assets, and number of dependent children currently attending post-secondary educational institutions. Family contribution is expected unless it is clearly established that the student is independent of any family support.

In determining whether a student is considered independent or self-supporting, the Financial Aid Office adheres to the standards set by the Department of Education to establish an applicant’s dependency status. Students 24 years or older are considered financially independent. Students under the age of 24 are considered financially dependent unless they are orphans, wards of the court, veterans, graduate students, married, or unmarried but with legal dependents. Both self-supporting and dependent students must submit a Free Application for Federal Student Aid (FAFSA) form in order that a determination can be made of the expected resources available to the applicants.

Selective Service

Male students between the ages of 18 and 26 must be registered with Selective Service to qualify for Federal student loans or grant programs. This includes College Work Study, Federal Stafford Student/Plus Loans, and Federal Perkins Student Loans. The Selective Service requirement also applies to Texas student loans or grant programs. Students may register with Selective Service by visiting their local postal office or using the World Wide Web at https://www4.sss.gov/regver/Register1.asp. Graduate students wanting to verify their Selective Service registration may do so online by visiting the Selective Service site at this URL https://www4.sss.gov/regver/verification1.asp.

Students subject to selective service registration will be required to file a statement that the student has registered or is exempt from selective service registration in order to be eligible to apply for federal financial aid. In addition, effective January 1, 1998, the selective service requirement is also applicable to students applying for financial assistance funded by State revenue.

Required Course Load

The course load requirement for students receiving each type of aid is at least one-half the normal course load. Graduate students must be enrolled in no less than 5 credit hours during any term of enrollment. Teaching Assistants and Research Assistants, however, must maintain a course load designated by the Dean in the school to which they have been assigned. Aid recipients should not reduce their course loads below the qualifying minimum hours as it may affect receiving financial assistance at a later date.

Basis for the Type of Financial Aid

The aid package awarded to a student may consist of a loan, grant, scholarship, part-time job, or any combination of these programs. The total amount of aid the student receives depends on the level of financial need, submission of appropriate financial information and applications, academic records, and the availability of funds.

Satisfactory Academic Progress Policy for Federal Financial Aid

The University of Texas at Dallas has a “Satisfactory Academic Progress” policy for a student receiving federal student financial assistance.

Generally, the student is expected to remain in good standing by the satisfactory completion of a minimum number of credit hours, based on a percentage of the credit hours attempted and completed. This completion rate may vary depending on the student's academic level and credit hour load. In addition, graduate students must maintain a GPA of 3.0 or above. For online information on the Satisfactory Academic Progress policy, visit the http://financial-aid.utdallas.edu/ and link to “ELIGIBILITY”. For more detailed information the student should contact the Financial Aid office. A copy of the Satisfactory Academic Progress policy is made available to all recipients of financial aid and is available online on our web site.
Renewal of Financial Aid

For a student to be considered for a renewal of financial aid, a new Free Application for Federal Student Aid (FAFSA) and supporting documents must be submitted for each academic year. The awarding of renewal aid is subject to the same considerations used in awarding all previous financial assistance.

Revocation of Aid

Financial aid packages are reviewed by the Financial Aid Office and canceled if the student fails to maintain a satisfactory record of academic progress or to enroll for and maintain the minimum number of course load hours. Aid packages may also be revoked because of changes in financial status. Partial or full repayment of awards may be required. In some instances, immediate repayment may be required.

Any change in a recipient’s financial situation, such as additional scholarships, loans, or change in employment status, must be reported to the Financial Aid Office, because compliance with federal regulations may require a revision of awards.

Types of Financial Aid

Following is a summary of the types of assistance that are available to graduate students at The University of Texas at Dallas. The student should be aware that many of the programs are subject to change without notice by the state or federal government. Information on all programs may be obtained from the Financial Aid office unless otherwise noted.

Texas Public Education Grant

An act of the 64th Texas Legislature established a grant program to provide financial assistance to students. This program is funded through appropriation of a portion of the tuition charge for resident and nonresident students. Graduate students receiving Teaching Assistantships or Research Assistantship appointments may apply for a Texas Public Education Grant through their academic program. Texas Public Education Grants may be awarded through the Financial Aid Office.

Educational Assistance Grant

Funds through this program are made available through a set-aside of Designated Tuition. Graduate students demonstrating financial aid need through a completed FAFSA will be considered for aid. Amount of award will vary each year based on availability of funds.

Teach For Texas Conditional Grant Program

(This is a Student Loan with Cancellation Provisions for Teaching)

The purpose of this program is to encourage students to become certified classroom teachers and to encourage these newly certified teachers to teach in a field having a critical shortage of teachers or in communities having a critical shortage of teachers.

Eligible students must:

- Obtain a recommendation from the Teacher Development Center
- Have completed at least 75 percent of the credit hours attempted in the most recent academic year.
- Be enrolled at least ¾ time
- A post-baccalaureate student enrolled for the first time in an educator certification program.
- Enter in an agreement with the Texas Higher Education Coordinating Board to teach full time as a certified classroom teacher for five years at the preschool, primary, or secondary level in a public school in Texas in the person’s chosen critical shortage field or in a community experiencing a critical teacher shortage.
- Sign a promissory note acknowledging the conditional nature of the grant and promising to repay the grant plus interest at an annual fixed interest rate of 7 percent and other charges stated in the promissory note.

The amount of this award will vary based upon the student’s anticipated program completion date and the availability of funds.
International Education Fund Scholarship
Through the proceeds from the International Education fee, scholarships are available for study-abroad programs. These scholarships are open to both graduate and undergraduate students enrolled at least one-half time (six hours or more). Graduate students should be admitted to a degree program and have a GPA of 3.0. While abroad, the recipient of this scholarship must be enrolled in a full-time course of study. Course work undertaken must apply to the student’s degree program.

Hazlewood Veteran Tuition Exemption
Certain veterans who have served on active military duty, who were residents of Texas at the time of entry into the service, who have resided in Texas for the last 12 months prior to the date of registration, and whose entitlement to educational benefits under federal legislation has been exhausted, are eligible for exemption from the payment of tuition, general fee and laboratory fees. However, an individual who has “exhausted his/her federal education benefit” as a result of a default on a federal or state loan may NOT receive the Hazlewood benefit. These exemptions also apply to children of those members of the Armed Forces killed in action, missing in action, who died while in service, or whose death is documented to be directly caused by illness or injury connected with service in the armed forces, and to children of those members of the Texas National Guard killed since January 1, 1946 while on active duty. Effective Fall 1995, there will be a maximum of 150 credit hours (including remedial courses) of work for which a person may receive benefit under the Act. This accrual will begin with the Fall 1995 semester. Applications are available in the Financial Aid office.

Federal Perkins Loan Program
This loan program provides a combination of federal and institutional funds to students who qualify on the basis of financial need. High priority is given to those students who demonstrate exceptional need.
A graduate student may borrow up to a maximum amount of $30,000 which includes all undergraduate Federal Perkins loans.
A Federal Perkins loan bears a modest interest rate. Borrowers are required to begin repayment of principal and interest six months after they cease to be at least half-time students. Repayment may extend over a ten-year period; however, there is a minimum rate of repayment.

Hinson-Hazlewood College Student Loan Program
Texas residents who meet eligibility requirements may borrow funds to meet a portion of their school expenses. The loan carries a modest interest rate. Repayment begins six months after graduation or withdrawal from the university.

Federal Stafford Student Loan Program
Funds from this program are made available to the student from lending institutions such as banks, savings and loan associations, and credit unions. Students must qualify for a Stafford Student Loan on the basis of financial need.
The loans are made at a modest interest rate and there exists a maximum amount which can be borrowed for a given academic year. See the Financial Aid office concerning the maximum loan amount. The borrower will be required to begin repayment of principal and interest upon graduation or after he or she ceases to be at least a half-time student. Repayment may extend over ten years, but the program requires a minimum monthly payment.
Graduate students admitted to graduate studies as Non-degree students because they lack pre-requisite coursework or need to take the appropriate test(s) (GMAT or GRE) before being admitted to a UTD degree program are limited to the following conditions:

1) May receive financial aid for no more than 12 consecutive months under the Non-degree status. At the end of the 12 months, the student must be admitted to a degree program to continue their eligibility for financial aid.
2) May borrow through the Federal Stafford Loan program at the 5th year, undergraduate level maximums.
Short-Term Emergency Loans

Students needing emergency help with educational expenses may borrow from the short-term loan fund. Loans must be repaid within 60 days from the date of issuance or one week prior to the end of the term for which the student applied for the short term loan, whichever comes first. A fee of $30.00 per month will be charged, up to a maximum of $90.00 per semester. Contributions to these funds have been made by Mrs. Lloyd V. Berkner, Mr. and Mrs. Louis Castelli, the Kiwanis Club of Richardson, Rotary Club of Richardson, Richardson Savings and Loan Association, the First Texas Savings and Loan Association of Dallas, Richardson Altrusa Club, Chaparral Steel Company, and funds set aside out of student tuition.

Federal College Work Study Program

College work study employment is available to students on the basis of demonstrated financial need. The acceptance of employment reduces the amount of loan assistance a student will be permitted to accept in order to meet financial need to cover educational expenses.

Compensation depends on the type of job, qualifications, and classification. The number of hours and work schedule will vary depending on the position. For information on job availability, students need to contact the Career Center at (972) 883-2943.

Other On-Campus Employment

Various programs and schools of the university employ students in positions that are not work-study positions and are not based on need. In accordance with appropriate guidelines, pay scales depend on the type of job, qualifications, and classification. Normally, students will be employed for a maximum of 19.5 hours per week. Information concerning student financial aid is accurate at the time of printing. Changes in regulations or policy on a federal, state, university, private lending, or donor level could affect the type and amount of programs available and/or program requirements. The Financial Aid Office has detailed information available upon request.

Scholarship Programs

Information about a variety of scholarships awarded on the basis of academic merit and achievement is available from the Office of Financial Aid. The University of Texas at Dallas also offers a number of endowed scholarships that are administered by a school, department, or program. Students are encouraged to contact their school dean or program office to obtain information about eligibility criteria and scholarships awarded in the student's area of study.

In accord with Chapter 51, of the Texas Education Code, all applications for competitive academic scholarships for graduate study are reviewed by the Committee on Student Scholarships and/or the Graduate Scholarship Committee in the appropriate academic unit. Award decisions are based on the same holistic evaluation of the applications as is carried out for admission decisions.

Career Center

Students are encouraged to contact the Career Center early in their academic careers in order to utilize the services available in the development of their long-range planning. The staff assists students with career counseling through evaluation and testing in the areas of skills analysis, interest identification, and values clarification. Computer-assisted career information searches and a Career Resource Library are also available.

The Career Center provides pre-employment preparation assistance through videotaped mock interviews and workshops on résumé writing, interviewing skills, and conducting an effective job search. Representatives of business, government, industry, education, and social agencies recruit UTD students at Career Expos and on-campus interviews. The office maintains daily updated on-line job listings for part-time, on-campus, and full-time positions with public and private employers. The Career Center also manages the Internship/Cooperative Education program.

All students register with the Career Center by completing an online registration profile through the UTD CareerWorks system. The student uploads a resume into the system, which can, in turn, be referred to employers. Employers also have access to candidate résumés via Résumé Books in the UTD CareerWorks system. For more information, contact the Career Center in McDermott Library 1.312. (Phone: 972-883-2943, Web: www.utdallas.edu/student/career, Email: careercenter@utdallas.edu).
Student Life

The Office of Student Life offers a variety of student services and programs, including Disability Services, New Student Programs, Health Center, Counseling Center, Service Learning, International Student Services, Multicultural Center, Recreational and Varsity Sports, Residential Life, Student Publications, the Student Union and Activities Advisory Board, and the Child Care Center. Student Life also provides support for student organizations and assists students in the interpretation of University rules and regulations including those regarding student discipline and conduct.

Child Care Center

A licensed Child Care Center under the supervision of the Office of Student Life and the Richardson YWCA is located in the Student Union. Evening care is available for children ages four to eleven of university students. For additional information call (972) 883-2945.

Comet Card

The Comet Card is the official University identification card for all students, faculty, and staff. The Comet Card allows students to use campus facilities and services and offers a debit feature where money may be stored to make on-campus purchases and payments. Cards are issued through the Info Depot. Call (972) 883-2495 for information.

Student Counseling Services

The Student Counseling Center is staffed by psychologists and counselors who are available to help students with personal and interpersonal problems. Services include individual counseling for personal or educational concerns, marital/family counseling, group counseling, crisis counseling and stress reduction, and special workshops/programs relevant to student needs. In addition, a personal development book and tape library is available and materials may be checked out.

All counseling services and records are held confidential to the extent permitted by law and are governed by the Family Educational Rights and Privacy Act, the Texas Open Records Act, and Article 5561(h), Vernon's Annotated Texas Civil Statutes. The Student Counseling Center is located in the Student Union, (972) 883-2575.

Disability Services

Disability Services provides for the special needs of students with disabilities. Students are urged to make their needs known to Disability Services as soon as they are admitted to the university. The Office of Disability Services is located in the Student Union, (972) 883-2070.

Student Government

Through the Student Government Association a student can express views to the student body, the faculty, and the administration. The president and vice president are elected each April for one-year terms. In addition two graduate students are elected from each school. In September elections are held for 14 at-large graduate senators. Further information may be obtained from the Student Government Offices in the Student Union, (972) 883-2284, or by contacting the Director of Student Development, (972) 883-6158.

Student Health Services

The Student Health Center offers routine medical treatment to all currently enrolled students. Services include diagnosis and treatment of acute illnesses and injuries, general medical problems, gynecological problems, health education and counseling, and limited immunizations. While there is no cost for most services, there are charges for laboratory services, medication and specific procedures provided at the Health Center. All services or treatment obtained from facilities other than the campus health center are the responsibility of the individual student. The staff at the Health Center can make referrals as indicated.

U.T. Dallas has adopted a written policy on HIV infection, and the educational pamphlet, HIV Infection and AIDS, developed by the Texas Department of Health, is available from the Student Health Center. In addition, the Student Health Center provides information on how to prevent the transmission of HIV infection and AIDS, offers HIV and AIDS education programs, and offers HIV and AIDS counseling/testing services upon request.
Information about bacterial meningitis is available upon request at the Student Health Center. Information also is distributed in Orientation packets, in the A to Z Guide to Student Life, in the graduate and undergraduate applications for admission to the University, and is published in the University newspaper, The UTD Mercury, at the beginning of each semester.

All medical services and records are held confidential to the extent permitted by law and are governed by the Family Educational Rights and Privacy Act, the Texas Open Records Act, and Article 5561(h), Vernon’s Annotated Texas Civil Statutes.

In accordance with Texas Education Code, Section 51.933, the following immunizations may be required by certain facilities, such as hospitals, for all students enrolled in health-related courses that will involve direct patient contact with human biological fluids or tissue. Students for whom these immunizations are not required are strongly urged to obtain these immunizations for their own protection.

- **Measles**: proof of two doses of measles vaccine administered on or after the first birthday and at least 30 days apart or proof of immunity;
- **Mumps**: proof of one dose of mumps vaccine administered on or after the first birthday or proof of immunity;
- **Rubella**: proof of one dose administered on or after the first birthday or proof of immunity;
- **Tetanus/diphtheria**: proof of one “booster” dose of tetanus/diphtheria (within 10 years).
- **Hepatitis B virus (HBV)**: proof of serologic immunity to HBV or certification of immunization with a complete series of Hepatitis B vaccine. Students will be required to present a letter or other suitable written certification.

The Student Health Center is located in the Student Union, SU1.606, 972-883-2747.

**Student Health Insurance**

A group health insurance plan is available to all enrolled students and is administered by the International Student Services Office.

International students on F and J non-immigrant status and dependents of J1 visa holders are required to maintain approved comprehensive health insurance while enrolled at U.T. System component institutions. At registration, F and J status students will be assessed a health insurance fee for the purchase of the U.T. System Student Health Insurance Plan where there is no evidence of continuing coverage under (1) the U.T. System Employee Health Plan or a comparable mandatory employee plan, (2) continuing mandatory coverage through a government sponsored health plan, (3) or continuing coverage that satisfies the requirements of USIA regulations with regard to J1 and J2 visa holders.

**International Student Services**

The International Student Services Office is available for those students in the United States under a non-immigrant visa status. The office provides several services not limited to:

- Immigration services, including issuance of F-1 and J-1 immigration documents, individual counseling sessions and group workshops to help students understand and comply with U.T. Dallas policies and USCIS regulations, invitation letters for visiting family members, travel authorizations, enrollment letters, etc.
- Programming services, including International Student Orientations, field trips, on-campus intercultural events, and organizing and implementing other programs.
- Student Health Insurance services, including maintenance of the mandatory Student Health Insurance program for F and J visa holders and liaison services between students and the U. T. System Approved Health Insurance company.

The International Student Services office may be contacted by calling (972) 883-4189.

**Student Involvement**

The University of Texas at Dallas encourages student involvement and provides numerous opportunities for students to further co-curricular and extracurricular interests. Students may have a voice and contribute to student life through participation in the Student Government Association, the Student Union and Activities Advisory Board, student publications, various university committees, and over 100 student organizations. Call the Center for Student Involvement at (972) 883-6651 for more information.
**Multicultural Center**

The Multicultural Center offers support to UTD minority students while educating the campus community about cultural diversity. The goals for the program include improving the recruitment and retention of minority students, increasing awareness of the campus community on minority issues, and offering paraprofessionals and minority student leaders opportunities to develop and refine leadership abilities. Call (972) 883-6390 for more information.

**Nondiscrimination Policy**

The University is committed to a policy of nondiscrimination on the basis of age, color, disability, gender, race, religion, sexual orientation, national origin, or veteran status in its provision of services, activities, and programs, and in its treatment of students. Students seeking further information about this policy, or related complaint procedures for alleged discrimination or sexual harassment should contact the Dean of Students at (972) 883-6391.

**Student Organizations**

Registered student organizations provide the major means by which students can contribute to student life while developing friendships, interests, talents, and leadership skills. These groups include academic and honor groups, service clubs, religious groups, ethnic groups, and special interest groups. Detailed information on the groups and guidelines for forming new organizations is available in the Center for Student Involvement in the Student Union or by calling (972) 883-6551.

**Student Media**

*The UTD Mercury* is the official student newspaper of the University. It is published bi-weekly during the regular academic year. Funded with student service fees and advertising sales, the Mercury is available without charge to all students. Other publications are the A to Z Guide to Student Life, which is mailed to new students each semester, and This Week at UTD, a weekly publication distributed on campus. Radio UTD is a student-operated internet-based radio station that webcasts nightly throughout the regular academic sessions.

**Recreational Sports**

Recreational Sports facilities include a 100,000 sq. ft. Activity Center (housing squash and racquetball courts, a multipurpose gym with 3 full basketball courts, a smaller single court auxiliary gym, a 10,000 sq. ft. fitness area, a multipurpose room, a 25 yd. six lane indoor pool, recreation and athletic training lockers, showers, a training room, and athletic administrative offices. Other facilities include eight lighted tennis courts, a jogging trail, lighted softball, baseball, and soccer fields, and an outdoor basketball court. A variety of intramural and club sports is offered year-round as well as physical activity courses for credit. For additional information call (972) 883-2090 or 883-2096.

**Varsity Sports**

U. T. Dallas is a provisional member of the NCAA Division III (no athletic scholarships). U. T. Dallas fields men’s and women’s teams in soccer, golf, basketball, tennis, cross country, baseball (men), softball (women), and volleyball (women). Graduate students are able to participate only if their undergraduate degree is from U. T. Dallas and they still have NCAA eligibility remaining. Administrative offices are located in the Activity Center. For additional information call (972) 883-4490.

**Student Union and Activities Advisory Board**

The Student Union and Activities Advisory Board (SUAAB) plans co-curricular and extra-curricular programs and events for the U. T. Dallas community. SUAAB’s goal is to provide programs to enrich students’ lives and to provide opportunities for faculty-student interaction.
Student Union

In addition to housing the Child Care center, the Counseling Center, Student Health Services and other Student Life offices, the Student Union provides meeting rooms, a TV lounge, billiards and ping pong, an arcade, the Comet Lounge (for study and leisure), Comet Café (food service), THE PUB (a coffeehouse), and the Info Depot offering discount tickets, locker rentals, the Comet Card (identification and on-campus debit card) a notary service, information, and referrals. The Student Union is also home to student organizations, Student Government, the Student Union and Activities Advisory Board, and Student Publications. A vending area, a first-aid dispenser, and an ATM are also located in the Student Union.

UT TeleCampus

Many online courses listed in this catalog are offered from the University of Texas at Dallas via the UT TeleCampus. The UT TeleCampus is the centralized support center for online education throughout The University of Texas system. In the website you will find: online classrooms, a digital library, free online tutorial services, 24/7 technical support, links to various admissions and registrar offices throughout the UT System and full program descriptions for the online courses and degrees the UT TeleCampus facilitates. Designated contacts at each campus are available to assist you as are the student services support staff of the UT TeleCampus. With questions please call toll-free: 1-888-TEXAS-16 (1-888-839-2716).

Online courses noted with an asterisk are part of a collaborative degree program with other University of Texas campuses. To see a full listing of courses and host universities for the UTTC programs, please access the UT TeleCampus website at http://www.telecampus.utsystem.edu.
SCHOOL OF ARTS AND HUMANITIES

The School of Arts and Humanities offers three graduate degree programs: Arts and Technology, History, and Humanities.

Graduate Program in Arts and Technology (M.A., M.F.A.)
The interdisciplinary Graduate Program in Arts and Technology focuses on the creation, application, and implications of technologically sophisticated interactive communication. Students may focus on either Games and Interactive Narrative or Digital Arts and Design.

Graduate Program in History (M.A.)
The Graduate Program in History fosters advanced understanding of the processes by which interpretations of the past are made, disseminated and evaluated.

Graduate Program in the Humanities (M.A., M.A.T., Ph.D.)
The interdisciplinary Graduate Program in Humanities fosters integrated study and practice of the arts, literature, history, and philosophy. Combining the activities of established disciplines in the arts and humanities into one enterprise, the program enables students to take a broad view of human achievement in these areas.

DEGREES OFFERED
Master of Arts in Arts and Technology
Master of Arts in History
Master of Fine Arts in Arts and Technology

Master of Arts in Humanities
Master of Arts in Humanities Major in Aesthetic Studies
Master of Arts in Humanities Major in History of Ideas
Master of Arts in Humanities Major in Studies in Literature

Master of Arts in Teaching in Humanities Major in Aesthetic Studies
Master of Arts in Teaching in Humanities Major in History of Ideas
Master of Arts in Teaching in Humanities Major in Studies in Literature

Doctor of Philosophy in Humanities
Doctor of Philosophy in Humanities Major in Aesthetic Studies
Doctor of Philosophy in Humanities Major in History of Ideas
Doctor of Philosophy in Humanities Major in Studies in Literature
Faculty


Associate Professors: Esteban R. Egea, Pamela Gossin, Cynthia Haynes, Midori Kitagawa, Adrienne L. McLean, Patricia Michaelson, Robert Nelsen, John J. Pomara, Erin A. Smith, Gerald L. Soliday, Deborah Stott, Theresa M. Towner, Marilyn Waligore, Daniel Wickberg, Michael Wilson

Assistant Professors: Sean Cotter, Carla Gerona, Michelle Nickerson, Venus O. Reese, Natalie Ring, Scott Swearingen, Dean Terry

Senior Lecturers: John F. Barber, Lisa Bell, Kelly P. Durbin, Maria Engen, Kathryn C. Evans, John Gooch, Dianne Goode, Thomas Lambert, Kathy Lingo, Mary Medrick, Greg L. Metz, Kent Polk, Monica M. Saba, Betty Wiesepape

Emeritus Professors: Joan Chandler, Esteban R. Egea, S. Michael Simpson, Gerald L. Soliday

Objectives

The School of Arts and Humanities is committed to interdisciplinary programs that investigate the linkages between the arts and the humanities by fusing critical with creative thinking, theoretical with practical endeavors. Rather than identifying fixed disciplinary areas, the program emphasizes the interrelationship of broad areas of interest.

Within the Graduate Program in Arts and Technology, most courses are offered under the rubric of Arts and Technology (ATEC), but the degree plan also includes courses in Aesthetic Studies (HUAS), History of Ideas (HUHI), and Studies in Literature (HUSL).

Within the Graduate Program in the Humanities, most courses are offered within the three main areas of concentration: Aesthetic Studies (HUAS), History of Ideas (HUHI), and Studies in Literature (HUSL), and students seeking the M.A. or Ph.D. degrees in humanities must take courses in all three areas. The fourth area and other courses, including core courses required of all students, are offered under the rubric Humanities (HUMA).

Within the Graduate Program in History, most courses are offered within History (HIST) and History of Ideas (HUHI) but students may also take courses in Aesthetic Studies (HUAS) and Studies in Literature (HUSL).

All our graduate programs are designed to provide students a flexible, interdisciplinary context within which to pursue a program of study built on connections among specific courses and the areas of concentration. Offerings include not only seminars stressing the interpretation and criticism of specific works and issues but also ensembles, studios, and workshops in which the activity of creation and/or performance becomes the primary means of learning.

Facilities

The School of Arts & Humanities provides specialized facilities for academic research and creative expression. The Jonsson Building contains technologically rich environments for studies in Rhetoric, Computer Graphics, Professional Communication, Musical Instrument Digital Interface, and Art & Technology. The Visual Arts Building houses a Media Room as well as studios for painting, photography, sculpture, and other arts. Performance venues for drama and music include the University Theatre and the Jonsson Performance Hall.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

Each application is considered on its individual merits. Normally students applying for admission to the Graduate Program in Arts and Technology should have a previous academic degree (B.A. or B.S.) in an appropriate field (i.e., Art, Computer Science), a grade point average of 3.3 (especially in upper-division undergraduate work), and evidence of previous course work and/or expertise in the creative arts and digital technology.
Normally students applying for admission to the Graduate Program in Humanities should have previous academic degrees (B.A. or M.A.) in arts and humanities fields and a grade point average of 3.3 (especially in upper-division undergraduate or graduate work).

Normally students applying for admission to the Graduate Program in History should have a previous degree (B.A. or B.S.) in history or related disciplines and a grade point average of 3.3 (especially in upper-division undergraduate work).

The School of Arts and Humanities no longer requires the Graduate Record Examination for admission to graduate programs.

Full-time and Part-time Students

Students can pursue the graduate degrees in humanities on a full- or part-time basis. Full-time students normally register for nine or more semester hours per term. The school takes care to accommodate part-time study by scheduling both day and night classes, thus allowing students flexibility in organizing individual schedules.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

The approach to graduate education in the School of Arts and Humanities is flexible. Within the specific degree requirements listed below, each student plans a program of studies in consultation with an assigned faculty adviser.

Courses meeting degree requirements are normally chosen from the core courses and the areas of concentration within the School of Arts and Humanities. To have courses taken outside the school applied to one of its degrees, students must seek prior approval from the School’s Associate Dean for Graduate Studies. They may also petition to have appropriate transfer courses applied to reduce the required number of hours for a degree at U.T. Dallas. The School’s Associate Dean for Graduate Studies may require students with background deficiencies in interdisciplinary work to take additional courses at the undergraduate or graduate level to remedy those deficiencies.

Active involvement in the process of artistic creation and performance is basic to the design of the Aesthetic Studies area of concentration. Therefore, students working in the Graduate Program in the Humanities at the M.A. level with an emphasis on Aesthetic Studies are required to take at least one ensemble/workshop, and those working toward a Ph.D. with an emphasis on this area are required to take at least one additional ensemble/workshop. Students undertaking creative projects for master’s portfolios or doctoral dissertations must demonstrate their competency as artists by including in their degree plans a minimum number of studios, ensembles, or workshops related to a proposed medium: two for the M.A. and four for the Ph.D.

Research

The research interests of the faculty reflect the interdisciplinary mission of the School. In addition to the research activities of individual faculty, five centers and institutes that promote interdisciplinary research are located within the School: The Center for Translation Studies; the Center for Holocaust Studies; the Institute for Professional Communication; the Institute for Interactive Arts and Technology; and the Center for the Interdisciplinary Study of Museums. Since the School combines the Humanities and the Arts, many faculty are engaged in the creation and performance of artistic works in music, drama, and the visual arts.
Graduate Program in Arts and Technology

Master of Arts

The program leading to the M.A. in Arts and Technology is designed both for individuals engaged in professional practice wishing to enhance their knowledge and skills and for students intending to pursue a doctorate in a related field. It offers advanced studies in interactive media and computer-based arts that emphasize the fusion of creative with critical thing and theory with practice. Students must complete thirty-six semester hours of course work and an advanced project.

Core Courses (6 hours)
ATEC 5349 Interdisciplinary Approaches to Arts and Technology
ATEC 6331 Aesthetics of Interactive Arts
Students are expected to complete these courses as early as possible in their degree plan.

Prescribed Electives (27 hours)
Twenty-seven hours chosen from the following courses:
ATEC 6341 Game Design
ATEC 6351 Digital Arts
ATEC 6361 Writing for Interactive Media
ATEC 6371 Community Media
ATEC 6V81 Special Topics in Emergent Communication
ATEC 7V82 Advanced Projects in Interactive Media
HUAS 6313 The Business of the Arts
HUAS 6330 Studies in Visual Arts
HUAS 6375 Imagery and Iconography
HUAS 6392 Image/Text Workshop
HUAS 6393 Time-Based Arts Workshop
HUAS 7301 Art and Society
HUHI 7387 Science and Technology in Western Culture
HUSL 6308 Studies in Literary Forms
HUSL 6370 Literature and Ideas

Final Project (3 hours)
ATEC 7V81 Advanced Project Workshop
Having completed at least 30 hours of course work, students will complete and present an advanced project in digital arts for evaluation by a master’s committee.

Master of Fine Arts

The program leading to the M.F.A. in Arts and Technology is designed both for students wishing to teach arts-and-technology-related courses in colleges and universities and for those intending to engage in professional studio or design practice. While maintaining a commitment to interdisciplinary education fusing critical with creative thinking, this program places greater emphasis on the creation and application of computer-based arts and narrative. Students must complete fifty-four semester hours of course work and a substantial advanced project.

Core Courses (6 hours)
ATEC 5349 Interdisciplinary Approaches to Arts and Technology
ATEC 6331 Aesthetics of Interactive Arts
Students are expected to complete these courses as early as possible in their degree plan.

Prescribed Electives (24 hours)
Twenty-four hours chosen from the following courses:
ATEC 6341 Game Design
ATEC 6351 Digital Arts
ATEC 6361 Writing for Interactive Media
ATEC 6371 Community Media
ATEC 6V81 Special Topics in Emergent Communication
ATEC 7V82 Advanced Projects in Interactive Media
HUAS 6313 The Business of the Arts
HUAS 6330 Studies in Visual Arts
HUAS 6352 Creating TV and Movie Scripts
HUAS 6373 Studies in Film
HUAS 6375 Imagery and Iconography
HUAS 6392 Image/Text Workshop
HUAS 6393 Time-Based Arts Workshop
HUAS 6395 Creating Short Fictions
HUAS 7301 Art and Society
HUAS 7310 Art and Authorship
HUHI 7387 Science and Technology in Western Culture
HUSL 6308 Studies in Literary Forms
HUSL 6370 Literature and Ideas

Free Electives (9 hours)
Nine hours of electives in any organized courses.

Independent Study (9 hours)
Final Project (6 hours)
ATEC 7V81 Advanced Project Workshop
Having completed at least 45 hours of course work, students complete and present a substantial advanced project in digital arts for evaluation by a master’s committee.

Graduate Program in History

Master of Arts
The program leading to the M.A. in History is designed both for individuals wishing to enhance their knowledge of and skills at the study of the past and for those intending to pursue a doctorate in a related field. Thus, students seeking the M.A. in History have two options, a “research” or a “professional” option. Students with plans for doctoral study should choose the research option.

Students in the research option must complete thirty-six semester hours of course work, demonstrate reading proficiency in an approved foreign language, and successfully complete a master’s thesis.

Core Course (3 hours)
HIST 5311 Historiography
Students are expected to complete this course as early as possible in their programs.

Electives in History (HIST) or History of Ideas (HUHI) (24 hours)
Twenty-four hours chosen from graduate courses in HIST or HUHI, at least fifteen of which must be in HIST courses. Normally no more than six hours of independent study are applicable to the degree plan.

Elective Course (3 hours)
Three hours in any organized course outside of History (HIST) and History of Ideas (HUHI), but normally in the Humanities Graduate Program.

Thesis (6 hours)
HIST 8398 Master’s Thesis
Having completed thirty hours of course work, students must write and present a thesis in history for evaluation by a master’s committee.

Students in the professional option in History must complete thirty-six semester hours of course work, including HIST 5311 and normally all in organized HIST and HUHI courses. They are not required to complete a thesis or meet a foreign-language requirement, and they receive a terminal degree.
Graduate Program in the Humanities

Master of Arts

The program leading to the M.A. in Humanities is designed both for individuals wishing to enhance their knowledge and skills and for students intending to pursue a doctorate in a humanistic field. Thus, students seeking an M.A. in Humanities have two options, a “research” or a “professional” option. Students with plans for doctoral study should choose the research option.

Students in the research option must complete thirty semester hours of course work, demonstrate reading proficiency in an approved foreign language, and successfully complete a portfolio.

Core Course (3 hours)
HUMA 5300 Interdisciplinary Approaches to the Arts and Humanities.
Students are expected to complete this course as early as possible in their programs.

Elective Courses (27 hours)
Twenty-seven semester hours, of which at least twenty-four hours are normally in organized courses. Eighteen of these hours are divided among organized courses in Aesthetic Studies (6 hours), History of Ideas (6 hours), and Studies in Literature (6 hours). The remaining hours may be taken in one or more of these three areas, and normally no more than three hours of independent study are applicable to the degree plan.

Foreign Language
The research M.A. degree requires demonstrated reading proficiency in an approved foreign language. Students can demonstrate proficiency by passing a translation examination in an approved language (e.g., French, German, classical Greek, Italian, Latin, or Spanish). Intensive review courses (HUMA 6320-6323) and the advanced language workshops (HUMA 7320-7323), which students may take to prepare for the examination, do not count toward minimum course requirements for the degree. Any students wishing to satisfy the requirement with languages other than those listed above must secure the approval of the School’s Associate Dean for Graduate Studies. Students must satisfy the M.A. language requirement before or as they submit their master’s portfolio proposals to the Graduate Studies Committee.

Portfolio
Two substantial pieces of work (two research papers or a creative project plus a scholarly essay) originating in or completed for graduate courses are revised and presented in a portfolio for evaluation by a master’s committee.
Students in the professional option in Humanities must complete thirty hours of coursework, all normally in organized courses and distributed as in the research option above. They are not required to complete a portfolio or meet a foreign language requirement, however, and they receive a terminal degree.

Master of Arts in Teaching

To earn the M.A.T. in Humanities, a degree specifically designed for practicing teachers, students must complete a total of thirty-six semester hours of course work. While most courses are the same as those for other students in the school, some courses are concerned specifically with the school classroom. It is possible for students who are particularly interested in English and History to design their degree programs so that their work in these areas can be focused and set in an interdisciplinary context. The M.A.T. degree does not require demonstration of reading proficiency in a foreign language.

Normally students applying for admission to the M.A.T. program should have a teaching certificate. Students may be teaching full-time while they are pursuing the degree.

Core Courses (6 hours)
HUED 5300 Teaching of the Humanities in the Secondary School
HUMA 5300 Interdisciplinary Approaches to the Arts and Humanities

Specialization (15 hours)
Fifteen hours in organized courses in one of these areas of concentration: Aesthetic Studies or History of Ideas or Studies in Literature
Professional Development (6 hours)
Six hours in education courses in addition to HUED 5300. Three hours may be taken as independent study to prepare for the casebook.

Elective Courses (6 hours)
Six hours of electives in any organized courses outside the area of specialization.

Casebook: HUED 8304 (3 hours)
The casebook consists of two parts, a critical essay on an interdisciplinary topic as well as a curriculum plan that adopts that topic to the candidate’s teaching level in twenty to thirty lesson plans.

Doctor of Philosophy
Students seeking a Ph.D. in the Humanities will normally complete a minimum of sixty semester hours beyond a master’s degree or its equivalent, demonstrate advanced proficiency in a foreign language, pass qualifying examinations, and complete and defend a dissertation. In addition to meeting the general university criteria for admission to graduate study, students earning an M.A. degree in the Humanities from U.T. Dallas must obtain the formal endorsement of their portfolio committees to proceed into the doctoral program. Students who have completed pertinent graduate work at other institutions (thirty hours of humanities courses, language training, and written work roughly equivalent to the portfolio here) may qualify for a Master of Arts equivalency upon admission to the graduate program. Students admitted with an M.A. equivalent must take HUMA 5300.

Courses (42 hours)
Forty-two semester hours of which at least thirty-three are normally in organized courses. Eighteen of these hours are divided among organized courses in Aesthetic Studies (6 hours), History of Ideas (6 hours), and Studies in Literature (6 hours). The remaining hours may be in one or more of the three areas, and normally no more than nine hours of independent study are applicable to the degree.

Foreign Language
Students admitted to the Ph.D. program from universities other than The University of Texas at Dallas must pass a translation examination in an approved foreign language (e.g., French, German, classical Greek, Italian, Latin, or Spanish) during their first year in the Ph.D. program. Part-time students admitted from other universities, however, may have two calendar years to meet this initial requirement. All Ph.D. students must then demonstrate active use of the foreign language at an advanced level in two courses. For this purpose, they may undertake readings and research in regular organized courses, they may meet one half the requirement by taking the Art and Craft of Translation (HUSL 7321) once, or they may arrange for Advanced Independent Studies in Foreign Languages (designated 7330-7335). These advanced independent studies courses will not count, however, toward minimum course requirements for the degree.

Students wishing to satisfy the requirement with languages other than those listed above must secure the approval of the school’s Associate Dean for Graduate Studies.

Students must satisfy the Ph.D. foreign-language requirement prior to taking qualifying examinations.

Qualifying Examinations
After completing all the above requirements, students proceed to the qualifying examination, a sequence consisting of three written sections and one oral section. The examining committee, composed of three regular members of the faculty, oversees definition and preparation of the three examination fields within guidelines established by the program. At least seven days before the exams themselves, the faculty members submit examination questions to the Arts and Humanities office, which schedules and administers the examination. The maximum time allowed for a student’s completion of the examination sequence is twenty business days.

Dissertation (18 hours minimum)
Students are formally advanced to Ph.D. candidacy when they have successfully completed the qualifying examinations and received final approval for dissertation topics. A student may submit a preliminary dissertation proposal for consideration during the oral section of the qualifying examination. In any case, after that examination,
a four-person supervising committee is formed, normally from the examining committee plus another regular faculty member proposed by the student, to oversee dissertation work. The supervising committee must then approve a formal dissertation proposal before the student submits it to the Graduate Studies Committee for final approval. Each candidate then writes a doctoral dissertation, which is supervised and defended according to general university regulation. Every student must register for a minimum of nine hours of dissertation credit in two successive semesters and must maintain continuous enrollment thereafter for at least three semester hours during consecutive long semesters until the degree is completed. Any exception to this requirement is granted only by petition to the school’s associate dean for graduate studies.

**Course Descriptions**

Many of the course descriptions in the School of Arts and Humanities are generic in nature. They define an area of inquiry and/or creative activity within the boundaries of which instructors offer courses on specific topics. Each semester the school makes available detailed descriptions of the specific courses to be offered during the next term. Moreover, the specific topics to be covered in generic courses will be listed with the course titles in the class schedules published by the university.

**Arts and Technology Core Courses**

**ATEC 5349 Interdisciplinary Approaches to the Arts and Technology** (3 semester hours) Introduction to the interdisciplinary study of mutual interactions between technology and the creative arts. Establishes basic theoretical concepts and principles underlying the graduate program in Arts and Technology. Required of all degree candidates in Arts and Technology. (3-0) Y

**ATEC 6331 Aesthetics of Interactive Arts** (3 semester hours) Exploration of aesthetic principles underlying the interactive electronic arts, their relation to and divergence from aesthetic principles underlying traditional forms of artistic expression. Topics will include interactive games, animation, and new modes of narrative. Required of all degree candidates in Arts and Technology. (3-0) Y

**Arts and Technology Elective Courses**

**ATEC 6341 Game Design** (3 semester hours) Exploration and application of advanced methods and techniques (literary, artistic, conceptual, technical) involved in the development of interactive computer-based games. Includes participation in development team for creation of a complex computer game. (May be repeated to a maximum of 6 credit hours.) (3-0) Y

**ATEC 6351 Digital Arts** (3 semester hours) Exploration and application of advanced methods and techniques for the creation of visual images through the use of digital media. (May be repeated to a maximum of 6 credit hours.) (3-0) Y

**ATEC 6361 Writing for Interactive Media** (3 semester hours) Theory, principles and practice of narratives created for distribution via digital media. Will include creation of both linear and nonlinear digital content for electronic distribution. (May be repeated to a maximum of 6 credit hours.) (3-0) Y

**ATEC 6371 Community Media** (3 semester hours) Students develop local media that gives voice to people and issues in a particular community. Emphasis on personal, expressive media production that displays an authentic, personal voice. Students write and produce projects for Internet distribution using text, audio, video, interactive, and participatory elements. (3-0) Y

**ATEC 6V81 Special Topics in Emergent Communication** (1-9 semester hours) Explores current theories informing research on and practices in digital media and communication, such as distributed, mobile, time-shifted, interactive and personal media. (May be repeated for credit to a maximum of 9 credit hours as topics vary.) ([1-9]-0) Y

**ATEC 7V82 Advanced Projects in Interactive Media** (1-9 semester hours) Students will complete an advanced creative and/or research project exploring the interaction of communication and digital technology. (May be repeated for credit to a maximum of 9 credit hours as topics vary.) ([1-9]-0) Y

**ATEC 7V81 Advanced Project Workshop** (3-6 semester hours) Students will engage in the creation of an advanced creative and/or research project exploring the interaction of the arts with digital technology. Required of all degree candidates in Arts and Technology. ([3-6]-0) Y

**ATEC 7390 Special Topics in Arts and Technology** (3 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. or M.F.A. degree. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) R

**ATEC 8303 Independent Readings in Arts and Technology** (3 semester hours) (May be repeated for credit) (3-0) R
ATEC 8305 Independent Research in Arts and Technology (3 semester hours) (May be repeated for credit.) (3-0) R

History Core Course
HIST 5311 Historiography (3 semester hours) Graduate-level introduction to the practice and forms of written history. Required of all students in the M.A. program in History, this course examines the ways in which historians have conceived of their craft, the centrality of interpretation to the historical process, and the use of a variety of methods and theories in the study of the past. (3-0) Y

History Elective Courses
HIST 6310 Early American History (3 semester hours) The study of specific themes and/or periods in American history through the American Revolution. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HIST 6320 America in the Nineteenth Century (3 semester hours) The study of specific themes and/or periods in American history in the nineteenth century. Topics may include the Civil War and Reconstruction. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HIST 6325 America in the Twentieth Century (3 semester hours) The study of specific themes and/or periods of American history in the twentieth century. Topics may include World War I, World War II, and the Civil Rights Era. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HIST 6330 Regional and Area History in the United States (3 semester hours) The study of themes related to the history of specific regions of the United States, for example the South, the Southwest, and Texas. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T
HIST 6340 European and World History (3 semester hours) The study of specific themes and/or periods in the history of Europe and the world. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HIST 7399 Special Topics in History (3 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. degree. (May be repeated for credit to a maximum of 9 hours.) (3-0) R
HIST 8303 Independent Readings in History (3 semester hours) (May be repeated for credit.) (3-0) R
HIST 8305 Independent Research in History (3 semester hours) (May be repeated for credit.) (3-0) R

Humanities Core Courses
HUMA 5300 Interdisciplinary Approaches to the Arts and Humanities (3 semester hours) Introduction to interdisciplinary approaches to the arts and humanities, including concepts of inquiry and interpretation that form the theoretical bases of the graduate programs, seminars, workshops, and studios. Required of all degree candidates for the Master of Arts, Master of Arts in Teaching, and Doctor of Philosophy in Humanities. (3-0) S
HUED 5300 (ED 5300) The Interdisciplinary Teaching of the Arts and Humanities in the Secondary School (3 semester hours) Approaches to the interdisciplinary teaching of the arts and humanities at the secondary level. Each student will design a curriculum unit to be taught from an interdisciplinary perspective. Required of students seeking the Master of Arts in Teaching. (3-0) Y
HUMA 6V81 Special Topics in Humanities (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S

Humanities Elective Courses
Aesthetic Studies
HUAS 6303 Performance Literature, Theory, and Criticism (3 semester hours) Examination of a wide range of performance and theatrical traditions and texts. Using various critical and theoretical perspectives, the focus will be on the interplay between textual analysis, theoretical and critical frames, and performance. Topics will vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HUAS 6305 Criticism, Interpretation, and Performance (3 semester hours) An investigation of the interrelationship among the activities of criticizing, interpreting, and performing artistic texts. Examples may be drawn from literature, theater, performance art, web and inter-media applications, film/video, music, and the visual arts. The course will include an exploration of the effects of various cultural and theoretical perspectives on our response to specific works. (3-0) T
HUAS 6313 The Business of the Arts (3 semester hours) Exploration of effective means to find, create, and manage markets and audiences for works of art. Topics may include digital media, visual or performing arts, museum studies, and arts management. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (3-0) T

HUAS 6315 The Arts in Historical Contexts (3 semester hours) Studies in one or more arts of various places and historical periods. Topics will vary, but may focus on a particular movement (e.g., Surrealism), a specific era (e.g., the Renaissance), or a place (e.g., Paris in the early twentieth century). (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6318 The Arts and Their Institutions (3 semester hours) Studies of the institutions that shape and present the visual and performing arts by providing their physical, administrative, and financial “frames”: art museums, theaters, symphony associations, performance consortiums, or private foundations. The course will focus selectively on these institutions, grouping them for study in various ways depending on the interests and expertise of the instructor. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) Y

HUAS 6320 Studies in Experimental Traditions (3 semester hours) Studies in the works of artists whose experimentation with forms of expression breaks new ground in the arts and demands changes in the aesthetic perception of the public. The course will focus on such experimental movements as modernism, postmodernism and various avant-gardes that form the new tradition of the contemporary arts. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6324 Spaces of Display and Performance (3 semester hours) Usually art works and performances are encountered in specific ritualized spaces designed for them and exerting strong influence on their character. The course will address such spaces critically from the point of view of architecture, theories of display, and concepts of ritual spectatorship. (3-0) T

HUAS 6330 Studies in the Visual Arts (3 semester hours) Explorations in various forms of the visual arts. The course may focus on a specific form (e.g., painting, sculpture, film, photography) or interrelations among visual forms. Emphasis will be on the understanding of the creative process underlying the finished work. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6331 Studies in Music (3 semester hours) Studies in forms of musical expression. Topics will vary, but the course will emphasize the nature, development, and artistic possibilities of various forms of music. Courses may relate music to developments in other arts. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUAS 6340 Studies in Theater and Dance (3 semester hours) An investigation of theater, performance art, intermedia, and/or dance as forms of art. The course will relate to and incorporate trends in other arts and contemporary intellectual and cultural movements, theories and critical issues. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUAS 6345 Shakespeare in Performance (3 semester hours) Studies of Shakespeare’s plays, examining varied artistic and scholarly interpretations in film and performance. The course will blend lectures, discussions, and practical skill-based exercises and may include scholarly and/or creative projects. Meant for aspiring writers, actors, directors, and teachers, with or without experience in performing. (May be repeated for credit to a maximum of 6 semester hours.) (3-0) T

HUAS 6350 Creating Poetry (3 semester hours) An investigation in a workshop environment of the aesthetics of the art and creation of poetry, focusing on the creative techniques and processes involved in producing poems and song lyrics in a variety of formalist, free verse, and experimental forms that combine verbal, written art with the visual and performing arts. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6351 Creating Novels (3 semester hours) An investigation in a workshop environment of the aesthetics of the art and creation of the novel, focusing on the creative techniques and processes involved in producing novels in a variety of lyrical, experimental, and traditional forms that combine verbal, written art with the visual and performing arts. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6352 Creating Television and Movie Scripts (3 semester hours) An investigation in a workshop environment of the aesthetics of art and creation of movie, multimedia, video, and television scripts, focusing on the creative techniques and processes involved in producing scripts in a variety of experimental and traditional forms that combine verbal, written art with acting, filmmaking, and production. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6353 Creating Plays and Musicals (3 semester hours) An investigation in a workshop environment of the aesthetics of art and creation of drama, focusing on the creative techniques and processes involved in producing plays and musicals in a variety of experimental and traditional forms that combine verbal, written art with the musical and dramatic arts. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HUAS 6373 Studies in Film (3 semester hours) An investigation into aspects of motion picture history, criticism, and aesthetics. Topics will vary but may include genre study, studies in national cinemas, or analysis of the social significance of films. Course may include exercises in filmmaking. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6375 Imagery and Iconography (3 semester hours) The study of the visual image and its use. Topics may include the nature of the visual image, our perception and interpretation of visual images, the relation of the visual to the verbal image, and the ways in which visual images are used in art to shape our imagination. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUAS 6391 Creativity: Visual Arts Workshop (3 semester hours) A workshop emphasizing the creation of artistic works in a specific area of the visual arts (e.g., painting, drawing, photography, sculpture). Topics, such as narrative representation or the study of a genre, are explored to examine the theoretical basis guiding practice. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) Y

HUAS 6392 Creativity: Image/Text Workshop (3 semester hours) An exploration of the visual possibilities inherent in the art of the text. Topics may include an investigation of techniques derived from various media that foster the transformation and combination of words and images. The problem of creating text for a visual environment will be examined. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6393 Creativity: Time-Based Arts Workshop (3 semester hours) Exploration of the conceptual demands inherent in time-based visual art. Topics may include interactive visual arts, installation, kinetic art, computer animation, and video processes. The potential of narrative models may be examined. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6394 Creativity: Performance (3 semester hours) A skills-based course intended to enable the exploration, development, and realization of a performance expression. Project-focused, the course may include playwriting, adaptation of non-dramatic or oral history sources, or be guided by specific text(s), improvisation, inter-cultural or inter-media explorations. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) Y

HUAS 6395 Creating Short Fiction (3 semester hours) An investigation in a workshop environment of the aesthetics of the art and creation of the short story and the novella, focusing on the creative techniques and processes involved in producing short stories in a variety of experimental and traditional forms that combine verbal, written art with the visual and performing arts. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6396 Creating Nonfictions (3 semester hours) This workshop will draw from one or several nonfiction genres such as portraiture, historical accounts, essays, biography, and autobiography and will show how they are realized using techniques by the creation of art. Topics may vary but may include visual artists, filmmakers, composers, or other artists. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6608 Performance Training (6 semester hours) Intensive workshop-based course focusing on training and performance techniques to develop skills and methods for creating new performance. Activities include physical and vocal training, performance games and exercises, and will focus on methods, strategies, and processes of creation. Special attention to the performer’s relation to 'text' exploration and evolution. (May be repeated for credit to a maximum of 12 credit hours.) (6-0) T

HUAS 7301 Art and Society (3 semester hours) This course explores the many forms of interaction between the arts and the society in which they exist. Topics may include the role of the artist in society, the representation of social and religious values in art, or the influence of art and the artist upon society. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7304 Critical Theory and the Visual Arts (3 semester hours) A mapping of the relations between the visual arts and new critical theories from structuralism to post-structuralism. Focus will vary but may include semiotics, deconstruction, feminism, or psychoanalysis. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7310 Art and Authorship (3 semester hours) The study of the role of the maker in the creation of art. Topics vary but may include visual artists, filmmakers, composers, writers, or other artists. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7350 Creating Nonfictions: Advanced (3 semester hours) An intensive investigation into the theory, aesthetics, and creation of biographies, autobiographies, and historical accounts in a workshop environment that will explore the boundaries between fiction and non-fiction and between art and reality. Permission of the instructor and previous completion of HUAS 6396 are required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HUAS 7351 Creating Short Stories: Advanced (3 semester hours) An intensive investigation into the theories, aesthetics, and creation of the short story in a workshop environment that will focus both on structure and on creative techniques and creative process involved in producing sophisticated, challenging, and linguistically developed short stories. Permission of the instructor and previous completion of HUAS 6395 are required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7352 Creating Poetry: Advanced (3 semester hours) An intensive investigation into the forms (both ancient and modern), theories, and creations of poetry in a workshop environment that will focus on the creative techniques and processes involved in producing formalist, lyrical, free verse, and experimental poetry. Permission of the instructor and previous completion of HUAS 6350 are required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7353 Creating Novels: Advanced (3 semester hours) An intensive investigation of the changing structural history, artistic development, and creation of the novel in a workshop environment that will focus on the creative techniques and the creative process involved in producing novels in a variety of realistic, minimal, lyrical, experimental, and traditional forms. Permission of the instructor and completion of a minimum of six hours of creative writing (fiction or nonfiction) at the graduate level are required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7354 Creating Scripts: Advanced (3 semester hours) An intense investigation of the theory, history, aesthetics, art, and creation of play, movie, and television scripts in a workshop environment that will focus on the creative techniques and processes involved not only in the creation of film, play, and television scripts, but also in the production of plays, films, and television episodes. Permission of the instructor and previous completion of either HUAS6352 or HUAS6353 required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7390 Special Topics in Aesthetic and Performance Studies (3 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. or Ph.D. degree. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) R

HUAS 8303 Independent Readings in Aesthetic and Performance Studies (3 semester hours) (May be repeated for credit.) (3-0) R

HUAS 8305 Independent Research in Aesthetic and Performance Studies (3 semester hours) (May be repeated for credit.) (3-0) R

History of Ideas

HUHI 6300 History of Early Modern Thought (3 semester hours) Introduction to and examination of the authors and texts influential in shaping Western culture through the eighteenth century. The course will treat philosophy as well as social, political, and religious thought during particular periods. Topics will vary. (May be repeated for credit to a maximum of 6 hours.) (3-0) T

HUHI 6301 History of Modern Thought (3 semester hours) Introduction to and examination of the authors and texts influential in shaping modern Western culture since 1800. The course will treat philosophy as well as social, political, and religious thought during particular periods. Topics will vary. (May be repeated for credit to a maximum of 6 hours.) (3-0) T

HUHI 6305 Ideas In Contexts (3 semester hours) The study of an idea or ideas as developed in specific cultural circumstances, for example, the idea of revolution considered in theory as well as in its actualization in the American Revolution, the French Revolution, the Bolshevik Revolution, Maoism, etc. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUHI 6313 Thought, Culture, and Society in Europe (3 semester hours) Themes in the intellectual and cultural life of European societies. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) Y

HUHI 6314 Thought, Culture, and Society in the United States (3 semester hours) Themes in the intellectual and cultural history of the United States. The course will focus on the writings of key thinkers chosen from different periods and on placing these writings within their intellectual and social contexts. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) Y

HUHI 6325 Movements in Thought and Culture (3 semester hours) The study of movements in thought and culture through a variety of perspectives, but emphasizing their intellectual bases: e.g., the Enlightenment, Romanticism, etc. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUHI 6340 Readings in American Culture (3 semester hours) An examination of the ways in which Americans have defined themselves, and been defined by others, over time. Works read will be drawn from a variety of genres and will include studies of myth and symbol. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T
HUHI 6342 American Political Cultures (3 semester hours) An inquiry into the development of political cultures in the United States since the late eighteenth century. Emphasis on how the apparatus of the state (courts, legislatures, elections, schools, asylums, the military) has provided formal frameworks for ongoing cultural contests among diverse Americans over the meanings of citizenship, family, work, property, nature, health, and privacy. (3-0) T

HUHI 6345 The Woman Question (3 semester hours) The study of how particular cultures and/or thinkers have defined the “woman question.” Subjects may include particular geographical regions, major literary or historical movements and events. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUHI 6347 Topics in Feminist Philosophy (3 semester hours) Examination of various topics in metaphysics, ethics, philosophy of science, philosophy of language, philosophy of mind, or philosophy of religion from feminist perspectives. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUHI 7320 Constructions of Sexuality (3 semester hours) The study of how sexuality has been defined by and linked to particular ideas in Western culture. Subjects may include the interrelationships between sexuality and ideas such as perversion, love, and violence; the examination of particular genres such as pornography, film, or novels; and/or an exploration of theoretical and historical scholarship. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUHI 7330 The History of Hermeneutics (3 semester hours) Studies in the history of hermeneutics as a biblical-philological method and its transformation by the modern German tradition into a philosophical approach to language and experience. Focus on the work of Schleiermacher, Dilthey, Heidegger, and Gadamer. (3-0) T

HUHI 7332 Topics in Recent Continental Philosophy (3 semester hours) Close textual study of the works of leading continental philosophers such as Nietzsche, Derrida, Foucault, Heidegger, Husserl, and others. Topics will vary. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) R

HUHI 7335 Philosophical Topics in the Analytic Tradition (3 semester hours) Examination of philosophical issues arising from or inspired by the works of Russell, Wittgenstein, Frege, Carnap, and their heirs, including Popper, Quine, and Sellars. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) R

HUHI 7340 New Currents in the History of Ideas (3 semester hours) Exploration of significant recent approaches that represent major disciplinary and interdisciplinary contributions to the field. With emphasis on theory and method, focus falls upon critical study of new interests that include “new” social and cultural histories, mentalities, poststructuralism, feminism, critical theory, institutionalist history, hermeneutics, among others. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUHI 7345 The Holocaust (3 semester hours) An examination of the event, its background and consequences, with emphasis on the political, psychological, theological, and artistic responses it has engendered. (3-0) Y

HUHI 7355 Perceptions of the Past (3 semester hours) Approaches to perceiving, reconstructing, appreciating, and analyzing the past. Formal historiographical methods, the fictionalization of the past, or the understanding of memory and nostalgia may be emphasized. (3-0) T

HUHI 7368 Topics in Thought and Society (3 semester hours) Studies in ideas, institutions, and applied history. The approach may be comparative or limited to a single cultural or geographical area. Topics will vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) R

HUHI 7375 Space, Time, and Culture (3 semester hours) Study of the relationship between changing philosophic and scientific concepts of space and time and forms of cultural expression such as art, literature, and music. (3-0) T

HUHI 7379 Philosophical Issues and the Humanities (3 semester hours) An investigation of the ways the humanities contribute to an understanding of such philosophical problems as hermeneutics, moral education, life and death, race, gender and sexual orientation, and the environment. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUHI 7386 Artist and Writer in Society (3 semester hours) Inquiries into the role of creative artists (e.g., painters, sculptors, musicians, writers, filmmakers) in various places and times. Topics may vary. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUHI 7387 Science and Technology in Western Culture (3 semester hours) Topics will vary but may include consideration of the philosophical or historical basis for the evolution of scientific thought; the problem of conceptual change in the study of the fundamental character of technology and its impact on culture. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUHI 7391 Women in European Society (3 semester hours) A historical examination of the varied experiences of European women, focusing on work, family life, political action, sexuality, and cultural expression. May emphasize early modern or modern period. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T
HUHI 7393 Feminist Methodologies (3 semester hours) An investigation of the various types of feminist methodologies and their application to philosophical and historical issues. Methodologies to be addressed may include Marxist and socialist feminism, phenomenological feminisms, liberal feminism, and radical feminism. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T
HUHI 7397 Women in American Society (3 semester hours) A historical examination of the varied experiences of American women, focusing on work, family life, political action, sexuality, and cultural expression. May emphasize early modern or modern period. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T
HUHI 7399 Special Topics in the History of Ideas (3 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. or Ph.D. degree. (May be repeated for credit to a maximum of 9 hours.) (3-0) T
HUHI 8303 Independent Readings in History of Ideas (3 semester hours) (May be repeated for credit.) (3-0) R
HUHI 8305 Independent Research in History of Ideas (3 semester hours) (May be repeated for credit.) (3-0) R

Studies In Literature
HUSL 6304 Studies in Literary Themes (3 semester hours) Examinations of specific themes as they appear in various literary works and traditions. Themes considered in courses may include love, heroism, feminism, the anti-hero, or revolution. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HUSL 6308 Studies in Literary Forms and Genres (3 semester hours) Studies in various literary genres, either individually or in relation to each other. Among topics considered will be the difficulties of defining genres, the nature of specific genres, their historical and aesthetic development, and their artistic possibilities. Genres for discussion may include tragedy, comedy, the novel, and various forms of poetic expression. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) Y
HUSL 6309 Literary Movements (3 semester hours) Studies in the nature of intellectual and artistic movements, with emphasis on how they affect literary expression. Examples of such movements are romanticism, naturalism, modernism, and postmodernism. May be repeated for credit to a maximum of 9 credit hours). (3-0) T
HUSL 6310 Studies in Literary Interpretation (3 semester hours) Study of the issues involved in the attempt to interpret dramatic, poetic, and fictional texts. Emphasis will be placed on the writing of interpretive essays and on the exploration of how various cultural and intellectual perspectives as well as different theoretical stances affect the reading of a specific text. (3-0) Y
HUSL 6312 Major Authors (3 semester hours) Study of one or more major literary figures, such as Dante, Chaucer, Milton, Goethe, Austen, Blake, Balzac, Dostoevsky, Tolstoy, Mann, Eliot, Pound, Woolf, or Faulkner. (May be repeated for credit as subjects vary to a maximum of 9 credit hours.) (3-0) Y
HUSL 6315 Literary Theory (3 semester hours) Consideration of major literary theories, such as new criticism, deconstruction, gender studies, and chaos theory, with emphasis on how these theories influence and modify the interpretation of literary and other artistic texts. (3-0) T
HUSL 6330 Studies in Literature and the Other Arts (3 semester hours) An examination of the links between literature and music, the visual arts, film, theater, and/or dance. Topics and approaches will vary but may include, for example, the fantastic in literature and visual arts, structures in literature and music, adaptations of novels into film, and the pastoral in literature and the visual arts. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T
HUSL 6340 Literature Before 1800 (3 semester hours) Studies in the literature and culture of selected periods in the Western tradition. May focus on ancient, medieval, or early modern periods. (May be repeated for credit to a maximum of 9 hours) (3-0) T
HUSL 6350 Literature of the Nineteenth Century (3 semester hours) Studies in the literature and culture of the nineteenth century. May focus on British, European, or American contexts. (May be repeated for credit to a maximum of 9 hours) (3-0) T
HUSL 6355 Literature, Science, and Culture (3 semester hours) Seminar emphasizing the treatment in literature of scientific concepts (e.g., relativity, evolution) and technological developments (e.g., computers, virtual reality) of particular importance. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T
HUSL 6360 Literature of the Twentieth Century (3 semester hours) Studies in the literature and culture of the twentieth century. May focus on British, European, or American contexts. (May be repeated for credit to a maximum of 9 hours) (3-0) T
HUSL 6370 Studies in Literature and Ideas (3 semester hours) Studies of the relationship between selected literary texts and major ideas in philosophy, science, and politics. The course will examine systems of thoughts as they are incorporated, delineated, and explored in literature. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) Y
HUSL 6372 Literature and Society (3 semester hours) Seminar studying the values and concerns of various social groups through a study of literary texts, including consideration of the role of literature and the writer in given societies. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) Y

HUSL 6378 Literature and the Holocaust (3 semester hours) Seminar considering both major literary works (novels, short stories, and poems) written under the impact of the Holocaust as well as literary theories responding to these texts. Some emphasis placed on films and other works of visual art. (3-0) T

HUSL 6390 Theory and Practice in Literary Studies (3 semester hours) Group projects integrating the interpretation of literary texts or themes with experiments in creative writing and performance. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUSL 6396 Spanish Language, Literature, and Culture (3 semester hours) Studies in the language, various literary movements, or the general cultures of Spanish-speaking peoples in Europe or Latin America. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) R

HUSL 6398 World Literatures (3 semester hours) Studies in literatures from specific regions, ethnic groups, and nationalities within and outside the United States. (May be repeated for credit as topic varies to a maximum of 9 credit hours.) (3-0) T

HUSL 7321 The Art and Craft of Translation (3 semester hours) Workshop designed to provide students with a model not only of literary interpretation but also of an interdisciplinary approach through the act of translating that can be applied to a wide range of texts and issues. Emphasis is on the actual translation of literary texts from another language into English. Issues involved in this process will form the basis of the workshop’s theoretical component. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) S

HUSL 7322 Advanced Translation Workshop (3 semester hours) An intensive investigation in a workshop environment of the aesthetics of the art and craft of literary translation focusing on the techniques and processes involved in producing English translations of poetic, dramatic, fictional, and essayistic works. Students are expected to produce publishable translations primarily of works by contemporary international writers. Discussions will include the history and theory of literary translation. Permission of the instructor or previous completion of HUSL 7321 required. (3-0) T

HUSL 7323 Critical Approaches to Translation (3 semester hours) The study of the various approaches to the history, theory, and criticism of literary and humanistic translation. Topics may include the translator's working methods, interviews with translators, multiple translations, the changing nature of interpretive approaches, theoretical models of translation, and criteria for the evaluation of translations. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (3-0) T

HUSL 7332 Digital Rhetorics (3 semester hours) Covers a wide range of topics concerned with rhetoric and writing in digital environments. It is designed specifically to address forms of expression (written and visual) and interpretation (reading protocols) with emphasis on critical analysis of various discourses and discourse communities (and disciplines) in which rhetoric is central in the age of information technologies. (3-0) T

HUSL 7333 Special Topics in Rhetoric (3 semester hours) A seminar in historical and theoretical studies of rhetoric. May include one or more topics such as ethos, histories of rhetoric, the rhetoric of technology and science, the Sophists, rhetoric as epistemic, key figures in rhetoric (e.g., Burke, Foucault, Baudrillard, Spivak, etc.). (May be repeated for credit to a maximum of 9 credit hours.) (3-0) R

HUSL 7334 Rhetoric Pedagogy Practicum (3 semester hours) Supervised practicum in teaching rhetoric and composition, with various topics emphasizing rhetorical theory, composition pedagogy, and educational technology presented in a workshop setting. Enrollment required for teaching assistants assigned to sections of Rhetoric 1302, but not limited to such students. (May be repeated for credit.) (3-0) S

HUSL 7370 Studies in Literature and History (3 semester hours) Studies of selected literary texts and art movements in times of high political tension (American Revolution, Civil War, Weimar Germany, etc.) (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUSL 7384 The Nature of Language (3 semester hours) An inquiry into the nature, origins, and evolution of language, the relationship of language to thought and to creativity, language as a social tool, and nonverbal patterns of communication. Survey of linguistic theory and method applicable to the study of the phonological, morphological, lexical, semantic, and syntactic levels of language. (3-0) Y

HUSL 7385 Applied Linguistics (3 semester hours) Techniques for comparing two or more languages. The study of traditional and modern theories and practices of language learning and teaching. (3-0) Y

HUSL 7390 Special Topics in Literary Studies (3 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. or Ph.D. degree. (May be repeated for credit to a maximum of 9 hours.) (3-0) R
**HUSL 7391 Special Topics in Translation Studies** (3 semester hours) The investigation of the field of Translation Studies. Topics may include the anthropological foundation of translation; the study of crossing cultural barriers; translation methodologies as a model for interdisciplinary research; communication as translation; translation and reading; historical aspects of translation; models of cultural differences; critical approaches to the theories of translation from the Greeks to the present; and specific research and translation projects. If taken as an independent studies course may count toward minimum course requirements for the M.A. or Ph.D. degree. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

**HUSL 8303 Independent Readings in Literary Studies** (3 semester hours) (May be repeated for credit.) (3-0) R

**HUSL 8305 Independent Research in Literary Studies** (3 semester hours) (May be repeated for credit.) (3-0) R

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**Education and General Courses**

**HUED 5353 (ED 5353) Teaching English as a Second Language** (3 semester hours) Investigation of modern techniques of teaching English as a second language in relation to the general development of language skills (listening, speaking, reading, and writing) in secondary schools. Contributions of modern linguistic science to both theory and practice. (3-0) Y

**HUED 5360 Teaching Spanish** (3 semester hours) Study of modern theories and practices of teaching Spanish, with a focus on pedagogical applications for students teaching foreign-language skills in secondary schools or community colleges. (3-0) T

**HUMA 6320-6323 Review Courses in Foreign Languages** (3 semester hours) Intensive grammar review to assist students in moving from intermediate to advanced work with foreign-language texts. Prerequisite: intermediate proficiency (usually equivalent to four semesters of undergraduate courses). The courses do not meet the language requirement or count in degree plans, but they are offered to help students prepare for the textual interpretation and translation undertaken in the language workshops. They are graded on a pass/fail basis. (3-0) Y

**HUMA 6320 French Review**

**HUMA 6321 Spanish Review**

**HUMA 6323 German Review**

**HUMA 7320-7323 Advanced Workshops in Foreign Languages** (3 semester hours) Advanced reading, interpretation, and translation of texts in the languages listed below. Prerequisite: at least intermediate proficiency (usually equivalent to four semesters of undergraduate courses); the appropriate review course HUMA 6320-6323 is also recommended. Although students earn regular grades in the workshops, they do not count toward minimum course requirements for the M.A. or Ph.D. degree, since they are offered to help students prepare for the program’s proficiency examinations. Each workshop concludes with a translation examination, which comprises both the course final and the program’s proficiency examination in the foreign language. (3-0) Y

**HUMA 7320 French Workshop**

**HUMA 7321 Spanish Workshop**

**HUMA 7323 German Workshop**

**HUMA 7330-7335 Advanced Independent Studies in Foreign Languages** (3 semester hours) Independent reading or research courses in which doctoral students may demonstrate advanced scholarly use of their chosen foreign languages. The courses satisfy the Ph.D. foreign-language requirement only after enrolled students have passed the appropriate proficiency examinations. Although students earn regular grades rather than pass/fail marks, the courses do not count toward the minimum requirements for the degree. (3-0) R

**HUMA 7330 Advanced French** (May be repeated for credit to a maximum of 6 hours.)

**HUMA 7331 Advanced Spanish** (May be repeated for credit to a maximum of 6 hours.)

**HUMA 7332 Advanced Italian** (May be repeated for credit to a maximum of 6 hours.)

**HUMA 7333 Advanced German** (May be repeated for credit to a maximum of 6 hours.)

**HUMA 7334 Advanced Classical Greek** (May be repeated for credit to a maximum of 6 hours.)

**HUMA 7335 Advanced Latin** (May be repeated for credit to a maximum of 6 hours.)

Students interested in taking other languages may do so by special arrangement.

**HUMA 7390 Special Topics in Arts and Humanities** (3 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. or Ph.D. degree. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

**HUMA 8303 Independent Readings in Arts and Humanities** (3 semester hours) (May be repeated for credit.) (3-0) R

**HUMA 8305 Independent Research in Arts and Humanities** (3 semester hours) (May be repeated for credit.) (3-0) R
**Thesis, Casebook And Dissertation Courses**

**HIST 8398 Master's Thesis** (3 semester hours) (May be repeated for credit but only 6 hours will be counted toward M.A.) (3-0) R

**HUED 8304 Master Of Arts In Teaching Casebook** (3 semester hours) (May be repeated for credit.) (3-0) R

**HUMA 8V99 Ph.D. Dissertation** (3-9 semester hours) (May be repeated for credit.) ([3-9]-0) R
The School of Behavioral and Brain Sciences offers graduate preparation at the Masters and Doctoral levels designed to meet the needs of students with both research and professional objectives. With instruction and mentoring from internationally recognized faculty, the School’s programs emphasize interdisciplinary training coupled with opportunities for intensive research and clinical supervision. The School’s degree programs draw upon three clusters of expertise in the School: Communication Sciences and Disorders, Cognition and Neuroscience, and Psychological Sciences. The Callier Center for Communication Disorders-Dallas and Callier-Richardson, large comprehensive clinical and research centers, as well as other interdisciplinary Centers on and off campus further enrich the training of students.

The programs in the School include masters training in Applied Cognition and Neuroscience, Communication Disorders, and Human Development and Early Childhood Disorders. Doctoral training is provided in the professional doctorate in Audiology (Au.D.) and the Ph.D.’s in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychological Sciences. The School also offers a certificate program for graduate students with interests in Evaluation Research.

**DEGREES OFFERED**

- Master of Science in Applied Cognition and Neurosciences
- Master of Science in Communication Disorders
- Master of Science in Human Development and Early Childhood Disorders

Doctoral Programs

- Doctor of Audiology
- Doctor of Philosophy in Cognition and Neuroscience
- Doctor of Philosophy in Communication Sciences and Disorders
- Doctor of Philosophy in Psychological Sciences

Certificate in Evaluation Research
Graduate Program in Applied Cognition and Neuroscience

http://bbs.utdallas.edu/

Faculty

Professors: Hervé Abdi, Peter Assmann, James C. Bartlett, W. Jay Dowling, George M. Gerken (emeritus), Richard M. Golden, Susan W. Jerger, Aage R. Møller, George Moushegian (emeritus), Alice O’Toole,
Associate Professors: Lawrence J. Cauller, William F. Katz, Michael Kilgard, Lucien T. Thompson
Assistant Professors: Marco Atzori, Daniel Krawczyk, Christa McIntyre
Distinguished Scholar in Residence: James Jerger

Objectives

The Master of Science in Applied Cognition and Neuroscience (ACN) program is an applied multidisciplinary program which incorporates and integrates methodologies from such diverse fields as psychology, neuroscience, and computer science. The Cognition and Neuroscience specialization area provides a flexible multidisciplinary curriculum for studying the mind and brain which is designed to be adaptable to the individual student’s interests. Students enrolling in the Cognition and Neuroscience specialization area with backgrounds in psychology and neuroscience will have the opportunity to gain the diverse skills needed to collect and interpret behavioral and neurophysiological data. The Computational Modeling/Intelligent Systems specialization area provides advanced training applicable to developing mathematical and computer simulation models of the brain and behavior as well as the development of artificially intelligent systems. The Human Computer Interaction specialization area provides excellent preparation for work in areas involving human computer interactions such as usability engineering issues associated with the design and evaluation of user-friendly web-based systems. The Neurological Diagnosis and Monitoring specialization area provides advanced training and preparation for using functional brain imaging methodologies such as: EEG, SPECT, PET, and fMRI for both clinical and experimental investigations. All four specialization areas provide excellent preparation for doctoral work in the Cognition and Neuroscience area.

Career Opportunities in the Applied Cognition and Neuroscience Area

The Master of Science in Applied Cognition and Neuroscience (ACN) program is a multidisciplinary program which should be of interest to business professionals interested in retraining or continuing education and are currently working full-time in a professional-level job. Business professionals in different fields should pursue the appropriate “specialization area” within the ACN degree program. Many courses in the ACN program are offered periodically as evening courses which meet either once or twice a week.

• Software development professionals whose focus is the development of web sites can acquire advanced training in the design and evaluation of web-site effectiveness using advanced behavioral science methodologies through the Human-Computer Interaction specialization area.
• Psychological counselors, and Education professionals (e.g., high school science teachers, adult literacy educators) will greatly benefit from the basic neuroscience and psychological science courses which are offered by the Cognition and Neuroscience specialization area.
• Medical Health professionals (e.g., MRI Technicians and Radiologists) who are working in the area of brain imaging technology will find the Neurological Diagnosis and Monitoring specialization area to be relevant for improving their knowledge and understanding of functional brain imaging technologies such as: EEG, SPECT, PET, and fMRI.
• Software development professionals interested in the area of the implementation of complex mathematical algorithms in software. Such mathematical algorithms are now widely embedded in a variety of software programs for the purposes of providing “intelligent assistance” to the end-user. Software development professionals interested in continuing education in this area should consider the Intelligent Systems specialization area in the ACN program.

Facilities

In addition, to numerous individual faculty research labs, the Applied Cognition and Neuroscience Program utilizes several facilities which are shared among faculty and graduate students. The Computational Systems Laboratory consists of a network of more than a dozen SUN workstations which are used for computationally
intensive models of perceptual, cognitive, and neural processes as well as high-volume data analyses. The Computational Systems Laboratory is located in Green Hall at the University of Texas at Dallas Richardson campus and can be accessed remotely by graduate students and faculty members. The Neuroscience Laboratory facilities are located in Green Hall and the Multipurpose Building at the Richardson campus as well. The Callier Center for Communication Disorders, located adjacent to the University of Texas Southwestern Medical School, provides access to brain imaging laboratories and speech, hearing, and language laboratories.

Admission Requirements
The University’s general admission requirements are discussed on page 13.

Admission to the Applied Cognition and Neuroscience Program is based on a review of the applicant’s GPA, letters of recommendation, and narrative description of interests and career goals. GRE scores may be submitted with the applicant’s application but are not required.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

All students in the program are required to regularly review their degree plans with their program advisor. In all areas of specialization students complete 6 hours of approved core courses, 6 hours of approved laboratory courses, 6 hours of approved advanced elective courses, 12 hours of coursework in an approved specialization area, and 6 hours of internship courses. A grade of “B” is the required passing grade for coursework used to fulfill the core course and laboratory course requirements of the degree. Coursework used to fulfill the advanced elective requirement may be taken pass/fail. Internship coursework must be taken pass/fail.

Required Core Courses (18 hours)
Select two of the following approved core courses:
ACN 6330 Cognitive Science I
ACN 6340 Cellular Neuroscience
ACN 6345 Cognitive Science II
ACN 6346 Integrative Neuroscience

Select two of the following approved laboratory courses:
ACN 6312 Research Methods I
ACN 6313 Research Methods II
ACN 6381 Observational Research Methods
ACN 6315 Grant Writing for Researchers
ACN 7345 Neuroanatomy Laboratory
ACN 7378 Advanced Neuropsychology Methods
ACN 5314 Cognitive and Neural Modeling Laboratory
ACN 7367 Speech Perception Laboratory
ACN 7335 Computational Neuroscience
ACN 7322 Computational Models of Language Understanding
ACN 6343 Human Computer Interactions Lab

Select two advanced elective courses: These courses may be chosen from either the Graduate Program in Human Development and Communication Sciences or the Applied Cognition and Neuroscience Program or the courses may be chosen from outside the School of Behavioral and Brain Sciences with approval from the ACN program head.

Area of Specialization (12 hours)
The following four specialization areas have been approved for the Applied Cognition and Neuroscience program but alternative specialization area proposals may be submitted for consideration to the Applied Cognition and Neuroscience program head.

Cognition and Neuroscience Specialization Area
Students selecting this specialization area should take two: ACN 6330 Cognitive Science I and ACN 6346 Systems Neuroscience to fulfill core course requirements. Students should take ACN 6312 Research Methods I and ACN 6313 Research Methods II. Students selecting this specialization area are approved to select any course from the
ACN program (i.e., courses with the prefix ACN) or the Cognition and Neuroscience Area of the Graduate Program in Human Development and Communication Sciences (i.e., courses with the prefix HCS).

Human-Computer Interactions Specialization Area

Students selecting this specialization area should take ACN 6330 Cognitive Science I and ACN 6346 Systems Neuroscience to fulfill core course requirements. Students should take ACN 6312 Research Methods I and ACN 6313 Research Methods II. It is recommended that students with strong backgrounds in computer science or engineering do not take ACN 6312. In addition, students should take two of the following three courses: ACN 6341 Human Computer Interactions I, ACN 6342 Human Computer Interactions II, and ACN 6343 Human Computer Interactions Lab. Students pursuing the behavioral sciences track should take two of the following courses: ACN 6322 Perception, ACN 6333 Memory, ACN 6367 Speech Perception, and HCS 7349 Text Comprehension Seminar. Students pursuing the user-interface development track should take: CS 5343 Algorithm Analysis and Data Structures and CS 6354 Software Engineering. Note that the prerequisites for CS5343 are: CS5303 Computer Science I (or equivalent) and CS 5333 Discrete Structures. Students specializing in the Human Computer Interactions area should regularly review the Arts and Technology courses offered in the School of Arts and Humanities which have the course prefix ATEC and discuss relevant course offerings with the ACN Program Head.

Computational Modeling/Intelligent Systems Specialization Area

Students concentrating in this area should take ACN 6330 Cognitive Science I and ACN 6346 Systems Neuroscience to fulfill core course requirements. All students in this specialization area should take ACN 6313 Research Methods II and either: ACN 5314 Cognitive and Neural Modeling Lab or ACN 6347 Intelligent Systems Analysis. Students pursuing the computer simulation modeling track should take at least one of the following courses: ACN 7335 Computational Neuroscience, ACN 7367 Speech Perception Lab, ACN 7322 Computational Models of Language Understanding. Students pursuing the mathematical modeling track will satisfy the advanced elective requirement in this specialization area by taking the sequence: ACN 6346 Neural Net Mathematics, ACN 6347 Intelligent Systems Analysis and ACN 6349 Intelligent Systems Design. Note that STAT 5351, linear algebra, multivariable calculus, and ACN 5314 Cognitive and Neural Modeling Lab are recommended prerequisites for: ACN 6346. The following Computer Science and Electrical Engineering courses are pre-approved electives for students specializing in the Intelligent Systems area who have the appropriate prerequisite background in computer science and/or electrical engineering: CS6320 (Natural Language Processing), CS 6321 (Discourse Processing), CS6364 (Artificial Intelligence), CS6373 (Intelligent Systems), CS6375 (Machine Learning), CS6384 (Computer Vision), EE6362 (Speech Processing), EE6363 Digital Image Processing, EE6364 (Pattern Recognition), and EE 6365 (Adaptive Signal Processing).

Neurological Diagnosis and Monitoring Specialization Area

Students selecting this specialization area should take ACN 6330 Cognitive Science I and ACN 6346 Systems Neuroscience to fulfill core course requirements. Students should take ACN 6312 Research Methods I and ACN 6313 Research Methods II. Students should also take ACN 7344 Functional Human Neuroanatomy and ACN 6373 Intraoperative Monitoring I. Students should choose at least 2 of the following courses as specialization area electives: ACN 6310 Fundamentals of Functional Brain Imaging, ACN 6374 Intraoperative Monitoring II, ACN 7315 Statistical Analysis of Brain Imaging Data, ACN 7329 Functional Brain Imaging Practica, ACN 6372 Pathophysiology of Disorders of the Nervous System, and ACN 7330 Advanced Functional Brain Imaging.

Internships (6 hours)

Students whose immediate post-graduate goals are graduate school and medical school should fulfill the Internship Requirement by taking six credit hours of HCS 8V80 in order to obtain research experience. Students not intending to pursue graduate or medical school training immediately after receiving their ACN masters degree should discuss internship opportunities with the Program Head during their second semester of enrollment in the ACN program.

ACN 7V71 Industry Internship (1-6 credit hours). This course may be taken only pass/fail.
ACN 7V72 Research Internship (1-6 credit hours). This course may be taken only pass/fail.
HCS 8V80 Research in HCS (1-6 credit hours). This course may be taken only pass/fail.
Course Descriptions

Core Courses
ACN 6330 (HCS 6330) Cognitive Science (3 semester hours) Cognitive and neural processing approaches to understanding perception, attention, memory, thought, and language. (3-0) Y
ACN 7344 Functional Human Neuroanatomy (3 semester hours) Function of each major brain system as related to the organization and synaptic connections of their principal nuclei. Function of each system related to the neurological disorders associated with disease or lesions at specific locations. (3-0) T
ACN 6346 (HCS 6346) Systems Neuroscience (3 semester hours) Integrative systems level study of the nervous system. Aspects of neural mechanisms and circuitry underlying regulation of motor behaviors, sensory and perceptual processing, biological homeostasis, and higher cognitive functions. (3-0) Y

Methods Courses
ACN 6312 (HCS 6312) Research Methods in Behavioral and Brain Sciences - Part I (3 semester hours). Applying, understanding, and interpreting various statistical techniques in behavioral science context. Participants have the opportunity to learn appropriate statistical details for basic descriptive and inferential statistics, the interrelationships among techniques, and computer skills required for data analyses. (3-0) Y
ACN 6313 (HCS 6313) Research Methods in Behavioral and Brain Sciences - Part II (3 semester hours). Topics in general linear modeling including factorial analysis of variance, analysis of covariance, between and within subject designs, and multiple regression. Prerequisite: ACN 6312 or consent of instructor. (3-0) Y
ACN 6351 (HCS 6351) Alternative Statistical Data Analysis (3 semester hours) Alternative statistical data analysis techniques that complement the classical general linear modeling approach. (3-0) Y
ACN 6373 (HCS 6373) Intraoperative Neurophysiological Monitoring I (3 semester hours). The anatomical and physiological basis for the use of electrophysiological techniques in intraoperative neurophysiologic monitoring and in diagnosis of disorders affecting the nervous system. (3-0) Y
ACN 6374 (HCS 6374) Intraoperative Neurophysiological Monitoring Part II (3 semester hours). The use of recordings of neuro-electric brain potentials and their interpretation for diagnostic purposes and for intraoperative monitoring. (3-0) Y. Prerequisite: ACN 6373 (HCS 6373)
ACN 7322 (HCS 7322) Computational Models of Language Understanding (3 semester hours). Probabilistic methods for natural language understanding. Use of the MATLAB computer language for instantiating specific knowledge-based computational theories of natural language understanding. Prerequisites: Computer Programming Experience is recommended but not required. (3-0) T
ACN 5314 (HCS 5314) Cognitive and Neural Modeling Lab (3 semester hours) Auto-associative, associative, competitive learning, recurrent, and back-propagation artificial neural network algorithms in a “hands-on” micro-computer laboratory environment using special simulation software. Applications to perceptual, cognitive, computational, and neuroscience problems. Prerequisites: Linear Algebra and Computer Programming Experience is recommended but not required. (3-0) T
ACN 7343 (HCS 7343) Neuropharmacology (3 semester hours) Biology of neurotransmission in the central nervous system. Includes ionotropic and metabotropic coupling of all known classes of receptors to both their cellular and systemic effects. Clinical efficacy, side effects, and other issues related to drug use and abuse are covered. Prerequisite: ACN 6340 or ACN 6346. (3-0) T
ACN 6343 Human Computer Interactions Lab (3 semester hours) Provides students with resources to learn and perform hands-on lab-based techniques such as usability testing and cognitive walkthroughs. (3-0) T
ACN 7345 (HCS 7345) Neuroanatomy Laboratory (3 semester hours). Laboratory experience with neural tracing techniques employed in neuroscience research. Prerequisite: HCS 7344 or consent of instructor. (3-0) T
ACN 7378 (HCS 7378) Advanced Neurophysiology Methods (3 semester hours). Hands-on experience with deeply anesthetized and reduced in vitro brainslice or dissociated cell preparations widely used in neuroscientific research. Prerequisite: ACN 6340 and consent of instructor. (3-0) R
ACN 7367 (HCN 7367) Speech Perception Laboratory (3 semester hours) Introduction to the field of speech processing by computer, with primary application to research techniques in the study of speech perception. (0-9) T
ACN 7335 Computational Neuroscience (3 semester hours) Introduction to state-of-the-art computer methods for simulation of biologically realistic neuronal dynamics. Students must demonstrate some degree of computer skills. (3-0) R
Elective and Specialization Area Courses

Note that the following list only represents a subset of the possible approved elective and specialization area courses. Students in the Applied Cognition and Neuroscience program should select their elective and specialization area coursework in consultation with their faculty advisor or the ACN Program Head. All courses with an HCS (Human Development and Communication Sciences) prefix area are automatically approved elective courses. Coursework outside the School of Behavioral and Brain Sciences may also be approved as an appropriate elective course if special permission from the ACN Program Head is obtained.

ACN 6340 (HCS 6340) Cellular Neuroscience (3 semester hours) Basic neural biology and physiology and principles of synaptic transmission. (3-0) Y

ACN 6V81 Special Topics in Applied Cognition and Neuroscience (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S

ACN 6332 (HCS 6332) Perception (3 semester hours) Psychophysical, neurophysiological, and computational foundations of sensation and perception. Basic senses of vision, audition, chemoreception, and tactile processing, with emphasis on understanding the processes that take us from neurons to perception and action. (3-0) T

ACN 6333 Memory (HCS 6333) (3 semester hours) Theoretical frameworks for knowledge acquisition and representation. Includes information processing and neuropsychological perspectives. (3-0) T

ACN 6334 Attention (HCS 6334) (3 semester hours) Theory and evidence on the study of attention especially in human vision and audition. Includes perceptual learning, information processing, and neuropsychological approaches. (3-0) T

ACN 6341 Human Computer Interactions I (3 semester hours) Methods and principles of human-computer interaction (HCI), user-centered design (UCD), and useability evaluation. Provides broad overview of HCI and how HCI informs UCD processes throughout product development lifecycle. (3-0) T

ACN 6342 Human Computer Interactions II (3 semester hours) Detailed exploration of human-computer interaction (HCI) through readings in journal articles and research reports. Practical experience in methodology typically used in the design of usable systems. (3-0) T

ACN 6348 (HCS 6348) Neural Net Mathematics (3 semester hours). Vector calculus and vector calculus-based probability theory with artificial neural network modeling applications. Intended to provide mathematics preparation for ACN 6347 and ACN 6349. Prerequisites: Either: (1) Linear algebra, multivariable calculus, STAT 5351, ACN 5314, or (ii) consent of instructor. (3-0) T

ACN 6347 (HCS 6347) Intelligent Systems Analysis (3 semester hours). Mathematical tools for investigating the asymptotic behavior of both deterministic and stochastic nonlinear dynamical systems for the purposes of building computational models in the fields of neuroscience, psychology, and artificial intelligence. Topics include: artificial neural network architectures, Lyapunov stability theory, nonlinear optimization theory, stochastic approximation theory, and the Gibbs Sampler. Prerequisites: HCS 6348 or consent of instructor (or equivalent). (3-0) T

ACN 6349 Intelligent Systems Design (3 semester hours). Mathematical tools for the design and evaluation of artificially intelligent deterministic and stochastic nonlinear dynamical systems for the purposes of building computational models in the fields of neuroscience, psychology, and artificial intelligence. Topics include: (1) Markov Random Field probability representations, and (2) asymptotic mathematical statistical theory for: parameter estimation, model selection, and hypothesis testing. Prerequisites: HCS 6347 or consent of instructor. (3-0) T

ACN 6395 (HCS 6395) Cognitive Psychology (3 semester hours) Theory and research on perception, learning, thinking, psycholinguistics, and memory. (3-0) Y

Internship

ACN 7V71 Industry Internship May be repeated for credit. This course may only be taken pass/fail. ([1-6]-0) S

ACN 7V72 Research Internship May be repeated for credit. This course may only be taken pass/fail. ([1-6]-0) S
Master of Science in Communication Disorders

http://bbs.utdallas.edu/

Faculty
Professors: Thomas Campbell, Sandra Chapman, Christine D'ollowhan, Robert D. Stillman, Linda Thibodeau, Emily Tobey, Hanna Ulatowska, Anne van Kleeck
Associate Professors: William F. Katz, Pamela Rollins
Assistant Professor: Mandy Maguire
Clinical Faculty: Michelle Aldridge, Lucinda Dean, Sara Haynes, Karen Kaplan, Helen Kenedi, Janice Lougeay, Felicity Sale

Objectives
The Master of Science program in Communication Disorders offers broad-based professional preparation in speech-language pathology within an environment which supports an active program of clinical services and research. Students are provided comprehensive exposure to clinical approaches in communication disorders and to the scientific foundations from which clinical approaches are derived. Practical experience is available in a variety of clinical, educational, and medical settings.

The graduate program in Communication Disorders is accredited in speech-language pathology by the Council on Academic Accreditation of the American Speech-Language-Hearing Association.

Facilities
The principal sites for the academic, clinical, and research activities of the Communication Disorders program is the U.T. Dallas Callier Center for Communication Disorders, adjacent to The University of Texas Southwestern Medical Center, and Callier-Richardson on the university's main campus. These facilities, and others throughout the Metroplex, provide the educational, clinical, research, and medical environments essential for an interdisciplinary program in Communication Disorders.

Admission Requirements
The University’s general admission requirements are discussed on page 13.

Admission to the Communication Disorders Program is based on a review of the applicant’s GPA, GRE scores, letters of recommendation, and statement of purpose. The GRE score is included in the evaluation of the applicant's record. In general, students admitted to the program have a combined Verbal and Quantitative score on the GRE of at least 1000. However, there is no minimum cut-off score for admission nor does a score of at least 1000 assure admission to the program.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The Master of Science program requires a minimum of 48 semester hours. Students completing the master’s degree meet the academic and clinical practicum requirements for the Certificate of Clinical Competence offered by the American Speech-Language-Hearing Association.

Student entering the master's program with a bachelor's degree in speech-language pathology are required to take the following courses: COMD 6221 Voice Disorders, COMD 6222 Stuttering, COMD 6320 Motor Speech Disorders, COMD 6377 Assessment and Treatment of Adult Neurogenic Disorders, COMD 7303 Dysphagia, and COMD 7378 Assessment and Treatment of Language Disorders in Preschool and School-Age Children. Students must also complete 23 hours of approved elective courses including a minimum of two additional courses in the area of language disorders in children and one additional course in the area of language disorders in adults. Students enroll in Practicum (HCS 7380) or Internship (COMD 6630) each semester in order to earn the necessary clock hours for certification and licensure. However, a maximum of 9 semester hours of Practicum/Internship may be counted toward the minimum 48 semester hours required.
Combined Master/Doctoral Study

Students who wish to earn a clinical master’s degree while pursuing doctoral study may apply for combined master's/doctoral study. Students approved to enroll in both masters and doctoral course pursue an individualized plan of study leading to both degrees.

Comprehensive Examination

All students seeking the master’s degree in Communication Disorders must pass a written comprehensive examination. A thesis is optional.

Out-Of-Field Students

Students entering the program who lack undergraduate preparation in speech-language pathology or audiology are required to take a specified 15 semester hours of preparatory courses. These courses may be taken at U.T. Dallas in conjunction with graduate coursework or may be taken at another university.

Course Descriptions

COMD 6221 Voice Disorders (2 semester hours) Etiology of voice disorders and methods for assessing and modifying vocal behavior. (2-0) Y

COMD 6222 Stuttering (2 semester hours) Principles, methods, and procedures for assessment and intervention of stuttering and associated disorders. (2-0) Y

COMD 6305 Speech Science (3 semester hours) Anatomy, physiology, and functional organization of speech. Mechanisms of normal speech production and perception, with applications to the clinical setting. (3-0) Y

COMD 6307 Language Acquisition (3 semester hours) Development of the phonological, morpho-syntactic, semantic, and pragmatic aspects of language, and consideration of the social, psychological, and cultural influences. (3-0) Y

COMD 6317 Language in Communication Disorders (3 semester hours) Basic processes underlying language disruptions in phonology, morphology, syntax, semantics and pragmatics. Biological and social aspects of language. (3-0) Y

COMD 6319 Articulation and Phonologic Disorders (3 semester hours) Etiology, symptomatology, evaluation, and treatment of articulation and phonologic disorders. (3-0) Y

COMD 6320 Motor Speech Disorders (3 semester hours) Anatomic and physiologic bases of the motor speech mechanism. Etiology, symptomatology, evaluation and treatment techniques for a variety of motor speech disorders in children and adults. (3-0) Y

COMD 6348 Counseling for Communication Disorders Professionals (3 semester hours) Psychological aspects of communication disorders in the context of the family system. Basic counseling and problem-solving skills to use as an adjunct to roles as communication disorders professionals. Emphasis on helping students to gain comfort and skill in coping with their clients’ emotions and giving their clients constructive feedback. (3-0) Y

COMD 6630 Advanced Seminar Internship in Communication Disorders (6 semester hours) Intensive internship program in a clinical setting. Pass/Fail only. (May be repeated for credit.) Prerequisite: Consent of instructor (0-18) S

COMD 6377 Neurogenic Communication Disorders I (3 semester hours) Symptomatology and diagnosis of aphasia, right hemispheric disorders, traumatic brain injury, and dementing disorders. (3-0) Y

COMD 6378 Neurogenic Communication Disorders II (3 semester hours) Language and cognitive intervention for individuals with adult neurogenic communication disorders with management of special populations including stroke, traumatic brain injury and dementia. (3-0) Y

COMD 7204 Craniofacial Disorders (2 semester hours) Etiology, symptomatology, evaluation, and treatment of craniofacial disorders emphasizing cleft lip and palate. (2-0) Y

COMD 7207 Advanced Topics in Dysphagia (2 semester hours) Integration and application of dysphagia evaluation and treatment at an advanced level. Management of special populations including stroke, traumatic brain injury, and oral/laryngeal cancers. Family and patient counseling/education. Ethical issues and decision-making. Prerequisite: COMD 7303. (2-0) Y

COMD 7209 Pediatric Medical Speech Pathology (2 semester hours) Terminology and medical diagnoses affecting the practice of speech pathology in the pediatric medical setting. Guest lectures by practicing clinicians will vary from year to year. (2-0) Y
COMD 7252 Cerebral Palsy (2 semester hours) Normal and abnormal fine motor, gross motor, respiratory, and feeding development. Characteristics of cerebral palsy. Feeding and speech/language assessment and intervention for individuals with cerebral palsy. (2-0) Y

COMD 7256 Bilingual Language (2 semester hours) Second language development in various languages and cultural contexts. Issues of assessment and intervention. Language difference vs. language disorder. (2-0) T

COMD 7260 Medical Speech-Language Pathology (2 semester hours) In depth orientation to general practices used in medical settings. Concepts and terminology utilized within the contexts of various medical conditions and environments. (2-0) Y

COMD 7301 Public School Methods (3 semester hours) Practices and procedures of implementing clinical skills in the public schools including applying federal and state laws to best practices in assessment and intervention. (3-0) Y

COMD 7302 Seminar in Aphasiology (3 semester hours) Current issues in neurolinguistics. Models of brain and language; classification, symptoms, and etiology of aphasia. Analysis of aphasic language with respect to phonology, morphology, syntax, and semantics. (3-0) Y

COMD 7303 Dysphagia (3 semester hours) Anatomic and physiologic bases of normal swallow. Etiology, symptomatology, evaluation and treatment techniques for swallowing disorders in children and adults. (3-0) Y

COMD 7305 Communication and the Aging Brain (3 semester hours) Social and biological factors affecting language and communication in normal aging. Pathological changes in aphasia and dementia. Assessment and intervention strategies. (3-0) Y

COMD 7306 Cultural Issues in Communication (3 semester hours) The multicultural nature of society, the role of language and communication in cultural identity, and how practice in the field of communicative disorders is tailored to cultural and linguistic diversity. (3-0) Y

COMD 7308 Preliteracy Development (3 semester hours) Historical, cultural, theoretical, developmental, and pedagogical perspectives on the foundation for literacy in early childhood. (3-0) T

COMD 7319 Birth-to-Three (3 semester hours) Assessment and treatment of infants and toddlers with a variety of speech, language, feeding, and oral-motor disorders. (3-0) Y

COMD 7323 Auditory-Verbal Methods (3 semester hours) Comprehensive survey of the auditory-verbal approach to the habilitation of children with hearing losses from infancy through the early elementary years; includes philosophy, research, special problems, and specific methodology. (3-0) Y

COMD 7324 (AUD 7324) Seminar in Cochlear Implants and Technology for Persons With Hearing Impairments (3 semester hours) Prosthetic alternatives available for individuals with profound hearing impairments. Topics include speech perception in children and adults, signal processing, aural rehabilitation techniques, prosthetic devices such as cochlear implants, and techniques for using such devices. (3-0) Y

COMD 7325 Hearing and Deafness (3 semester hours) Introduction to issues, assessment, and management of hearing impairment. Includes principles and prerequisites for intervention, amplification, aural habilitation programs, sign language, and deaf culture. (3-0) Y

COMD 7345 Pediatric Traumatic Brain Injury (3 semester hours) Assessment and management of acquired brain injury in children including linguistic, cognitive, psychosocial, educational, and neurological factors within a brain plasticity framework. (3-0) T

COMD 7354 Seminar in Brain and Communicative Development (3 semester hours) Seminar on brain/communicative behavior relationships in development. Emphasis on factors underlying communicative abilities and disorders. Pass/Fail only. (3-0) Y

COMD 7362 Seminar in Autism (3 semester hours) Issues concerning the diagnosis and theories of autism. The development of social, communication/language, and cognitive skills in autism, as well as various therapeutic approaches. (3-0) Y

COMD 7367 Advanced Management of Neurogenic Communicative Disorders (3 semester hours) Design of language intervention strategies for individuals with adult neurogenic communication disorders and presentation of difficult diagnostic cases. Demonstration/participation with clients. Prerequisite: COMD 7628. (3-0) Y

COMD 7368 Cognitive Rehabilitation (3 semester hours) Basics of cognition including attention, memory, reasoning, and executive function skills and how it relates to communication. Studying both normal cognitive skills and impaired cognition, including evaluation and treatment theories. (3-0) R

COMD 7373 Seminar in Hearing and Speech Science (3 semester hours) Current topics in hearing and speech science. (May be repeated for credit.) Prerequisite: Consent of instructor. (3-0) T

COMD 7377 Assessment and Intervention of Children With Severe Language Disorders (3 semester hours) Language assessment and intervention with children birth-to-three or older children who have severe language handicapping conditions. Formal, informal, and observational assessments used for children with severe language disorders. Applying, understanding, and interpreting assessment information as it relates to designing and implementing intervention. (3-0) T
COMD 7378 Assessment and Intervention of Language Impairments in School-Age Children (3 semester hours) Assessment and intervention for children with diverse language impairments. Assessment will emphasize developmental capabilities as well as individual differences using both standardized and non-standardized procedures. Intervention strategies in various settings appropriate for school-age children and adolescents. (3-0) Y

COMD 7V82 Special Topics in Communication Disorders (1-3 semester hours) Selected topics and current research in communication disorders. Topics will vary from semester to semester. (May be repeated for credit.) ([1-3]-0) R

COMD 7384 Augmentative Communication (3 semester hours) Components and dimensions of augmentative and alternative communication (AAC) systems. AAC assessment and intervention for individuals with congenital and acquired complex communication needs. Includes hands on AAC equipment labs. (3-0) Y

COMD 7389 Alzheimer’s Disease and Related Disorders (3 semester hours) Clinical characteristics, diagnosis, cognitive-linguistic evaluation and discourse based assessment, direct and indirect intervention of adults with different dementias such as Alzheimer’s disease, frontotemporal dementias, and vascular dementia. (3-0) R

COMD 7V86 Special Topics in Child Language (1-3 semester hours) Current issues in child language emphasizing research on intervention practices. Specific topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) ([1-3]-0) R

COMD 7V90 Special Topics in Hearing and Speech Science (1-6 semester hours) Special topics and current research in hearing and speech science. (May be repeated for credit to a maximum of 9 hours.) ([1-6]-0) R

COMD 7V91 Methods in Communication Disorders (1-3 semester hours) Issues related to methods of assessment and intervention in communication disorders. (May be repeated for credit.) ([1-3]-0) R

COMD 7V98 Directed Study in Communication Disorders (1-9 semester hours) Individualized program of study which may include reading, research or implementation of clinical strategies and/or other designated activities. Pass/Fail only. (May be repeated for credit.) ([0]-[3-27]) S

COMD 8V80 Research in Communication Disorders (1-9 semester hours) Supervised research and readings. (May be repeated for credit.) ([0]-[9-27]) S

COMD 8V98 Thesis (3-6 semester hours) (May be repeated for credit.) ([3-6]-0) S

Graduate Program in Human Development and Early Childhood Disorders

http://bbs.utdallas.edu/

Faculty

Professors: Thomas G.R. Bower, Duane Buhrmester, Bert S. Moore, Margaret Tresch Owen, John W. Santrock, Robert D. Stillman, Marion K. Underwood

Associate Professors: Teresa Nezworski, Pamela Rollins, Melanie J. Spence

Assistant Professors: Shayla Holub, Mandy Maguire

Clinical Faculty: Michelle Aldridge, Cheryll Bryant

Senior Lecturers: Toosje Van Beveren

Objectives

The Master of Science program in Human Development and Early Childhood Disorders is designed for students with professional interests in early child development and disorders. The curriculum offers a strong foundation in the normative path of physical, cognitive and social development with specialized training in diagnostic and intervention techniques needed to work with disorders of early childhood. The professional plan of study is designed for students interested in a career in the delivery of services to young children who show developmental delays and disorders and their families. This program will be of special interest to students wishing to work with infants and young children and their families in early childhood intervention programs and other professional settings, including schools, hospitals, and medical clinics. Classroom training is combined with practical experience in a variety of clinical and educational settings. Students graduating from the program qualify to work as Early Intervention Specialists. A research plan of study is also available which focuses on the development of skills necessary to conduct research in child development. The research plan requires a directed project and thesis.
Facilities

The principal sites for the academic and research activities of the The Human Development and Early Childhood Disorders program are located on the main campus in Richardson and at the UTD/Callier Center for Communication Disorders on the campus of the UT Southwestern Medical Center at Dallas and Callier-Richardson on the Richardson campus. Facilities at the main campus include research and observational laboratories, and laboratories dedicated to infant assessment. The Toddler Playgroup program meets weekly in an early childhood classroom in the Student Union and provides on-campus fieldwork opportunities with toddlers with special needs and their parents. The Callier Center operates a laboratory preschool as well as a number of other educational and clinical programs serving young children. These facilities, and others throughout the Metroplex, provide essential educational, clinical, and research environments for training in Human Development and Early Childhood Disorders.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

The Human Development and Early Childhood Disorders program is designed for students with backgrounds in psychology, special education, early childhood education, and communication disorders. Students from other disciplines are also encouraged to apply.

Admission to the Human Development and Early Childhood Disorders program is based on a review of the applicant’s GPA, GRE scores, letters of recommendation, and narrative description of interests and career goals. In general, a combined Verbal and Quantitative score on the GRE of at least 1000 is advisable based on our experience with student success in the program. However, there is no minimum cut-off score for admission nor does a score of at least 1000 assure admission to the program.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

The two plans of study have a common core of courses. In the professional track there is additional coursework and experience in applied settings designed to prepare students to work with children and their families. The emphasis in the research track is in developing expertise in conducting research in the field of human development and early childhood disorders. A required research project is facilitated by close work with a research mentor from the faculty.

Students are advised that participation in off-campus practicum and internship requires a criminal background check. Students excluded from off-campus sites for any reason may be unable to complete all degree requirements. Students are responsible for the cost of criminal background checks.

The Master of Science program requires a minimum of 48 semester hours. Specific degree requirements follow.

Professional Plan of Study

Required Core Courses (24 hours)

HDCD 5311 The Developing Child: Infants and Toddlers
HDCD 5312 Atypical Development
HDCD 5315 Assessment Theory
HDCD 5316 Developmental Assessment
HDCD 5320 Service Coordination of Community Resources
HDCD 5330 Intervention Paradigms
HDCD 6310 Parent Education
HDCD 6320 The Developing Child: Preschool Years

Practicum (3 hours)

HDCD 7V20 Practicum in Early Childhood Disorders

Internship (6 hours)

HDCD 7V20 Internship in Early Childhood Disorders

Electives (15 hours)

HCS 6350 Social Development
HCS 6331 Cognitive Development
HCS 6358 Affective Development
HDCD 6360 Behavioral Management
HDCD 6370 Infant Intervention
HDCD 6395 Medical and Biobehavioral Factors in ECD
HDCD 7350 Seminar: Early Childhood Disorders
COMD 6307 Language Acquisition
COMD 7362 Seminar in Autism
HCS 6326 Infant Perception
HCS 7376 Child Psychopathology
HDCD 7V98 Independent Study
HDCD 8V80 Independent Research

Research Plan of Study
Required Core Courses (18 hours)
HDCD 5311 The Developing Child: Infants and Toddlers
HDCD 5312 Atypical Development
HDCD 5315 Assessment Theory
HCS 6331 Cognitive Development
HCS 6350 Social Development
COMD 6307 Language Acquisition

Research Methods Core (6 hours)
HCS 6312 Research Methods in Human Development and Communication Sciences - Part I
HCS 6313 Research Methods in Human Development and Communication Sciences - Part II

Elective Coursework (18 hours)
Directed Project (6 hours)
HDCD 7610 Directed Project

Teacher Certification Early Childhood – 4th Grade
Required of post-baccalaureate students seeking Early Childhood-4th grade Teacher Certification

HDCD 5301 Child Development
HDCD 5302 Educational Psychology
HDCD 5303 Exceptional Children
HDCD 5304 Cognitive Development
Course Descriptions

**HDCD 5301 Child Development** (3 semester hours) Introduction to psychological theory and research on physical, cognitive, social, and emotional development from birth to adolescence. Cannot be used to satisfy degree requirements for HDCD, ACN, and COMD programs. (3-0) Y

**HDCD 5302 Educational Psychology** (3 semester hours) This course introduces the psychological theories and research underlying various teaching strategies and provides a framework for understanding student cognitive and motivational development. Emphasis will be on applications in actual teaching behavior. This course assumes an introductory background in child development. (3-0) S

**HDCD 5303 Exceptional Children** (3 semester hours) Introduction to the characteristics of exceptional children and their education, including children with disabilities (learning, emotional/behavioral, communication and physical) as well as those who are gifted. The causes and assessment of exceptionality are examined, along with educational and social policy considerations. This course assumes an introductory background in child development. (3-0) Y

**HDCD 5304 (HCS 6331) Cognitive Development** (3 semester hours) A contrast of Piagetian, behaviorist, and information-processing approaches to the development of cognitive processes during childhood. This course assumes an introductory background in child development. Cannot be used to satisfy degree requirements for HDCD, ACN, and COMD programs. (3-0) Y

**HDCD 5311 The Developing Child: Infants and Toddlers** (3 semester hours) Relevant developmental theories and processes as well as skills acquired in motor, sensory-perceptual, cognitive, and social domains from the prenatal period through two years of age. (3-0) Y

**HDCD 5312 (HCS 6356) Atypical Development** (3 semester hours) Disorders of development from conception to age three, emphasizing etiology, diagnosis and treatment. Impact of delays in the acquisition and integration of various developmental skills as they relate to specific disorders of personality and socialization, sensory and motor skills, and language and cognition. (3-0) Y

**HDCD 5315 Assessment Theory** (3 semester hours) Latest developments in the field of infant/toddler assessment, including behavioral observation, contextual multi-faceted assessment, and inclusion of the family. Traditional psychometrics and assessment tools/techniques. Pre- or corequisite: HDCD 5311. (3-0) Y

**HDCD 5316 Developmental Assessment** (3 semester hours) Play-based and family assessment protocols. Diagnostic classification through differential diagnosis decision-making. Emphasis on interpretation and integration of diagnostic information. Prerequisites: HDCD 5311, 5315. (3-0) Y

**HDCD 5320 Service Coordination of Community Resources** (3 semester hours) Policies and procedures pertinent to service coordination of community resources in early intervention and family-centered practices that help families become more independent. (3-0) Y

**HDCD 5330 Intervention Paradigms** (3 semester hours) Historical, theoretical, political, and research bases for approaches to early intervention with at-risk and handicapped infants, toddlers, and preschoolers and their families. Insights gained from research on effectiveness of early intervention. (3-0) Y

**HDCD 6310 Parent Education** (3 semester hours) Skills needed by professionals to assess parents’ strengths, resources and needs as well as to assist parents in understanding and promoting their children’s development and adjustment. Includes effective communication techniques, basic counseling skills, and strategies to enhance parental effectiveness within the family and community. (3-0) Y

**HDCD 6320 The Developing Child: Toddler and Preschool Years (Two to Five Years)** (3 semester hours) Relevant developmental theories and processes as well as skills acquired in motor, sensory-perceptual, cognitive, and social domains from 2 to 5 years. Prerequisite: HDCD 5311. (3-0) Y

**HDCD 6360 Behavior Management** (3 semester hours) Observational methodology in behavioral assessment and a review of principles and procedures of behavior change from social learning and applied behavior analysis perspectives. Particular attention will be given to the design, implementation, and evaluation of behavioral interventions with children and families. (3-0) Y

**HDCD 6370 Infant Intervention** (3 semester hours) Methods and procedures for facilitating development of high risk or handicapped infants through relationship-based intervention. Reviews the contributions and perspectives of various early intervention disciplines. Students design infant intervention programs. (3-0) Y

**HDCD 6380 Precursors to Development of Literacy** (3 semester hours) The acquisition of linguistic skills antecedent to early reading and the problems of acquisition of reading during early school years. Prerequisite: HDCD 6320. (3-0) R

**HDCD 6395 Medical and Biobehavioral Factors in Early Childhood Disorders** (3 semester hours) The normal functioning of organ systems and the most common malformations, dysfunctions, and diseases. Effects of these disorders on the child and family are studied. (3-0) Y
HDCD 6V81 Special Topics in Human Development and Early Childhood Disorders (1-9 semester hours)
Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) R

HDCD 7V20 Practicum/Internship in Early Childhood Disorders (3 or 6 semester hours)(P/F grading)
Supervised participation in early intervention settings, including professional activities such as assessment, intervention, service coordination and interdisciplinary teaming. Weekly seminars address reflective practice as a tool for professional growth, ethical decision making in real situations, and professional use of self. Taken for 3 hours credit coincident with practicum placement and for 6 hours credit coincident with internship placement. Prerequisite: Consent of instructor. May be repeated for credit. (3-0 or 6-0) S

HDCD 7350 Advanced Seminar in Early Childhood Disorders (3 semester hours) Selected topics will vary from semester to semester. Pass/Fail only. May be repeated for credit. (3-0) Y

HDCD 7V98 Independent Study (1-6 semester hours) Individualized program of study which may include reading, research, and/or other designated activities. May be repeated for credit. ([1-6]-0) S

HDCD 8V80 Independent Research (1-6 semester hours) Individualized program of study which includes research and/or other designated activities. ([1-6]-0) S

Doctoral Programs in Cognition and Neuroscience, Communication Sciences and Disorders, Psychological Sciences

http://bbs.utdallas.edu/

Faculty


Associate Professors: Lawrence J. Cauller, William F. Katz, Michael Kilgard, Teresa Nezworski, Pamela Rollins, Melanie Spence, Lucien T. Thompson,

Assistant Professors: Marco Atzori, Shayla Holub, Daniel Krawczyk, Christa McIntyre, Mandy Maguire, Candace Mills

Distinguished Scholar in Residence: James Jerger

Objectives

The School of Behavioral and Brain Sciences offers doctoral programs in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychological Sciences. Each provides preparation in basic and applied aspects of behavioral and brain sciences. The faculty consists of specialists in developmental psychology, cognitive science, neuroscience, and communication sciences and disorders. Students may specialize in these areas or pursue study across areas as in the study of language development, aging, auditory and visual perception, and behavioral and neural plasticity. Core and specialized courses provide the foundation for a wide spectrum of doctoral research in laboratories, schools, and clinics.

Cognition and Neuroscience

The doctoral program in Cognition and Neuroscience provides opportunities for disciplinary and interdisciplinary study in the fields of cognitive science and neuroscience. The extensive laboratory resources of the School of Behavioral and Brain Sciences offer students numerous options for research in cellular and systems neuroscience, cognition and perception, and computational modeling of perceptual and neural processes. The doctoral programs in Psychological Sciences and Communication Sciences and Disorders provide additional opportunities for coursework and research experience. For students with interests in cognitive neuroscience, the facilities of the U.T. Southwestern Medical School including its brain imaging facilities are available for basic and clinical research.

Psychological Sciences

The doctoral program in Psychological Sciences provides opportunities for intensive graduate study in
developmental and cognitive psychology. The program also offers strong interdisciplinary linkages to other areas within the School of Behavioral and Brain Sciences, including cognitive science, behavioral neuroscience, and communication sciences and disorders. The primary goal of the program is to prepare research investigators for academic and applied settings. Students work closely with one or more faculty members in a collegial apprenticeship type of relationship. Although there is a core curriculum that all students fulfill, the program is flexible enough to allow students to individually tailor their studies in creative ways. The opportunities for collaborative research with faculty, as well as a rich array of colloquia and brown-bag seminars, provide a stimulating environment for scholarly development.

Communication Sciences and Disorders

The doctoral program in Communication Sciences and Disorders provides opportunities for graduate study and research in the areas of speech, language, and hearing science and in the disorders which affect speech, language, and hearing. Students have available a wealth of research opportunities in laboratories, clinics, and schools, both on-campus and in the community. Close liaison with the U.T Southwestern Medical Center provides patient access and numerous opportunities for research in medical settings. Coursework and research options within the doctoral programs in Psychological Sciences and Cognition and Neuroscience allow students to pursue interdisciplinary study in areas such as brain imaging, child language, plasticity and recovery, and aging.

Facilities

The offices and research facilities of the School of Behavioral and Brain Sciences are located on the Richardson campus and at the UTD/Callier Center for Communication Disorders on the campus of the UT Southwestern Medical Center at Dallas. Facilities on the Richardson campus include teaching and research laboratories for neuroscience, facilities for the study of child development, and laboratories supporting research in the cognitive sciences. Callier-Richardson also located on the Richardson campus provides speech-language pathology and audiology services to the community and serves as a research and training site for students. The School of Behavioral and Brain Sciences supports three research centers: The Advanced Hearing Research Center; the Center for Brain Health; and the Center for Brain, Behavior, and Cognition. These centers provide research opportunities for doctoral students in cochlear implants, auditory neuroscience, brain plasticity, and neuroimaging.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

Admission to a doctoral program is based on a review of the applicant’s GPA, GRE scores, letters of recommendation, and narrative description of research interests and career goals. The admissions committee weighs heavily the match between the applicant’s research interests and the research areas available to students in the school. For information about faculty research interests, see our web pages at bbs.utdallas.edu. The GRE score is included in the evaluation of the applicant’s record. In general, combined verbal and quantitative scores on the GRE of at least 1000 are advisable based on our experience with student success in the program and most scores are substantially higher. However, there is no minimum cutoff score nor does a score above 1000 assure admission to the program.

Many courses in the graduate programs in Audiology, Applied Cognition and Neuroscience, Communication Disorders, and Human Development and Early Childhood Disorders complement doctoral coursework and, upon a student’s admission to the Ph.D. program, can be applied toward the degree. Students should consult with the program office to determine which graduate courses can be applied to the Ph.D.

Combining the M.S. and Ph.D. Programs

Students seeking clinical certification (CCC) in speech-language pathology in addition to the Ph.D. may combine their masters and doctoral program. An individualized plan of study allows students to earn the M.S. degree in Communication Disorders while meeting requirements for the Ph.D. degree. In addition, students may choose to combine Ph.D. study with master’s work in Human Development and Early Childhood Disorders, Applied Cognition and Neuroscience, or with the clinical doctorate in Audiology.

Degree Requirements

The University’s general degree requirements are discussed on page 18.
COGNITION AND NEUROSCIENCE (Ph.D.)

Doctoral Proseminar (6 SCH)
HCS 6302 Issues in Behavioral and Brain Sciences I
HCS 6303 Issues in Behavioral and Brain Sciences II

Research Methods (6 SCH minimum)
HCS 6312 Research Methods in Behavioral and Brain Sciences – Part I
HCS 6313 Research Methods in Behavioral and Brain Sciences – Part II

or

HCS 6351 Alternative Statistical Data Analysis

Cognition and Neuroscience Core Courses (6 SCH minimum). Students must take a minimum of one Cognition Core and one Neuroscience Core, choosing from those listed below.

1. Cognition
   HCS 6330 Cognitive Science
   HCS 6395 Cognitive Psychology

2. Neuroscience
   HCS 6346 Systems Neuroscience
   HCS 7344 Functional Neuroanatomy

Advanced Electives (9 SCH minimum). In addition to completing the 6 SCH core requirement, students will take a minimum of 9 SCH of advanced electives. Any HCS course may count as an advanced elective. This includes core courses (see above), though no course can be counted both as a core and an advanced elective for any single student. Advanced electives are selected by students with the concurrence of their research advisors based on the students’ research foci. Depending on a student’s background and the requirements of his or her dissertation research, additional advanced electives beyond the 9 SCH minimum will be necessary. Possible research foci and advanced elective courses are listed below.

Research Focus
Cellular Neuroscience
   HCS 6340 Cellular Neuroscience
   HCS 7347 Seminar in Synaptic Physiology
   HCS 7348 Seminar in Cortical Connections

Cognitive Aging
   HCS 7367 Aging and Cognition
   HCS 7351 Aging and the Nervous System
   HCS 6333 Memory

Speech/Language Processing
   HCS 6367 Speech Perception
   HCS 7367 Speech Perception Lab
   HCS 7349 Text comprehension Seminar

COMMUNICATION SCIENCES AND DISORDERS (Ph.D.)

Doctoral Proseminar (6 SCH)
HCS 6302 Issues in Behavioral and Brain Sciences I
HCS 6303 Issues in Behavioral and Brain Sciences II

Research Methods (9 SCH minimum)
HCS 6312 Research Methods in Behavioral and Brain Sciences – Part I
HCS 6313 Research Methods in Behavioral and Brain Sciences – Part II

Approved Advanced Research Methods/Statistics course

Core (6 SCR minimum) Students must complete a minimum of 6 semester credit hours of approved COMD or AUD prefixed courses. Courses meeting this requirement will vary depending on the student’s research interests. The requirement may be waived for students holding a graduate degree in the field of speech-language pathology or audiology. Students lacking an adequate foundation in communication sciences may be required to complete more than the 6 SCH minimum of Core coursework.
Communication Sciences and Disorders (3 SCH minimum) All students must complete a minimum of 3 SCH of doctoral coursework offered through the Ph.D. program in Communication Sciences and Disorders.

Supplemental Coursework (12 SCH minimum) All students must complete an additional minimum of 12 SCH's of doctoral level courses and seminars. Courses may be selected from doctoral level coursework offered through the Ph.D. programs in Communication Sciences and Disorders or, with advisor approval, from the doctoral coursework offered through the Ph.D. programs in Cognition and Neuroscience and Psychological Sciences.

PSYCHOLOGICAL SCIENCES (Ph.D.)

Doctoral Proseminar (6 SCH)
HCS 6302 Issues in Behavioral and Brain Sciences I
HCS 6303 Issues in Behavioral and Brain Sciences II

Research Methods (6 SCH minimum)
HCS 6312 Research Methods in Behavioral and Brain Sciences – Part I
HCS 6313 Research Methods in Behavioral and Brain Sciences – Part II

Psychological Science Core Courses (12 SCH minimum). Students will declare a major in Developmental Psychology, Cognition, or Social/Personality Psychology. Students must take four core courses from those listed below. Two of these courses must be selected from the major area, and the four courses must be selected from at least two of the four areas listed.

1. Developmental Psychology
   HCS 6350 Social Development
   HCS 6331 Cognitive Development
   HCS 6368 Language Development
2. Cognition
   HCS 6395 Cognitive Psychology
   HCS 6330 Cognitive Science
   HCS 6333 Memory
3. Social/Personality Psychology
   HCS 6371 Social Psychology
   HCS 6327 Personality
4. Neuroscience
   HCS 6346 Systems Neuroscience
   HCS 7344 Functional Neuroanatomy

Advanced Electives (12 SCH minimum). After completing the 12 SCH core requirement, students will take an additional 12 SCH of advanced electives. Any core course (see above) may count as an advanced elective (though it cannot count both as a core course and as an elective). One of these 3-hour elective courses must be an advanced research methods course. Students will declare a major in Developmental Psychology, Cognition, or Social/Personality Development and will take a minimum of four courses (cores and electives) in the major area. Students may enroll in other advanced electives from the other doctoral course offerings available in the School, including courses in language and communication. Additional advanced electives are available each semester.

INDIVIDUALIZED DEGREE PLANS
The option of creating an individualized degree plan is available to students whose interests cut across the three degree areas. One such plan offers a focus in Child Language Development and Disorders. This focus allows students to take advantage of unique interdisciplinary research opportunities in the School’s demonstration programs for infants, toddlers, and preschool children. Individualized plans should be drafted in consultation with the student's research advisor and require the approval of the Graduate Studies Committee.

ADDITIONAL REQUIREMENTS
All students must complete the Qualifying Project/Qualifying Paper requirements of the Ph.D. degree sought. The successful defense of a written dissertation completes the requirements for the degree.
Course Descriptions

Proseminars

HCS 6302 Issues in Behavioral and Brain Sciences - Part I (3 semester hours) Doctoral proseminar on current theory and research in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychological Sciences. Pass/Fail only. (Open only to HCS doctoral students) (3-0) Y

HCS 6303 Issues in Behavioral and Brain Sciences - Part II (3 semester hours) Continuation of the doctoral proseminar on current theory and research in Cognition and Neuroscience, Communication Sciences and Disorders, and Psychological Sciences. Pass/Fail only. (Open only to HCS doctoral students) (3-0) Y

Research Methods Courses

HCS 6312 (ACN 6312) Research Methods in Behavioral and Brain Sciences - Part I (3 semester hours) Applying, understanding, and interpreting various statistical techniques in behavioral science context. Participants have the opportunity to learn appropriate statistical details for basic descriptive and inferential statistics, the interrelationships among techniques, and computer skills required for data analyses. Students without the necessary background knowledge of basic statistics and experimental design will be required to take PSY 3392 before registering for HCS 6312. (3-0) Y

HCS 6313 (ACN 6313) Research Methods in Behavioral and Brain Sciences - Part II (3 semester hours) Topics in general linear modeling including regression analysis correlation, simple analysis of variance, factorial analysis of variance, analysis of covariance, between and within subject designs, and multiple regression. Prerequisite: HCS 6312 or consent of instructor. (3-0) Y

HCS 6314 Instrumentation (3 semester hours) Basic principles of electricity, signal processing, instrumentation, and laboratory safety. (3-0) R

HCS 6315 Grant Writing for Researchers (3 semester hours) Identifying funding sources appropriate to research needs, formulating a research plan, generating specific aims and a methodological design to address those aims, presentation of preliminary results to show the feasibility of the proposed work, and use of appropriate reference citations. Prerequisite: Permission of instructor. (3-0) Y

HCS 6351 (ACN 6351) Alternative Statistical Data Analysis (3 semester hours) Alternative statistical data analysis techniques that complement the classical general linear modeling approach. (3-0) Y

HCS 6390 Evaluation Research Methods in Behavioral and Brain Sciences (3 semester hours) A review of research methods used in evaluation research, with consideration given to public, private, and nonprofit programs. Issues to be addressed include research design, appropriate performance standards, measurement and selection of indicators, sampling, data collection, and data analysis. (3-0) Y

HCS 6399 Research Ethics and Scientific Integrity (3 semester hours) An interactive, intensive course designed to cover critical issues related to human subjects, animal welfare, research design, accountability of scientific actions and fraud. Course designed for individuals intending research careers in academia or industry. (3-0) Y

HCS 6V91 Evaluation Research (3-6 semester hours) Individual or group project in evaluation research performed for a public or private organization. Students must have a faculty sponsor who supervises the research project. Students normally enroll for two consecutive semesters. The first semester culminates in the completion of a formal evaluation research proposal; the second ends with a final research report and presentation based on the completed evaluation research. Students must also participate in a weekly seminar on topics in evaluation research, featuring faculty and student presentations, guest speakers, and group discussion. Permission of the Program Coordinator and a faculty sponsor are required. May be repeated for a total of six semester credit hours. (Same as POEC 6V91.) (3-6-0) Y

HCS 7310 Advanced Research Methods (3 semester hours) Advanced methods of inquiry and analysis unique to either Cognition and Neuroscience, Communication Sciences and Disorders, or Psychological Sciences. Prerequisite: HCS 6313. (May be repeated for credit.) (3-0) Y

HCS 7312 Applied Research Design (3 semester hours) Formal principles of research design, how to apply these principles to published work and original investigations. (3-0) R

HCS 7314 Research Methods in Behavioral and Brain Sciences—Part III (3 semester hours) Applying, understanding, and interpreting various advanced multivariate statistical techniques in brain and behavioral science contexts. Includes principle component analyses, simple and multiple correspondence analyses, partial least square regression, discriminant analyses, and structural equation modeling. (3-0) R
Cognition and Neuroscience

HCS 5314 (ACN 5314) Cognitive and Neural Modeling Lab (3 semester hours) Auto-associative, associative, competitive learning, recurrent, and back-propagation artificial neural network architectures in a “hands-on” micro-computer laboratory environment using special simulation software. Applications to perceptual, cognitive, computational, and neuroscience modeling problems. Prerequisites: Linear Algebra and Computer Programming Experience is recommended but not required. (3-0) T

HCS 6310 Fundamentals of Functional Brain Imaging (3 semester hours) This course covers topics such as principles of tracer techniques, neuroimaging instrumentation, safety issues, brain physiology (perfusion, metabolism, and receptor function), image processing and analysis, fundamentals of SPECT, PET and fMRI, and critical evaluation of the functional neuroimaging literature. (3-0) Y

HCS 6330 (ACN 6330) Cognitive Science (3 semester hours) Cognitive, computational, and neural processing approaches to understanding perception, memory, thought, language and emotion. (3-0) Y

HCS 6332 (ACN 6332) Perception (3 semester hours) Psychophysical, neurophysiological, and computational foundations of sensation and perception. Basic senses of vision, audition, chemoreception, and tactile processing, with emphasis on understanding the processes that take us from neurons to perception and action. (3-0) T

HCS 6333 (ACN 6333) Memory (3 semester hours) Research and theory on the acquisition, representation and retrieval of information by the mind/brain. Includes information processing and neuropsychological perspectives. (3-0) T

HCS 6334 (ACN 6334) Attention (3 semester hours) Theory and evidence on the study of attention especially in human vision and audition. Includes perceptual learning, information processing, and neuropsychological approaches. (3-0) T

HCS 6335 Seminar in Auditory Cortical Processing (3 semester hours) Basic principles of neural information processing with special emphasis on the central nervous system processes underlying hearing and speech perception. (3-0) T

HCS 6336 Principles of Developmental Neuroscience (3 semester hours) Molecular and cellular events underlying neuronal differentiation, axon guidance, synapse formation, neurotrophic factors, and neural death, with special emphasis on activity-dependent plasticity and its role in generating and maintaining the extraordinary precision of connections found in the nervous system. (3-0) T

HCS 6337 Seminar in Neural Plasticity and Behavior (3 semester hours) Critical readings from the interfaces between the behavioral neurosciences, biophysics, and biochemistry. Neural mechanisms of learning and memory and of plasticity compensating for peripheral or central nervous system damage are among the topics discussed. (3-0) T

HCS 6340 (ACN 6340) Cellular Neuroscience (3 semester hours) Basic neural biology and physiology and principles of synaptic transmission. (3-0) Y

HCS 6344 Electrophysiology (3 semester hours) Patch-clamp, sharp electrode and extracellular recording techniques are examined in detail, including multi- and single-unit recording, evoked and event-related potentials including recording techniques, and applications of these techniques. Prerequisite: HCS 6346 or consent of instructor. (3-0) T

HCS 6346 (ACN 6346) Systems Neuroscience (3 semester hours) Integrative systems level study of the nervous system. Aspects of neural mechanisms and circuitry underlying regulation of motor behaviors, sensory and perceptual processing, biological homeostasis, and higher cognitive functions. (3-0) Y

HCS 6347 (ACN 6347) Intelligent Systems Analysis (3 semester hours) Mathematical tools for investigating the asymptotic behavior of both deterministic and stochastic nonlinear dynamical systems for the purposes of building computational models in the fields of neuroscience, psychology, and artificial intelligence. Topics include: artificial neural network architectures, Lyapunov stability theory, nonlinear optimization theory, stochastic approximation theory, and the Gibbs Sampler. Prerequisites: HCS 6348 (or equivalent) or consent of instructor. (3-0) T

HCS 6348 (ACN 6348) Neural Net Mathematics (3 semester hours) Vector calculus and vector calculus-based probability theory with artificial neural network modeling applications. Intended to provide mathematics preparation for HCS 6347 and HCS 6349. Prerequisites: Either: (1) Linear algebra, multivariable calculus, STAT 5351, and HCS 5314, or (2) consent of instructor. (3-0) T

HCS 6349 (ACN 6349) Intelligent Systems Design (3 semester hours) Mathematical tools for the design and evaluation of artificially intelligent deterministic and stochastic nonlinear dynamical systems for the purposes of building computational models in the fields of neuroscience, psychology, and artificial intelligence. Topics include: (1) Markov Random Field probability representations, and (2) asymptotic mathematical statistical theory for parameter estimation, model selection, and hypothesis testing. Prerequisites: HCS 6347 or consent of instructor. (3-0) T
HCS 6372 Pathophysiology of Disorders of the Nervous System (3 semester hours) The pathophysiology of disorders such as movement disorders and pain is discussed with emphasis on the role of neural plasticity in causing symptoms and signs. (3-0) Y

HCS 6373 (ACN 6373) Intraoperative Neurophysiological Monitoring I (3 semester hours) The anatomical and physiological basis for the use of electrophysiological techniques in intraoperative neurophysiologic monitoring and in diagnosis of disorders affecting the nervous system. (3-0) Y

HCS 6374 (ACN 6374) Intraoperative Neurophysiological Monitoring Part II (3 semester hours) The use of recordings of neuro-electric brain potentials and their interpretation for diagnostic purposes and for intraoperative monitoring. Prerequisite: HCS 6373 (ACN 6373) (3-0) Y

HCS 7315 Statistical Analysis of Brain Imaging Data (3 semester hours) Covers analysis of brain imaging data obtained from diverse techniques such as PET, SPECT, fMRI, or EEG. Includes “standard analyses” with packages such as SPM02 or AFNI as well as pattern analyses approaches (e.g., partial least squares regression, correspondence, discriminant, and principal component analyses). (3-0) R

HCS 7322 (ACN 7322) Computational Models of Language Understanding (3 semester hours) Probabilistic methods for natural language understanding. Use of the MATLAB computer language for instantiating specific knowledge-based computational theories of natural language understanding. Prerequisites: Computer Programming Experience is recommended but not required. (3-0) T

HCS 7329 Functional Brain Imaging Practica (3 semester hours) This course applies learned skills to short research projects in a small group format. Projects include: 1) acquisition of new data in SPECT, PET or fMRI in association with ongoing funded research sponsored by various faculty at UTSW or UTD; 2) mentored analysis of existing data sets from these sources; and 3) experimental design projects in which more advanced trainees will develop a full experimental protocol, including informed consent procedures, acquisition parameters and data analysis plans. All projects are reviewed in a biweekly group meeting to facilitate learning across groups. (3-0) Y

HCS 7330 Advanced Functional Brain Imaging (3 semester hours) This course explores more in-depth topics such as neuroimaging detection systems, clinical applications of functional neuroimaging, experimental design, statistical techniques in image analysis and reviews of pertinent literature using functional brain imaging to illuminate various cognitive and perceptual processes, such as language, memory, hearing and vision. (3-0) Y

HCS 7333 (ACN 7335) Computational Neuroscience (3 semester hours) Construction of biologically realistic simulations of neurons and small neural circuits using state-of-the-art simulation software. Students will construct simulations that shed light on the neural basis of higher functions such as visual contrast enhancement, perceptual oscillation, sensory localization, and motor pattern generation. (3-0) R

HCS 7343(ACN 7343) Neuropharmacology (3 semester hours) Biology of neurotransmission in the central nervous system. Includes ionotropic and metabotropic coupling of all known classes of receptors to both their cellular and systemic effects. Clinical efficacy, side effects, and other issues related to drug use and abuse are covered. Prerequisite: HCS 6340 or HCS 6346. (3-0) T

HCS 7344 (ACN 7344) Functional Human Neuroanatomy (3 semester hours) Function of each major brain system related to the organization and synaptic connections of their principal nuclei. Function of each system related to the neurological disorders associated with disease or lesions at specific locations. (3-0) T

HCS 7345 (ACN 7345) Neuroanatomy Laboratory (3 semester hours) Laboratory experience with neural tracing techniques employed in neuroscience research. Prerequisite: HCS 7344 or consent of instructor. (3-0) T

HCS 7349 Text Comprehension Seminar (3 semester hours) Current readings in the field of text comprehension and memory. May be repeated for credit with instructor’s permission. (3-0) R

HCS 7351 Aging and the Nervous System (3 semester hours) Critical evaluation of research and theory concerning the impact of aging on neuronal function. Cognitive dysfunctions, dementias, and underlying neuropathologies, as well as neurophysiological and neurochemical changes that accompany normal aging. (3-0) R

HCS 7372 Seminar in Cognition and Neuroscience (3 semester hours) Selected topics and current research in cognition and neuroscience. (May be repeated for credit.) (3-0) R

HCS 7378 (ACN 7378) Advanced Neurophysiology Methods (3 semester hours) Hands-on experience with deeply anesthetized and reduced in vitro brain slice or dissociated cell preparations widely used in neuroscientific research. Satisfies the Measurement and Evaluation (Master’s) or advanced Methods (Doctoral) requirement. Prerequisite: HCS 6340 or HCS 6346 and consent of instructor. (3-0) R

Communication Sciences and Disorders

HCS 6367 Speech Perception (3 semester hours) Current topics and theories in speech perception. Topics include the acoustic correlates of speech sounds and the problem of invariance, the perception of speech under adverse conditions, the effects of hearing impairment, and models of speech perception. (3-0) T
HCS 6368 Language Development (3 semester hours) Advanced study of normal oral language development. Focus on research in child language and recent theories of language acquisition. Prerequisite: Consent of instructor. (3-0) Y

HCS 6369 Brain Mechanisms in Hearing (3 semester hours) Neuroanatomical and neurophysiological bases of stimulus processing in the auditory neuraxis. (3-0) R

HCS 6379 Neurological Basis of Language Development (3 semester hours) Study of the developing brain and how it relates to the acquisition and development of language throughout the lifespan. (3-0) R

HCS 6391 Seminar on Preliteracy Development (3 semester hours) Selected topics and current research in preliteracy development (May be repeated for credit). (3-0) R

HCS 6392 Seminar in Theories of Language Acquisition (3 semester hours) A survey and critical exploration of current theories of language acquisition and more general theories of cognitive development that have been applied to language development. (3-0) R

HCS 7339 Psycholinguistics (3 semester hours) Classic and current research in psycholinguistics. Includes concepts from linguistics, the biological bases of speech and language processing, and child language acquisition. Hands-on exercises include labs on speech perception, language acquisition, and language comprehension. (3-0) R

HCS 7352 Seminar in Language Impairments in Children (3 semester hours) Advanced study of language impairments in children emphasizing research issues related to these diverse clinical populations. Topics may include SLI, SCI, SELD, deafness, autistic spectrum disorders among others. May be repeated for credit. Prerequisites: COMD 6307 or HCS 6368 and COMD 7378 or consent of instructor. (3-0) T

HCS 7367 (ACN 7367) Speech Perception Laboratory (3 semester hours) Introduction to the field of speech processing by computer, with primary application to research techniques in the study of speech perception. (0-9) T

HCS 7368 Speech Production Development (3 semester hours) Foundations of speech production development including anatomic, physiologic, acoustic, and psycholinguistic bases. (3-0) R

HCS 7V71 Seminar in Communication Sciences and Disorders (1-6 semester hours) Selected topics and current research in communication sciences and Disorders. (May be repeated for credit.) ([1-6]-0) R

HCS 7379 Current Research in Autism (3 semester hours) Advanced seminar addressing current issues in the field of autism; topics vary and may include various theoretical approaches to autism, diagnosis and assessment of children with autism, and affective reciprocity in both typically developing children and children with autism. (May be repeated for credit with consent of the instructor.) (3-0) R

Psychological Sciences

HCS 6326 Infant Perception (3 semester hours) Research, theoretical issues, and experimental paradigms in infant perception, including topics such as face and speech perception. (3-0) R

HCS 6327 Personality (3 semester hours) Survey of cognitive, analytic, and learning theory approaches to study of personality. Emphasis on intensive exploration of selected concepts and related research (3-0) R

HCS 6331 (HDCD 5304) Cognitive Development (3 semester hours) Survey of cognitive development theories and research in a variety of domains including perception, memory, language, and problem solving. (3-0) Y

HCS 6350 Social Development (3 semester hours) Foundations of social and personality development. Includes survey of psychodynamic, social learning, behavior genetic, family systems, and social-cognitive approaches to the study of attachment, parenting, aggression, peer relationships, sex typing, and other contemporary issues. (3-0) Y

HCS 6352 Individual Factors in Human Development (3 semester hours) Contemporary theory and research in personality and social psychology. (3-0) R

HCS 6354 Social Cognition (3 semester hours) The influence of cognition as a determinant of social behavior with particular focus on social perception, attributions, and attitudes. (3-0) R

HCS 6356 (HDCD 5312) Atypical Development (3 semester hours) Disorders of development from conception to age three, emphasizing etiology symptoms, diagnosis and treatment. Impact of delays in the acquisition and integration of various developmental skills as they relate to specific disorders of sensory and motor skills, language and cognition, and personality and socialization. (3-0) Y

HCS 6358 Affective Development (3 semester hours) Theory and research on emotions and emotional development. Includes perspectives on the links between emotions, socialization and behavior, and marital and family processes and emotion regulation. (3-0) R
HCS 6375 Development of Social Cognition (3 semester hours) Combines methods from developmental, social, and cognitive psychology to examine how children and adults perceive and interpret information in their social worlds. Explores social cognition from infancy (e.g., imitation, joint attention) through childhood (e.g., perspective taking, theory of mind) and adulthood (e.g., social judgments, biases). R

HCS 6376 Social Psychology (3 semester hours) Overview of the social bases of behavior. Topics include social cognition and self justification, biases in judgment, attitudes and persuasion, conformity, compliance, and group dynamics, prejudice and stereotyping, interpersonal attraction and relationships, aggression and altruism, cultural diversity, and applications relevant to these aspects of the human experience. Special attention to research paradigms of interest to students developing their own empirical work. Y

HCS 6395 (ACN 6395) Cognitive Psychology (3 semester hours) Theory and research on perception, learning, thinking, psycholinguistics, and memory. (3-0) Y

HCS 7331 Relationships and Development (3 semester hours) Theory and research on relationship processes involved in development. Topics include parent-child and parent-adolescent relations, sibling relations, peer and friendship relations, romantic relationships, and marital/couple relations. Linkages among relationships are also emphasized. (3-0) R

HCS 7332 Adult Psychopathology (3 semester hours) Theory and research on the origins, classification, and treatment of psychological disorders of adulthood, with consideration of whether these disturbances exist on continua with normal behavior. Critical examination of diagnoses, with an emphasis on how scientific research can guide our understanding of etiology and treatment (3-0) R

HCS 7355 Seminar in Psychological Sciences (1-6 semester hours) Selected topics of current research in social or cognitive development. (May be repeated for credit.) (1-6)-0 R

HCS 7374 Peer Relationships and Interpersonal Competence (3 semester hours) Theory and research on children’s and adolescents’ peer groups, friendships, and romantic relationships, as well as the social skills that are called for in these relationships. (3-0) R

HCS 7376 Child Psychopathology (3 semester hours) Major classes of childhood psychopathology manifested during infancy through adolescence. Normal personality development as a basis for identifying psychopathology. Issues of etiology, diagnosis, prognosis and social policy. (3-0) Y

Other Courses
HCS 7380 Practicum in Communication Sciences (3 semester hours) Supervised research or practice-based activities in applied contexts or evaluation and therapeutic management of communication disorders. Weekly conference may be required. Pass/Fail only. (May be repeated for credit) (3-0) S

HCS 7V98 Directed Individual Study in Behavioral and Brain Sciences (1-9 semester hours) Individualized program of study which may include reading, research, implementation of clinical strategies, and/or other designated activities. (May be repeated for credit) (1-9)-0-27 S

HCS 8V50 Doctoral Readings and Research Seminar (1-6 semester hours) Seminar for advanced doctoral students on current issues and research in Behavioral and Brain Sciences. (May be repeated for credit) (1-6)-0 S

HCS 8V80 Research in Behavioral and Brain Sciences (1-9 semester hours) Supervised research and readings. (May be repeated for credit) (1-9)-0-27 S

HCS 8V99 Dissertation (3-9 semester hours) (May be repeated for credit.) (3-9)-0-27 S

Doctor of Audiology Program

http://bbs.utdallas.edu/

Faculty
Professors: Peter F. Assmann, George M. Gerken (emeritus), Susan W. Jerger, Aage R. Møller, Karen Prager, Ross J. Roesser, Robert D. Stillman, Linda Thibodeau, Emily Tobey

Associate Professors: Michael Kilgard, Lucien T. Thompson

Clinical Faculty: Carolyn Musket, Jackie Clark, Carol Cokely, Lee Wilson

Distinguished Scholar in Residence: James F. Jerger
Objectives

The Doctor of Audiology (Au.D.) degree offers broad-based professional preparation in audiology within an environment supporting an active program of clinical services and research. Students receive comprehensive exposure to clinical methods and procedures in communication disorders and to the scientific foundations from which clinical approaches are derived. Practical experience is available in a variety of clinical, educational, and medical settings.

Facilities

The principal site for the academic, clinical, and research activities of the Doctor of Audiology program is the U.T. Dallas Callier Center for Communication Disorders, which is adjacent to The University of Texas Southwestern Medical Center. Courses and practicum are also offered at U.T. Dallas Callier Richardson on the Main Campus of the University. The U.T. Dallas Callier Advanced Hearing Research Center provides specialized clinical and research facilities for the program. These facilities, and others throughout the Metroplex, offer the educational, clinical, research, and medical environments essential for an interdisciplinary program in audiology.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

Admission to the Doctor of Audiology Program is based on a review of the applicant’s GPA, GRE scores, letters of recommendation, and narrative description of research interests and career goals. The GRE score is included in the evaluation of the applicant’s record. In general, students admitted to the program have a combined Verbal and Quantitative score on the GRE of at least 1100. However, there is no minimum cut-off score for admission nor does a score of at least 1000 assure admission to the program.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

The Doctor of Audiology (Au.D.) degree requires 121 semester hours. Students completing the Au.D. degree meet the academic and clinical practicum requirements for the Certificate of Clinical Competence offered by the American Speech-Language-Hearing Association, and Texas State licensure requirements for audiology. Specific degree requirements follow.

Required Courses (121 hours)

Foundation (25 Semester Hours)
- AUD 6V20 Laboratory Procedures in Audiology and Hearing Science (taken 4 times)
- AUD 6303 Hearing Science
- AUD 6305 Anatomy and Physiology of Audition
- AUD 6306 Speech Science
- AUD 6310 Advanced Clinical Audiology
- AUD 6311 Diagnostic Audiology
- AUD 6316 Audiologic Rehabilitation for Adults
- AUD 6318 Pediatric Audiology

Doctoral Core (24 Semester Hours)
- AUD 6348 Counseling for Communication Disorders Professionals
- AUD 6352 Medical Audiology
- AUD 7321 Theories of Amplification
- AUD 7324 Seminar in Cochlear Implants and Technology for Persons with Hearing Impairments
- AUD 7326 Aural Habilitation of Children with Hearing Impairments
- AUD 7327 Evaluation and Fitting/Amplification Systems
- AUD 7353 Clinical Electrophysiology
- HCS 6312 Research Methods in Human Development and Communication Sciences – Part I

Advanced (24 Semester Hours)
- AUD 7310 Professional Issues in Audiology
- AUD 7328 Hearing Conservation
AUD 7351 Physiologic Assessment of Vestibular and Auditory System
AUD 7371 Doctoral Seminar in Audiology (taken 3 times)
AUD 7340 Auditory Processing Disorders
HCS 6314 Instrumentation

**Experiential (48 Semester Hours)**
HCS 7380 Practicum in Human Development and Communication Sciences (24 semester hours)
AUD 8V80 Individual Research in Audiology (6 semester hours)
AUD 8V97 Doctoral Internship in Audiology (18 semester hours)

**Out-of-Field Students**

Students entering the program who lack undergraduate preparation in communication disorders are required to take a specified 6-12 semester hour sequence of preparatory courses. These courses may be taken at The University of Texas at Dallas and may be enrolled in concurrently with some graduate courses.

Students are advised that participation in off-campus practicum and internship requires a criminal background check. Students excluded from off-campus sites for any reason may be unable to complete all degree requirements. Students are responsible for the cost of criminal background checks.

**Course Descriptions**

**AUD 6V20 Laboratory Procedures in Audiology and Hearing Science** (1-9 semester hours) Application in structured laboratories of principles taught in diagnostic audiology, rehabilitation audiology, amplification, cochlear implant and electrophysiology courses. To be taken with AUD 6310, AUD 6311, AUD 6316, AUD 7321, AUD 7326, AUD 7327 and AUD 7353. (May be repeated for credit.) (0-[1-9])Y

**AUD 6303 Hearing Science** (3 semester hours) Basic acoustics and psychoacoustics. (3-0)Y

**AUD 6305 Anatomy and Physiology of Audition** (3 semester hours) Structure and function of the auditory system including external, middle, and inner ear, and central auditory mechanisms. (3-0)Y

**AUD 6306 Speech Science** (3 semester hours) The physical properties of speech and the perceptual, cognitive and neural processes that intervene between the production and perception of speech in everyday speech communication. (3-0)Y

**AUD 6310 Advanced Clinical Audiology** (3 semester hours) Instrumentation and calibration standards for audiology practice. The development and application of standard diagnostic audiological procedures. Administration and interpretation of standard audiometric tests. (3-0) Y

**AUD 6311 Diagnostic Audiology** (3 semester hours) The development and application of advanced diagnostic procedures for audiological diagnosis including behavioral and electrophysiological measures (ABR and OAE). Administration and interpretation of diagnostic audiological tests. (3-0)Y

**AUD 6316 Audiologic Rehabilitation for Adults** (3 semester hours) Evaluation and remediation of impairment, disability and handicap associated with hearing loss. Emphasis on hearing aid orientation and benefit, assistive technology, coping skills, communication strategies, speech reading and advocacy for older adults with hearing loss. (3-0)Y

**AUD 6318 Pediatric Audiology** (3 semester hours) Etiological, medical and genetic considerations relevant to exceptional populations. Emphasis on current diagnostic options with infants and young children, including those having mental retardation or multiple disabilities. (3-0)Y

**AUD 6348 (COMD 6348) Counseling for Communication Disorders Professionals** (3 semester hours) Psychological aspects of communication disorders in the context of the family system. Basic counseling and problem-solving skills to use as an adjunct to roles as communication disorders professionals. Emphasis on helping students to gain comfort and skill in coping with their clients’ emotions and giving their clients constructive feedback. (3-0)Y

**AUD 6352 Medical Audiology** (3 semester hours) Etiology and pathology of auditory/vestibular disorders and diagnostic and treatment procedures. (3-0)Y

**AUD 7310 Professional Issues in Audiology** (3 semester hours). Ethics and professional issues in various practice settings, including multicultural considerations, licensure, certification, outcome measures, liability, malpractice, and practice management. (3-0)Y

**AUD 7351 Physiologic Assessment of Vestibular and Auditory Systems** (3 semester hours) Anatomy, physiology and pathophysiology of the vestibular, oculomotor and related systems used for maintaining equilibrium and balance. Procedures used for diagnostic assessment of the vestibular system and medical and non-medical treatments for vestibular disorders. (2-0)Y
AUD 7321 Theories of Amplification (3 semester hours) Principles underlying soundfield acoustics and calibration, earmold acoustics, speech perception in hearing impaired persons, and fitting methods. (3-0)Y

AUD 7324 (COMD 7324) Seminar in Cochlear Implants and Technology for Persons with Hearing Impairments (3 semester hours) Prosthetic alternatives available for individuals with profound hearing impairments. Topics include speech perception in children and adults, signal processing, aural rehabilitation techniques, prosthetic devices such as cochlear implants and techniques for using such devices. (3-0)Y

AUD 7326 Aural Habilitation of Children with Hearing Impairments (3 semester hours) Issues in selection and fitting of amplification and FM systems for children, rationale and methods of auditory training, optimizing the auditory environment, communication options, and family-centered intervention. (3-0)Y

AUD 7327 Evaluation and Fitting of Amplification Systems (3 semester hours) Advanced study of analog and digital technology in amplification systems including: programmable hearing aids, compression characteristics, noise reduction, and speech enhancement strategies. (3-0)Y

AUD 7328 Hearing Conservation (3 semester hours) Identification and prevention of hearing loss in children and adults through screening programs. Includes school, community, and industrial-based hearing conservation programs, noise measurement techniques, and hearing protection. (3-0)Y

AUD 7340 Auditory Processing Disorders (3 semester hours) Auditory processing disorders with respect to underlying etiologies and behavioral and electrophysiologic procedures for diagnosis and therapeutic management. (3-0)Y

AUD 7353 Clinical Electrophysiology (3 semester hours) Evoked and event-related potentials including recording techniques, neurophysiological mechanisms, and applications to clinical populations. (3-0)Y

AUD 7371 Doctoral Seminar in Audiology (3 semester hours) Selected topics and current research in audiology and hearing science. (May be repeated for credit.) (3-0)Y

AUD 7V80 Doctoral Practicum in Audiology (1-9 semester hours) Supervised doctoral level experience in assessment and habilitation/rehabilitation of hearing impairment. (May be repeated for credit.) ([1-9]-0) S

AUD 8V80 Individual Research in Audiology (1-9 semester hours) Independent research project to fulfill the Doctor of Audiology research requirement. (May be repeated for credit.) ([1-9]-0) S

AUD 7V82 Special Topics in Hearing Science and Audiology (1-9 semester hours) Selected topics and current research in Hearing Science and Audiology. Topics will vary from semester to semester. (May be repeated for credit.) ([1-9]-0) R

AUD 8V97 Doctoral Internship in Audiology (1-9 semester hours) Intensive, full-time, clinical audiology practicum in a work setting that provides exposure to a diverse clinical population and a wide breadth of audiologic services. Completed during the fourth year of the Au.D. Program. (May be repeated for credit.) ([1-9]-0) S

Certificate in Evaluation Research

A graduate-level certificate program in Evaluation Research is offered jointly by the Schools of Social Sciences and Behavioral and Brain Sciences. Students who complete this program will have an opportunity to gain competencies in the design and implementation of program evaluations in fields such as education, health care, human services, criminal justice, and economic development. The Certificate in Evaluation Research program may be incorporated into graduate degree programs in the Schools of Social Sciences or Behavioral and Brain Sciences, or may be taken on its own by nondegree seeking students. Students in the Evaluation Research certificate program are normally expected to have completed undergraduate courses in social statistics and research design; students lacking appropriate preparation may be asked to take needed courses prior to admission to the program.

In order to receive the certificate, students must successfully complete four required courses and one guided elective, complete an evaluation research project including a final report, and participate in a weekly evaluation research seminar. The courses in the School of Social Sciences leading to the Certificate in Evaluation Research are POEC 5313 Descriptive and Inferential Statistics for the Social Sciences, POEC 6352 Evaluation Research Methods in the Social Sciences, POEC 6V91 Evaluation Research (six credit hours), and an additional course to be chosen from a list of guided electives available from the Social Sciences graduate advising office, for a total of 15 semester credit hours. With permission of the Evaluation Research program coordinator, students may substitute appropriate courses from the School of Behavioral and Brain Sciences or prior coursework taken at other institutions. Students interested in applying for admission to the Certificate in Evaluation Research program should consult the graduate advising office in the School of Social Sciences or the School of Behavioral and Brain Sciences.
SCHOOL OF ECONOMIC, POLITICAL AND POLICY SCIENCES

As we begin the 21st century, the School of Economic, Political and Policy Sciences is strategically positioned to offer leadership in addressing society’s most pressing concerns. Our mission is simple: develop scholars and practitioners who love to learn, individuals who can integrate knowledge and analyze sophisticated problems, and who are committed to advancing the search for truth and justice. Our domain is broad: risk management, economic performance, terrorism, voter behavior, health care, democratization, social inequality, international trade, and conflict resolution only hint at the wide variety of specific topics that must be addressed by informed social scientists. Our approach is comprehensive: strong disciplinary foundations, a dynamic interdisciplinary environment, and a striving to achieve a synthesis of theory-based knowledge and practical experience through internships, workshops, and seminars.

The School of Economic, Political and Policy Sciences awards master’s degrees in Applied Economics, Applied Sociology, Geographic Information Sciences (jointly with the School of Natural Sciences and Mathematics), Public Affairs, and Ph.D.s in Economics, Geospatial Information Sciences (jointly with the Erik Jonsson School of Engineering and Computer Science and the School of Natural Sciences and Mathematics), Political Science, Public Affairs, and Public Policy and Political Economy. Each degree program offers a rigorous foundation with enough flexibility to specialize and earn additional certification in crime and justice analysis, economic and demographic data analysis, evaluation research, financial economics, geographic information systems, and non-profit management. These certificate programs are available to degree-seeking as well as non-degree students seeking highly focused curricula that can benefit their professional development. We invite you to explore our programs, scrutinize our faculty, examine our resources, and, then, to join us as we prepare to face our future.

DEGREES OFFERED

Doctor of Philosophy in Economics
Doctor of Philosophy in Geospatial Information Sciences
Doctor of Philosophy in Political Science
Doctor of Philosophy in Public Affairs
Doctor of Philosophy in Public Policy and Political Economy

Master of Science in Applied Economics
Master of Science in Applied Sociology
Master of Science in Geographic Information Sciences
Master of Public Affairs

Certificate in Crime and Justice Analysis
Certificate in Economic and Demographic Data Analysis
Certificate in Evaluation Research
Certificate in Financial Economics
Certificate in Geographic Information Systems
Certificate in Local Government Management
Certificate in Non-Profit Management
Graduate Programs in Economic, Political and Policy Sciences

http://www.utdallas.edu/dept/socsci/

Faculty
Professors: Kurt Beron, Brian J. L. Berry, Ronald Briggs, Anthony M. Champagne, Alexander L. Clark (emeritus), Harold D. Clarke, Lloyd J. Dumas, Catherine Eckel, Euel Elliott (Associate Dean for Graduate Education), Daniel Griffith, Edward J. Harpham, Donald A. Hicks, Irving J. Hoch (emeritus), L. Douglas Kiel, Murray J. Leaf, Kimberly Kempf Leonard, Robert Lowry, James Marquart, James Murdoch (Dean), Lawrence J. Redlinger, Todd Sandler, Richard K. Scotch, Barry J. Seldon, Marianne C. Stewart, Larry D. Terry, Paul Tracy, Wim P. M. Vijverberg, Douglas Watson
Associate Professors: Bobby C. Alexander, Sheila Amin Gutiérrez De Piñeres, Philip K. Armour, Nathan Berg, Pamela Brandwein, Thomas Brunell, Marie Isabelle Chevrier, Simon Fass, Jennifer Holmes, Bruce Jacobs, Paul Jargowsky, Susan McElroy, Fang Qiu, Kevin Siqueria, Michael Tiefelsdorf, Gregory S. Thielemann
Assistant Professors: Patrick Brandt, Floun'say Caver, Kevin Curtin, Chetan Dave, Douglas Dow, Roxanne Ezzet-Lofstrom, Karen Hayslett-McCall, Melinda D. Kane, Linda Kemp Keith, Chad M. King, Danielle Lavin-Loucks, Magnus Lofstrom, Isaac McFarlin, Clint Peinhardt, Scott Robinson, Sheryl Skaggs, Carole J. Wilson
Senior Lecturers: Brian Bearry, Teodoro Benavides, Wendy Hassett, Brenda McCoy

Objectives
There is increasing awareness of the impact that rapid technological, economic and social change is having on society. The graduate programs in the School of Economic, Political and Policy Sciences are designed to prepare students for careers in the rapidly evolving public, private and non-profit sectors by developing expertise in areas such as policy analysis, economic decision making and public management. Our PhD. Programs are also designed to prepare students for careers in both teaching and research. Each graduate program is discussed in more detail below.

Facilities
Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University’s Computing Center. The School has its own teaching laboratories. The University’s Computing Center also provides personal computers and UNIX workstations for student use. Databases, a computerized geographic information system and WESTLAW, a legal research system, are also available for student research. Doctoral students have opportunities to participate in research programs directed by members of the faculty. Further details are available below.

Admission Requirements
The University’s general admission requirements are discussed on page 13.

All programs require applicants to have a baccalaureate degree from an accredited college or university, GRE or GMAT scores, transcripts and letters of recommendation. Specific additional requirements are discussed for each program in their respective sections below.

Prerequisites
The details for each program are discussed in their respective sections below. Students may be required to take courses to prepare them for coursework.

Transfer Policies
Students who have previous graduate work pertinent to the requirements of a master’s program or the Ph.D. may be given transfer credit, and the hours of coursework required for the degree will be reduced accordingly. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to
demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s “Transfer of Credit” policy.

Research
The School of Economic, Political and Policy Sciences offers graduate degrees in four master’s programs and five Ph.D. programs. These programs represent a wide range of both disciplinary as well as interdisciplinary courses of study. Our masters degree offerings include M.S. degrees in Applied Economics, Applied Sociology, Geographic Information Sciences and the Master of Public Affairs degrees. The Ph.D. programs include programs of study in Economics, Geospatial Information Sciences, Political Science, Public Affairs, Public Policy and Political Economy. The Economics and Political Science programs offer innovative courses of study in these disciplinary areas. The Ph.D. in Public Policy and Political Economy combines rigorous methodological training with a strong substantive focus in different policy areas. The School also offers non-degree certificate programs in Crime and Justice Analysis, Economic and Demographic Data Analysis, Evaluation Research, Financial Economics, Geographic Information Sciences and Nonprofit Management.

Summary
The School of Economic, Political and Policy Sciences offers four masters programs and five Ph.D. programs. These programs and their credit hour requirements are given below.

Master’s Programs
M.S. in Applied Economics (36 hours)
M.S. in Applied Sociology (36 hours)
M.S. in Geographic Information Sciences (30 hours)
Master of Public Affairs (42 hours)

Ph.D. Programs
Economics
Geospatial Information Sciences
Political Science
Public Affairs
Public Policy and Political Economy
All Ph.D. programs require 90 hours beyond the baccalaureate degree. Applicants should contact their respective program office to discuss possible transfer credit.

Graduate Certificate Programs
In addition to our degree programs the School offers the following certificate programs for both degree and non-degree seeking students.

Crime and Justice Analysis
Economic and Demographic Data Analysis
Evaluation Research
Financial Economics
Geographic Information Systems (GIS)
Local Government Management
Nonprofit Management
Doctor of Philosophy in Economics

http://www.utdallas.edu/dept/socsci/

Faculty
Professors: Brian J. L. Berry, Lloyd J. Dumas, Catherine Eckel, Donald A. Hicks, James Murdoch, Barry J.
Seldon, Wim P.M. Vijverberg
Associate Professors: Sheila Amin Gutiérrez de Piñeres, Nathan Berg, Kurt J. Beron, Susan Williams
McElroy, Kevin Siqueria
Assistant Professors: Roxanne Ezzet-Lofstrom, Magnus Lofstrom, Isaac McFarlin

Objectives
The Ph.D. Program in Economics prepares students for careers in academics as well as for research-oriented positions in the private and public sectors. It provides a cutting-edge education in micro- and macroeconomic theories, the development of a rigorous toolkit of mathematical and econometric techniques, and extensive exposure to various research areas in economics. This education enables students to analyze and contribute to the study of issues in their areas of specialty, as defined by their respective economic literatures. To prepare students for teaching in academic careers, teaching assistantships will be made available to as many students possible on a competitive basis. Teaching assistants will work closely with faculty in undergraduate courses, assisting in courses in the School’s undergraduate program in Economics and Finance. Teaching assistants may also assist in faculty research. Students will be mentored and supervised as they proceed through their training. Furthermore, the curriculum incorporates several components (in a course setting) where students make multiple oral presentations.

To prepare for their academic or non-academic research careers, students will select a topic of study, analyze the literature, conduct their research (developing new theory, collecting data, analyzing data), make oral presentations, and write reports at various stages of the process. This experience is completed with the submission of the research paper for publication in the economics literature. Furthermore, students write a dissertation as part of the graduation requirement. This experience is invaluable for positions both within and outside the academic sector where students may find employment in banking or financial institutions, insurance, corporate strategic planning, real estate, journalism, management, marketing, labor arbitration, regulation of private firms, environmental planning, and urban and regional planning.

Facilities
Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University’s Computing Center. The School has two computing laboratories which have over 30 computers that are network linked and equipped with major social science software packages, including E-Views, R, Rats, SPSS and STATA. A computerized geographic information system, the Lexis Nexis Database, and WestLaw are also available for student use. The University’s Computing Center provides personal computers and UNIX Workstations. Many important data and reference materials are also available online via the library’s and school’s memberships in numerous organizations.

Admission Requirements
The University’s general admission requirements are discussed on page 13.
Applicants will be judged and evaluated by the existing admission standards as set forth by the University in its Graduate Catalog. These standards include a bachelor’s degree from an accredited institution or its equivalent, fluency in written and spoken English, a grade average of 3.25 or better in upper-division and graduate course work in economics and related courses, submission of official Graduate Record Examination (GRE) scores: GRE scores in the verbal and quantitative components of the exams should total to at least 1200. Students may also wish to consider submitting their score from the writing component of the GRE test as additional evidence of their writing skills.

Standardized tests scores are only one of the factors taken into account in determining admission. Given the demands that will be placed on the student in his/her study of economics, a strong background in calculus, linear algebra, and mathematical statistics is highly desirable. Furthermore, a student also may be admitted to
the Ph.D. program after being accepted by the Master of Science in Applied Economics and achieving at least a 3.0 grade point average in the core courses.

Students should submit all transcripts, three letters of recommendation, and a one-page essay outlining the applicant’s background, education, and personal objectives.

**Prerequisites**

Students who lack the necessary background to start the program are advised to take courses at the School of Economic, Political and Policy Sciences to strengthen their preparation, but they will not receive credit towards their Ph.D. program. The following courses may be used to gain the prerequisite knowledge (i) ECO 3310 Intermediate Microeconomics; (ii) ECO 3311 Intermediate Macroeconomics; (iii) ECO 4351 Mathematical Economics; (iv) POEC 5316 Advanced Regression Analysis or ECO 4355 Econometrics; (v) POEC 5313 Basic and Inferential Statistics or equivalent. It is also necessary to have had undergraduate courses in calculus and matrix or linear algebra. Additional math courses, such as differential equations or real analysis, are useful.

**Transfer Policies**

Students who have previous graduate work pertinent to the Ph.D. Program in Economics may be given transfer credit. Up to 45 hours of credit hours may be transferred, but students must fulfill the requirements outlined in the next section below at the University of Texas at Dallas, and they must be students in residence while doing so. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s “Transfer of Credit” policy.

**Degree Requirements**

The University’s general degree requirements are discussed here.

Students seeking the Ph.D. in Economics must (i) complete core courses with an average GPA of 3.00; (ii) pass comprehensive exams in micro- and macroeconomic theory and in econometrics (although the econometrics exam will be waived for students who complete each of the required econometrics courses with a grade of A); (iii) be certified in two research areas within the science of Economics; and (iv) submit an approved dissertation. The following paragraphs elaborate on these requirements.

Students are required to complete the following core courses:
- ECO 5301 Microeconomics Theory I
- ECO 6307 Microeconomics Theory II
- ECO 5302 Macroeconomics Theory I
- ECO 6308 Macroeconomics Theory II
- ECO 5309 Mathematical Economics
- ECO 6109 Econometrics I Lab
- ECO 6311 Statistics for Econometrics
- ECO 6309 Econometrics I
- ECO 6310 Econometrics II

In addition, they are required to register for the following courses at the appropriate stages of their study:
- ECO 7V01 Survey/Research Seminar
- ECO 8V01 Dissertation Seminar

In order to assure that the student progresses satisfactorily, each student is required to consult with the Director of Economics Programs prior to registration in every semester.

For research area certification, the student must select the two research areas, preferably during the second year of study, and advise the Program Director of the selection. The Program Director will, in conjunction with the Economics curriculum committee, advise the student regarding which research area courses will satisfy the certification requirements. The general guideline for certification consists of (i) making a grade of B or better in three courses within each area; (ii) writing a major literature survey on a topic in each area; and (iii) writing an acceptable research paper in one area. The student will write the literature surveys during the second year and present them orally. The research paper will normally be written during the third year and will also be discussed in various oral presentations. The expectation is that a completed research paper may be submitted for publication,
presented at professional meetings or offered at a professional forum. In addition, the student may decide to pursue further work on that topic and develop a dissertation from it.

The submission of an approved dissertation will complete the course of study on the Ph.D. degree in Economics. The procedure for approval of the dissertation is outlined in the UTD Graduate Catalog under ‘Graduate Registration Requirements’.

The program highlights six research areas. The definition of these areas offers a guideline; however, students may wish to request a customized research area definition that better suits their research objectives. Such requests will be evaluated by the Program Director in conjunction with the Economics Curriculum Committee. In the following research area descriptions, courses that are required within the area are denoted by an asterisk.

(i) Applied Econometrics
ECO 6315 Time Series Econometrics
ECO 6316 Spatial Econometrics
ECO 7311 Special Topics in Applied Econometrics

(ii) Financial Economics
ECO 6321 Financial Economics I*
ECO 6322 Financial Economics II*
ECO 6325 Cost Benefit Analysis
ECO 6315 Time Series Econometrics

(iii) Human Resources
ECO 6331 Labor Economics I*
ECO 6332 Labor Economics II
ECO 6335 Health Economics
ECO 6336 Economics of Education
ECO 6358 Population and Development
ECO 7321 Special topics in Human Resources

(iv) Industrial Organization
ECO 6340 Industrial Organization*
ECO 6343 Economic Regulation of Business
ECO 6344 Transfer Pricing
ECO 6345 Innovation Dynamics and Economic Change
ECO 6362 Industry, Technology, and Science Policy
ECO 7331 Special Topics in Industrial Organization

(v) International Development
ECO 6351 Development Economics*
ECO 6352 World Political Economy
ECO 6355 International Trade
ECO 6356 International Finance
ECO 6358 Population and Development
ECO 7341 Special Topics in International Development

(vi) Public Policy
ECO 6361 Public Sector Economics*
ECO 6362 Industry, Technology, and Science Policy
ECO 6325 Cost Benefit Analysis
ECO 6335 Health Economics
ECO 6336 Economics of Education
ECO 6343 Economic Regulation of Business
ECO 7351 Special Topics in Public Policy
Other courses of general interest to students in economics are:
ECO 6371 Urban Economics
ECO 6372 Local Economic Development
ECO 7391 Special Topics

Course Descriptions

Graduate Courses in Economics

ECO 5301 Microeconomics Theory I (3 semester hours) Modern approaches to the theory of the firm, the theory of the consumer, and formal relationships among the various economic functions developed using dual approaches to the optimization of objectives such as profit maximization, utility maximization, and cost minimization. Introduction to game theory; and market analysis through classical/neoclassical and game theoretic approaches.
(3-0) Y

ECO 5302 Macroeconomics Theory I (3 semester hours) This course introduces the fundamental concepts of macroeconomic analysis. The classical long-run growth model, Walras’ law and model building techniques from a micro-foundation perspective are covered. Comparative statistics are used to analyze the classical and Keynesian models. Modern Keynesian aggregate supply, rational expectations and Lucas critique are also examined. Aggregate consumption and investment behavior are analyzed from the perspective of the representative agent model. Unemployment theory is also examined. (3-0) Y

ECO 5309 Mathematical Economics (3 semester hours) Mathematical tools used in advanced topics model building and in the social and economic analysis of public policy. (3 0) Y

ECO 5311 Applied Econometrics (3 semester hours) This course investigates the consequences of relaxing the classical linear regression model assumptions and explores solutions when the assumptions do not hold. Topics include a review of the OLS basics (including the assumptions, hypothesis testing, multicolinearity, dummy variables and heteroskedasticity), model specification and selection, GLS, maximum likelihood estimation, binary choice models, simultaneous equation models, instrumental variables, and fixed and random effects models. (3-0) Y

ECO 5321 Microeconomic Theory for Applications (3 semester hours) For MSAE students only. Modern approaches to the theory of the firm, the theory of the consumer, and formal relationships among the various economic functions developed using dual approaches to the optimization of objectives such as profit maximization, utility maximization, and cost minimization. Introduction to game theory; and market analysis through classical/neoclassical and game theoretic approaches. MSAE students who intend to enter PhD program in ECO should take ECO 5301. (3-0) Y

ECO 5322 Macroeconomic Theory for Applications (3 semester hours) For MSAE students only. Development of modern macroeconomic theory, including national income accounts and their relation to input-output tables; classical, Keynesian, and monetarist aggregate models; behavior hypotheses of consumption, investment, and government; properties and the role of money and interest; foreign trade and investment; price rigidity, price flexibility, and employment; wage-price interaction and inflation; unemployment; and ad hoc stabilization models. MSAE students who intend to enter PhD program in ECO should take ECO 5302. (3-0) Y

ECO 6109 Econometrics I Lab (1 semester hour) This course uses STATA both as a data analysis tool and a programming language in econometric analysis. The course parallels ECO 6309, Econometrics I, in the topics covered in econometric data analysis. May be repeated for credit. Corequisite or prerequisite: ECO 6309. (1-0) Y

ECO 6307 Microeconomics Theory II (3 semester hours) General equilibrium theory of markets and welfare economics; discusses the problems of existence, stability, efficiency, and equity of economic equilibrium; and introduces social choice and the special problems created by public goods, externalities, and uncertainty. ECO 5301 recommended. (3-0) Y

ECO 6308 Macroeconomics Theory II (3 semester hours) Development of modern macroeconomic theory, including disequilibrium theory, optimal short-term stabilization measures, and monetary, fiscal, incomes, and exchange rate policies; large-scale econometric models; linear and neoclassical growth models; aggregate distribution theory; money, capital movements, trade, and growth; optimal growth models; and exhaustible resources and growth. ECO 5302 recommended. (3-0) Y

ECO 6309 Econometrics II (3 semester hours) An introduction to econometrics, with a development of background concepts in linear algebra and statistics. The course focuses on estimation, hypothesis testing, and prediction in the classical linear regression model. Corresponding large sample issues are considered. General testing principles, such as likelihood ratio, Wald, and Hausman-type test are also discussed. Other topics include various specification issues and qualitative dependent variable models. ECO 5311 recommended. (3-0) Y
ECO 6310 Econometrics II (3 semester hours) This is the second core course in the econometrics sequence of the economics Ph.D. program. The course extends the topics covered in the first course and covers topics such as panel data, simultaneous equations, maximum likelihood and GMM estimations. Discrete choice models, limited dependent variable models and duration models are also studied. (3-0) Y

ECO 6311 Statistics for Economists (3 semester hours) The course introduces calculus-based statistical analysis and probability theory, providing background for econometrics and economic modeling of simple stochastic processes. Standard probability distributions are covered, including Bernoulli, binomial, negative binomial, hypergeometric, Poisson, normal, gamma, beta, t and F distributions. Estimation and hypothesis testing are discussed. Introductory asymptotic theory, including the Law(s) of Large Numbers and the Central Limit Theorem, will be covered as well as real-world applications of probability theory as time permits. (3-0) Y

ECO 6314 Structural Equation and Multilevel (Hierarchical) Modeling (3 semester hours) An introduction to structural equation modeling (SEM) and multilevel modeling (MLM), sometimes called hierarchical linear or mixed modeling. SEM represents a general approach to the statistical examination of the fit of a theoretical model to empirical data. Topics include observed variable (path) analysis, latent variable models (e.g., confirmatory factor analysis), and latent variable SEM analyses. MLM represents a general approach to handling data that are nested within each other or have random components. Topics include dealing with two-level data that may be cross-sectional, such as students within classes, or longitudinal, such as repeated observations on individuals, firms, or countries. Prerequisite: ECO 5311 or ECO 6309 or POEC 5316 or consent of instructor. (Same as POEC 6318 Structural Equation and Multilevel (Hierarchical) Modeling) (3-0) R

ECO 6315 Time Series Econometrics (3 semester hours) This course examines econometric issues encountered in the analysis of time series data from a perspective of both estimation and forecasting: various forms of serial correlation within classical regression models, ARCH and GARCH models, Box-Jenkins ARIMA models, unit root models and cointegration, and modeling economic dynamics with VAR and other techniques. Prerequisites: ECO 5311 or ECO 6309 (Same as POEC 7370) (3-0) R

ECO 6316 Spatial Econometrics (3 semester hours) The application of econometric techniques to the explicit treatment of space (geography) in social science models. Covers the specification of spatial regression models, estimation and specification testing. The emphasis is on the application of spatial econometric methods to an empirical data analysis project. Prerequisite: POEC 5311 or equivalent. (3-0) R

ECO 6321 Financial Economics I (3 semester hours) A course in quantitative methods for investment analysis, supplemented with detailed descriptions of the prominent players and the rules of the game which prevail in major U.S. financial markets. Security valuation, fixed income pricing formulas, and basic portfolio management are covered. The key concepts and outstanding debates surrounding the efficient market hypothesis are introduced. (3-0) R

ECO 6322 Financial Economics II (3 semester hours) Continuation of Financial Economics I. It covers core concepts in portfolio theory within the mean-variance framework, focusing on the problem of choosing a point on the efficient set. Additional topics to be covered include the CAPM model, arbitrage pricing theory, bond analysis, and the basics of the term structure. (3-0) T

ECO 6325 Cost Benefit Analysis (3 semester hours) Examines methods for measuring costs and benefits of public projects and policies, and the application of cost benefit analysis to areas such as economic development, water resources, recreation, transportation, regulation, and the environment. (Same as POEC 7304 Cost Benefit Analysis) (3-0) R

ECO 6331 Labor Economics I (3 semester hours) Labor economics is the branch of economics that deals with how labor markets function. Topics covered will include labor supply, retirement, wage structure, inequality in earnings, discrimination, and labor market frictions. This course is one of two courses in the nonsequential course offerings in graduate labor economics. (3-0) T

ECO 6332 Labor Economics II (3 semester hours) This course continues the study of theoretical and applied research of labor markets from Labor Economics I. Topics studied include demand for labor, wage setting institutions, wage structure, investment in human capital, and labor mobility. Labor Economics II is not a prerequisite for Labor Economics III. (3-0) T

ECO 6335 Health Economics (3 semester hours) Economic analysis of the health care industry to explain the demand for and supply of medical care. Includes analysis of behavior of consumers, producers, and insurers; and public policies to regulate the industry and to provide services for the various segments of the population. (3-0) R

ECO 6336 Economics of Education (3 semester hours) This seminar examines theoretical and empirical writings relating to educational policy. The issues considered will include the link between educational achievement and earnings, the role of early childhood, assessments of head start and pre-school programs, the effectiveness of compensatory education and tutoring programs, the large and persistent achievement gap between children from minority and low-income families and those from middle-income Asian and white families, a critical examination of educational production functions, the extent and consequences of school segregation, bilingual education
programs, special education programs, international comparisons of student achievement and schools, school finance and an examination of various school reform proposals. (Same as POEC 7319 Seminar on Education Policy) (3-0) R

ECO 6340 Industrial Organization (3 semester hours) Market structure, firm conduct, and economic performance of business with emphasis on firms’ strategic behavior in price and nonprice competition. Topics include oligopoly pricing and production decisions, strategic entry deterrence, location strategies, product differentiation, advertising, research and development, and the effects of firms’ conduct on economic welfare and market structure. (3-0) T

ECO 6343 Economic Regulation of Business (3 semester hours) Studies the rationale for, and the history and political-economic results of, government intervention in markets in the form of (1) direct regulation of prices, quantity, entry and exit, and product quality in industries (utility, communication, and transportation), and (2) indirect intervention through antitrust laws and the regulation of advertising. Government deregulation and changes in antitrust institutions also are explored. Prerequisite: ECO 5321 or ECO 5301 or POEC 5307 (Same as POEC 7323 Economic Regulation of Business) (3-0) T

ECO 6344 Transfer Pricing (3 semester hours) The economics of transfer pricing of goods, services, and intellectual property traded among units (divisions or affiliated firms) of a common parent company. Multidivisional firms and multina-tional enterprises use transfer pricing for coordination of divisional objectives, allocating internal resources, and maximizing after-tax profits, among other goals. Governments base firms’ tax liability on transfer prices; so their taxing authorities operate to ensure transfer prices adequately reflect the value of goods and services, challenging firms’ established transfer pricing if it is deemed necessary. Legal issues and methods used by private firms and government agencies for establishing transfer prices are explored. (3-0) T

ECO 6345 Innovation Dynamics and Economic Change (3 semester hours) Examines patterns and processes of technological and organizational innovation in technology-intensive industries. Special attention given to industries in the broad IT-Telecom sector heavily represented in the Dallas regional economy. Focuses on the institutional, economic, political, and sectoral contexts in which the continued development must be interpreted, with a focus on how rapid technical advance has emerged as a key criterion for competitiveness. (Same as POEC 7327) (3-0) T

ECO 6351 Development Economics (3 semester hours) An overview of theories of national economic growth and development in the context of developing countries. This includes macroeconomic models; the role of financial development, trade, and agriculture; domestic sectoral policy; human resource development; the environment; poverty. (3-0) R

ECO 6352 World Political Economy (3 semester hours) An overview of the major economic, social, political and cultural forces that influence the nature of the international economic and political environment, as well as global economic and political relations. Topics include: theories of global political economy; economic and political transformation in Eastern Europe, China and the former Soviet Union; democratization and development in the less developed countries; military and non-military approaches to national and international security; environmentally sustainable economic development; and the international implications of technological failure. (Same as POEC 6360 World Political Economy) (3-0) T

ECO 6355 International Trade (3 semester hours) Provides a broad overview of theory and evidence concerning international trade, direct foreign investment and trade policy. Topics include scale economies, imperfect competition, and product differentiation, trade dynamics, economic growth, trade policies, and the political process. (3-0) R

ECO 6356 International Finance (3 semester hours) Financial aspects of growth and income determination in open economies. Specific topics include financial risk in the international setting; money and exchange rate regimes; income determination and macroeconomic policy; history of international monetary arrangements, and current issues in international monetary reform. (3-0) R

ECO 6358 Population and Development (3 semester hours) Examines the relations between population, resources, economic development, and the environment in light of conflicting Malthusian and anti-Malthusian paradigms. Topics include fertility, mortality, public health, human capital, use of resources, and environmental impacts at local, regional, and global scales. (Same as POEC 6368 Population and Development) (3-0) R

ECO 6361 Public Sector Economics (3 semester hours) Examines the economic role of government in a mixed economy. Surveys why markets may fail and explores governmental strategies of intervention in light of these failures. Expenditure and tax policies are studied with attention to effects on both efficiency and distribution. (3-0) T

ECO 6362 Industry, Technology, and Science Policy (3 semester hours) An examination of the bi-directional relationship of science and technology to the economy and society. Topics include: the nature of technology; technology as magic— the technological fix; technological progress, productivity and global industrial competitiveness;
the economic and social shaping of science and technology; the role of government policy; human fallibility and
dangerous technology; appropriate technology and economic development; and science, technology and the
environment. (Same as POEC 6353 Industry, Technology, and Science Policy) (3-0) T

**ECO 6371 Urban Economics** (3 semester hours) Presents methods and models for understanding urban growth
and development processes. Topics include analysis of urban growth, land use patterns, transportation and local
public good delivery systems. Welfare consequences of various urban policy options are explored. (Same as POEC
6341 Urban Development) (3-0) R

**ECO 6372 Local Economic Development** (3 semester hours) Examines the role of local governments in
promoting economic development in the United States. This course analyzes the economic development process
through economic theories of local development and examines practical implications of those theories. Topics
include local economic development and poverty, tax incentives, infrastructure credits, firm location decisions and
effects of government competition for economic activity. (Same as PA 6342) (3-0) R

**ECO 6380 Experimental Economics I** (3 semester hours) Introduction to the methodology of laboratory
experimental economics, including principles of experimental design, development of effective protocols, research
with human subjects, and statistical analysis of experimental data, designing experiments to test theory,
experimental measurement of preferences and attitudes, and market and institutional “wind-tunnel” design.
Prerequisites: ECO 5301 and ECO 6309, or instructor’s permission. (3-0) T

**ECO 7311 Special Topics in Applied Econometrics** (3 semester hours) Topics vary from semester to semester.
May be repeated for credit to a maximum of 9 hours. However, students may not take more than 3 hours of the
field requirement from ECO 7311. (3-0) R

**ECO 7321 Special Topics in Human Resources** (3 semester hours) Topics vary from semester to semester.
May be repeated for credit to a maximum of 9 hours. However, students may not take more than 3 hours of the
field requirement from ECO 7321. (3-0) R

**ECO 7331 Special Topics in Industrial Organization** (3 semester hours) Topics vary from semester to
semester. May be repeated for credit to a maximum of 9 hours. However, students may not take more than 3 hours
of the field requirement from ECO 7331. (Same as POEC 7329 Special topics in Industry and Public Policy) (3-
0) R

**ECO 7341 Special Topics in International Development** (3 semester hours) Topics vary from semester to
semester. May be repeated for credit to a maximum of 9 hours. However, students may not take more than 3 hours
of the field requirement from ECO 7341. (3-0) R

**ECO 7351 Special Topics in Public Policy** (3 semester hours) Topics vary from semester to semester. May be
repeated for credit to a maximum of 9 hours. However, students may not take more than 3 hours of the field
requirement from ECO 7351. (3-0) R

**ECO 7391 Special Topics in Economics** (3 semester hours) Topics vary from semester to semester. (May be
repeated for credit to a maximum of 9 hours.) R

**ECO 7V01 Survey/Research Seminar** (3 or 6 semester hours) Students registering for this seminar work towards
the completion of their literature survey or their research project. Oral presentations and progress reports, as well
as a presentation of the final product. [3-6]-0 R

**ECO 7V02 Research in Economics** (Variable number of semester hours) Topics vary from semester to semester.
May be repeated for credit. Prerequisite: Consent of Instructor. [1-9]-0 R

**ECO 8V01 Dissertation Seminar** (Variable number of semester hours) A seminar for students preparing proposals
or writing dissertations. Prerequisite: Successful completion of qualifying examination or consent of instructor.
May be repeated for credit. (Same as POEC 8398 Dissertation Seminar) ([3-9]-0)

**ECO 8V02 Dissertation** (Variable number of semester hours) Provides faculty supervision of a student’s
dissertation research. May be repeated for credit. Prerequisite: Consent of instructor. ([1-9]-0) Y

**ECO 8V97 Internship** (3-6 semester hours) Provides faculty supervision for a student’s internship. Internships must
be related to the student’s course work. Internships are mainly intended for terminal MSAE students. Prerequisite:
Consent of Instructor ( [1-9] – 0) R
Doctor of Philosophy in Geospatial Information Sciences

http://www.utdallas.edu/dept/socsci/

This degree program is jointly offered by the School of Economic, Political and Policy Sciences, the School of Natural Sciences and Mathematics (specifically in the Department of Geosciences) and the Eric Jonsson School of Engineering and Computer Science, and is administered by the School of Economic, Political and Policy Sciences.

Faculty

Professors: Carlos Aiken (Geosciences), Brian J. L. Berry (Economic, Political and Policy Sciences), Ronald Briggs (Economic, Political and Policy Sciences), Daniel Griffith (Economic, Political and Policy Sciences), James Murdoch (Economic, Political and Policy Sciences), Edwin Sha (Computer Science), Robert Stern (Geosciences)

Associate Professors: Tom Brikowski (Geosciences), John Ferguson (Geosciences), Paul Jargowsky (Economic, Political and Policy Sciences), Michael Tiefelsdorf (Economic, Political and Policy Sciences), Fang Qiu (Economic, Political and Policy Sciences), Kang Zhang (Computer Science)

Assistant Professors: Mohammed Abdelsalam (Geosciences), Timothy Bray (Economic, Political and Policy Sciences), Kevin Curtin (Economic, Political and Policy Sciences), Karen Hayslett-McCall (Economic, Political and Policy Sciences), Latifur Kahn (Computer Science), Fang Qiu (Social Sciences), Weili Wu (Computer Science)

Objectives

Powerful new technologies have emerged in recent years to collect, store, manage, and analyze information regarding the features of the Earth’s surface and to combine these with other types of environmental, social and economic information. These technologies, which include geographic information systems (GIS), the global positioning system (GPS), and satellite-based remote sensing, are used in many ways from digital maps in rental and delivery vehicles, to the management and maintenance of city infrastructure, regional agriculture and forest lands, to the policing of communities, and to the conduct of modern warfare. The objective of the PhD in Geospatial Information Sciences is to develop individuals capable of advancing this field by developing new knowledge or capabilities relevant to it.

The degree program is jointly offered by the School of Economic, Political and Policy Sciences, the School of Natural Sciences and Mathematics (specifically in the Department of Geosciences) and the Eric Jonsson School of Engineering and Computer Science. This unique structure reflects geospatial information science’s origins as the confluence of work in multiple disciplines including geography, computer science, engineering, geology, and various social, policy and applied sciences. It is anticipated that many students will enter the program with a bachelor’s or master’s degree (and/or work experience) in an application area (such as public administration, geology, or economics) or in a technical specialization (such as engineering, computer science, or statistics) with the intent of advancing existing practice with geospatial information sciences in that application area or expanding the technological or theoretical base for geospatial information sciences.

The curriculum requires students to have mastery of Geospatial Information Sciences Technologies and Theory, have a Technological Specialization, have a Specific Application area (possibly derived from their master’s degree), and evidence research skills through a Ph. D. dissertation for a total of 90 semester credit hours beyond the bachelors degree.

Facilities

Students have access to state-of-the-art GIS computing facilities housed at the Bruton Center in the School of Economic, Political and Policy Sciences and the NASA Center for Excellence in Remote Sensing in the Department of Geosciences. The University’s extensive instructional computing facilities, including those in the Eric Jonsson School of Engineering and Computer Science, are also available. Facilities are open extended hours including evenings and weekends. Enrollment in hands-on courses is controlled to ensure that a station is available for every student. All industry-standard GIS and remote sensing software is available. The University is
a an Oracle Center of Excellence for Spatial Data Management and a member of the University Consortium for Geographic Information Science (UCGIS).

## Admission Requirements

The University’s general admission requirements are discussed on page 13.

The PhD program in Geospatial Information Sciences seeks applications from students with a baccalaureate, Master of Arts, Master of Science or professional masters-level degree in any field relevant to geospatial information science including, but not limited to, computer science, economics, engineering, geography, geology, management information systems, marketing, natural resource management, public affairs and public administration, statistics, and urban and regional planning. Applicants will be judged and evaluated by the existing admission standards as set forth by the University in its Graduate Catalog and by the standards set forth here by the Geospatial Information Sciences program. A bachelor’s degree from an accredited institution or its equivalent and fluency in written and spoken English are required. A grade average of at least 3.25 in undergraduate and graduate course work, and a combined verbal and quantitative score of 1150 on the GRE are desirable.

Students must submit transcripts from all higher education institutions attended, three letters of recommendation, and a one-page essay outlining the applicant’s background, education, and personal objectives as they specifically relate to a Ph.D. in Geospatial Information Sciences.

## Prerequisites

The following pre-requisites/co-requisites will also be required for admission to the PhD program: (i) college mathematics through calculus, (ii) competence in at least one modern programming language equivalent to GISC 5317 Computer Programming for GIS, or CS 5303 and CS 5330 Computer Science I & II or MIS 5321 Computer Programming or MIS 6322 Visual Basic or MIS 6323 Java, or their equivalents, and (iii) at least one course in inferential statistics through to regression analysis equivalent to POEC 5313 Descriptive and Inferential Statistics or GEOS 5306 Data Analysis for Geoscientists. Graduate courses taken at UTD to meet these pre-requisites may be counted as electives toward the 90 credit hours for students entering the Ph.D. program directly from a B.A. or B.S. degree, but they shall not be considered substitutes for any other specified course.

## Transfer Policies

Students may transfer up to 36 hours of course work from another institution and have them apply to degree requirements set out below.

## Advising

Because of the cross-disciplinary nature of this doctoral program, to ensure adequate preparation and appropriate course sequencing, every doctoral student is required to consult with the student’s designated advisor and/or the GIS Doctoral Program Director prior to registration in every semester.

## Degree Requirements

The University’s general degree requirements are discussed on page 18.

To receive the PhD in Geospatial Information Sciences, students must complete the Geospatial Science Core (15 SCH) to achieve a mastery of appropriate Geospatial Information Science technologies and theory, have a Geospatial Specialization Area (15 SCH), have a Specific Application area or Technical field (12 SCH), evidence research skills through successful completion and defense of a Ph. D. dissertation, and take related electives as necessary for a total of 90 semester credit hours. In addition, students must satisfy a set of exams and qualifiers. Other courses may be substituted for those listed below with the written permission in advance of the Director of the GIS Doctoral program.

### Geospatial Science Core (15 SCH)

- GISC 6381 GIS Fundamentals
- GISC 6382 Applied GIS
- GISC 6384 Spatial Analysis and Modeling
- GISC 6385 GIS Theories, Models and Issues
- GISC 6387 GIS Workshop
Geospatial Specialization Area selected from one of the following, with a minimum of 15 SCH:

I. Geospatial Computing and Information Management
CS 6378 Advanced Operating Systems
CS 6359 Object Oriented Analysis and Design
CS 6360 Database Design
CS 6V80 Spatial Data Management
CS 6364 Artificial Intelligence
CS 6366 Computer Graphics
CS 6384 Computer Vision
CS 6381 Combinatorics and Graph Algorithms
CS 6375 Neural Nets and Machine Learning
GISC 6383 GIS Management and Implementation
GISC 7363 Internet Mapping and Information Management
GISC 6488 GIS Application Development
*MIS 6326 Database Management Systems
(* may not be used in conjunction with certain other courses. Consult GIS Doctoral Program Director)

II. Spatial Statistics and Modeling
CS 5343 Data Structures
*ECO 6309 Econometrics I
*ECO 6310 Econometrics II
*ECO 6314 Structural Equation Modeling
*GEOS 5306 Data Analysis for Geoscientists
GISC 7360 Pattern Analysis
GISC 7361 Spatial Statistics
GISC 7363 GIS Network Modeling
GISC 7364 Demographic Analysis and Modeling
GISC 7368 Spatial Epidemiology
GISC 7384 Advanced Raster Modeling
*POEC 5313 Descriptive and Inferential Statistics
*POEC 5316 Advanced Regression Analysis
POEC 7371/ECO 6315 Time Series Analysis
(* may not be used in conjunction with certain other courses. Consult GIS Doctoral Program Director)

III. Remote Sensing and Satellite Technologies
GEOS 5422 GPS Surveying Techniques
GEOS 5489 GIS Applications in Geosciences
GEOS 5325 Intro to Remote Sensing
GEOS 5328 Radar Remote Sensing
GEOS 5329 Applied Remote Sensing
GEOS 5326/GISC 7365 Remote Sensing Digital Image Processing
GEOS 7327 Remote Sensing Workshop
EE 6360 Digital Signal Processing I
EE 6363 Digital Image Processing

IV. Customized Geospatial Specialization (15 SCH)
Identified by the student with approval in advance by the Director of the GIS Doctoral Program.

Application Area or Technical Field (12 SCH)
Twelve semester-credit hours of specialized course work in an application area or technical field relevant to GIScience. Normally, these will derive from the student’s masters degree. These hours may be transferred from another institution, or taken at UTD in an existing master’s program area and may be applied toward a master’s in that area.
Application area examples: planning, public affairs, criminal justice, health and epidemiology, geoscience, forestry, hydrology, marketing, real estate, economics, civil engineering.
Technical field examples: statistics, computer science, software engineering, management information systems, image analysis, operations research/location science, instrumentation.

Research and Dissertation (24 to 48 SCHs)
GISC 7389 GIS PhD Research Project Qualifier
GEOS 6205 Geoscience Presentations
POEC 5310 & 6342 Research Design I & II
GISC 7387 GIS Research Design
GISC 8V29 Research in GIS
GISC 8v99 or GEOS 8v99 or CS 8v99 Dissertation
Other Related Electives (0 to 24 SCH)

Students may choose up to 24 SCHs in related electives with consent of the GIS Doctoral Program Director.

Exams and Qualifiers
1. Ph.D. Research Project Qualifier
   The student must register for and complete GISC 7389 Geospatial Information Sciences (GI Sciences) PhD Research Project Qualifier according to uniform guidelines established by the GIS program.

2. Grade Point Qualifier
   The student must have a GPA of at least 3.25, and preferably 3.5, in courses taken at UT-Dallas at the time they register for GISC 7389 Ph.D. Qualifier, or they must petition the GIS faculty for an exemption for extenuating circumstances beyond the student’s control.

3. Qualifying Examination and Defense of Proposal
   After meeting the Research Project Qualifier, the student must (1) demonstrate through a general exam his/her competency in the area chosen for their dissertation, and (2) successfully present and defend a dissertation proposal through an oral examination, according to uniform guidelines established by the GIS program.

4. Defense of Dissertation
   A dissertation must be prepared and defended successfully following the procedures established by the Dean of Graduate Studies.

Geospatial Information Sciences Course Descriptions

GISC 5317 Computer Programming for GIS (3 semester hours) General introduction to Visual Basic and other languages with GIS related applications. Topics covered include fundamental data structures and algorithms, user-interface design, component object model, and data base management. Emphasis on rapid GIS application development with hands-on experiences. Students are expected to design and implement a project. (3-0) R

GISC 6332 GIS Applications in Criminology (3 semester hours) Examines spatial distribution of crime, criminals, and criminal justice interventions. Students conduct spatial analysis of point patterns and area-based data in studies of the locations of crime events and rates, offenders, police controlling practices, judicial districts and community corrections and how they relate to physical and social characteristics of neighborhoods. Same as POEC 6332 (3-0) R

GISC 6379 Special Topics in Geographic Information Sciences (3 semester hours) Topics vary from semester to semester. May be repeated for credit up to a maximum of 9 hours. Consult with adviser to determine appropriateness of topic for degree plan. (3-0) R

GISC 6381 Geographic Information Systems Fundamentals (3 semester hours) Examines the fundamentals of Geographic Information Systems and their applications. Emphasizes the concepts needed to use GIS effectively for manipulating, querying, analyzing, and visualizing spatial-based data. Industry-standard GIS software is used to analyze spatial patterns in social, economic and environmental data, and to generate cartographic output from the analysis. (Same as PA 6381) (3-0) Y

GISC 6382 Applied Geographic Information Systems (3 semester hours) Further develops hands-on skills with industry-standard GIS software for application in a wide variety of areas including urban infrastructure management, marketing and location analysis, environmental management, geologic and geophysical analysis and the Economic, Political and Policy Sciences. Prerequisite: GISC 6381, or equivalent with instructor’s permission. (3-0) Y

GISC 6383 Geographic Information Systems Management and Implementation (3 semester hours) Management strategies for GIS are examined by presenting GIS as an integrated system of people, computer hardware, software, applications and data. Implementation is examined as a systematic process of user needs
GISC 6384 Spatial Analysis and Modeling (3 semester hours) Treatment of more advanced topics in the application of spatial analysis in a GIS environment. Topics covered include raster-based cartographic modeling, 3-d visualization, geostatistics and network analysis. Student will be acquainted with state-of-the-art software through hands-on laboratory experiences. Prerequisite: GISC 6381. (3-0) Y

GISC 6385 GIS Theories, Models and Issues (3 semester hours) Provides an understanding of the theory, data models and associated issues (such as uncertainty) that underlie GIS and the way these are applied to, and effect, spatial analysis and spatial data management. Prerequisite: GISC 6381 and 6382, or equivalent with instructor’s permission. (3-0) Y

GISC 6386 Urban and Environmental Applications of GIS/Remote Sensing. (3 semester hours) Examines the use of GIS and/or remote sensing techniques for understanding selected social phenomena (such as health, political behavior, poverty, crime) or environmental conditions (such as land use, air quality, hydrology) in urban areas and for implementing potential solutions to associated problems. Requires completion of projects and/or papers that reflect the students’ mastery of theory, research, data, and software. Prerequisites: GISC 6381 or GEOS 5325, or equivalent with instructor’s permission. (3-0) R

GISC 6387 Geographic Information Systems Workshop (3 semester hours) Provides a structured laboratory experience focused on the students’ substantive area of interest. Each participant develops a project which should include aspects of database design and manipulation, spatial analysis, and cartographic production. Projects may be designed in coordination with a local government, utility, business, or other entity that uses GIS in its operations and research. Prerequisites: GISC 6381 and GISC 6382. (3-0) Y

GISC 6388 GIS Application Development (3 semester hours) Provides instruction and hands-on experience in specific techniques and languages for developing application systems based on GIS concepts. Students will learn to use current generation commercial software to design and implement an application. Prerequisites: GISC 6381 and GISC 5317, or consent of instructor. (3-0) R

GISC 6389 Geospatial Information Sciences Master’s Project (3 semester hours) Requires completion of an original GIS project by the student working alone or in a team. Team efforts must result in products that can be associated uniquely with each student. Projects normally continue efforts started in GISC 6387 or GISC 6386. (3-0) S

GISC 7360 GIS Pattern Analysis (3 semester hours) Examines univariate and multivariate methods for point pattern analysis, geo-statistical surface interpolations, and spatial regression models. Underlying models and processes leading to spatially clustered and spatially dispersed patterns are discussed. Course has particular relevance for local and global spatial analyses of crime, disease, or environmental patterns. Prerequisites: GISC6381 and descriptive and inferential statistics through regression analysis, or consent of instructor. (3-0) R

GISC 7361 Spatial Statistics (3 semester hours) The application of statistical techniques to the explicit treatment of space (geography) in social science models. Covers indices of spatial autocorrelation, the specification of autoregressive models (Gaussian, Poisson, binomial/logistic), geostatistical modeling, spatial filtering, Bayesian map analysis, random effects in models, and imputation of missing geocoded data. Prerequisite: POEC 5316 or equivalent; GISC 7360 recommended. (3-0) R

GISC 7362 GIS Network Modeling (3 semester hours) Examines the theory of network analysis and its application in Geographic Information Systems. Topics covered include graph theoretic measures of network connectivity and proofs of network properties; optimization problems including shortest path algorithms, flow algorithms, and assignment problems on networks; special solution procedures for the classic transportation problem; procedures for linear referencing and urban travel demand modeling. The implementation of these algorithms and procedures with GIS data structures is explored using industry standard GIS software. Prerequisite: GISC 6381 or equivalent knowledge. (3-0) R

GISC 7363 Internet Mapping and Information Processing (3 semester hours) Provides a conceptual overview and hands-on experiences in Internet mapping and web-based geospatial information processing with state-of-the-art commercial software. Topics covered include client/server configuration, distributed data access and display, web-based user interaction and customization. (3-0) T

GISC 7364 Demographic Analysis and Modeling (3 semester hours) Examines key demographic models for population analysis, their underlying theoretical foundations, and extensions into the spatial domain. Incorporates quantitative estimation and projection techniques and their use within a geographic information systems framework. Provides a solid understanding of spatio-temporal population dynamics, either local or global, which is essential to many disciplines engaged in planning for the public and private service sectors, for transportation networks or for regional development projects. Prerequisites: descriptive and inferential statistics through regression analysis (3-0) (Same as PA 7364 and SOC 6364) R
GISC 7365 Remote Sensing Digital Image Processing (3 semester hours) Introduction to remote sensing digital image processing techniques. Topics covered include principles of remote sensing and remote sensors, image visualization and statistics extraction, radiometric and geometric correction, image enhancement, image classification and change detection. Innovative image processing approaches will also be introduced. State-of-the-art commercial image processing software is used for labs and applications development. Same as GEOS 5326 (3-0) R

GISC 7366 Applied Remote Sensing (3 semester hours) Focuses on the application of remote sensing techniques to solving real world urban and environmental problems in areas such as urban and suburban landscape, lane use and land cover, transportation and communication, vegetation and forestry, biodiversity and ecology, water and water quality control, soils and minerals, geology and geomorphology studies. The current generation, industry standard software is used for labs and applications development. Same as GEOS 5326 (3-0) R

GISC 7367 Remote Sensing Workshop (3 semester hours) An independent project is designed and conducted by the student, after instructor approval. The project develops and demonstrates student’s competence in using remote sensing techniques in a substantive application appropriate to his/her field of interest. Projects may be developed in coordination with a local government, utility, business, or other entity, which uses remote sensing in its operations and research. A formal presentation and a project report are required. Prerequisites: GISC 6381 and GISC 7365 Same as GEOS 7327. (3-0) R

GISC 7368 Spatial Epidemiology (3 semester hours) Examines the conceptual and analytic tools used to understand how spatial distributions of exposure impact on processes and patterns of disease. Emphasizes the special design, measurement, and analysis issues associated with spatial patterns of diseases. Contemporary diseases of public health importance are addressed, and the statistical and inferential skills are provided that can be used in understanding how spatial patterns arise and their implications for intervention. Prerequisite: descriptive and inferential statistics through regression analysis. (Same as PA 7368 and SOC 7368)(3-0) R

GISC 7384 Advanced Raster Modeling (3 semester hours) Examines advanced topics in raster modeling beyond those discussed in GISC 6384 Spatial Analysis. Prerequisite: GISC 6384 or equivalent knowledge. (3-0) R

GISC 7387 Research Design in GIS (3 semester hours) Examines issues relative to the conduct of effective and valid research in geospatial information sciences. (3-0) R

GISC 7389 GI Sciences Ph.D. Research Project Qualifier (3 semester hours) Requires completion, according to uniform guidelines established by the GI Sciences program, of a GI Sciences Research Project and its presentation to a committee of at least three GI Sciences faculty. May be repeated once in the immediate following semester. May substitute for GISC 6389 GI Sciences Master’s Project. Prerequisite: completion of 24 hours of coursework in GI Sciences Ph.D. program (3-0) R

GISC 8V01 Independent Study in GIS (1-9 semester hours) Provides faculty supervision for a student’s individual study of a topic agreed upon by the student and the faculty supervisor. Prerequisite: Consent of instructor. (May be repeated for credit.) ([1-9]-0) S

GISC 8320 Seminar in Spatial Analysis (3 semester hours) Examines selected topics in spatial analysis or GI Science. (May be repeated for credit when topics differ.) (3-0) R

GISC 8V27 Internship in GIS (1-9 semester hours) Provides faculty supervision for a student’s internship, which must be related to GIS. ([1-9]-0) S

GISC 8V29 Research in GIS (1-9 semester hours) Provides faculty supervision of research conducted by a student. Prerequisite: Consent of instructor. (May be repeated for credit.) ([3-9]-0) S

GISC 8V99 Dissertation (3-9 semester hours) Provides faculty supervision of a student’s dissertation research. Prerequisite: Consent of instructor. (May be repeated for credit.) ([3-9]-0) S

Additional Courses

Additional courses relevant to degrees in geospatial information sciences are available in other degree programs in the School of Sciences, in the Department of Computer Science, and in the Department of Geosciences. See the Geospatial Information Sciences degree requirements for listings of these courses.
Doctor of Philosophy in Political Science

http://www.utdallas.edu/dept/socsci/ psci

Faculty
Associate Professors: Pamela Brandwein, Thomas Brunell, Marie I. Chevrier, Gregory S. Thielemann
Assistant Professors: Patrick Brandt, Jennifer S. Holmes, Chad King, Clint Peinhardt, Scott Robinson, Carole J. Wilson
Senior Lecturers: Brian Bearry, Karl Ho

Objectives
The Doctor of Philosophy in Political Science provides a rigorous, sharply focused disciplinary program with strong multidisciplinary links. The Program consists of innovative, state-of-the-science graduate education in political methodology and the fields of Decision Making and Public Management, Democratization, Globalization and International Relations, and Political and Government Institutions and Processes. Students’ research skill development and degree completion are facilitated by a rolling cohort design. In the first year of the cohort, students acquire basic research skills and tools and work on research projects. Later, they have opportunities to develop their instructional and presentation skills, to participate in summer methodology programs, and to interact with highly regarded scholars and practitioners in their fields of study.

The Program is intended to educate highly qualified students for fulfilling careers in academe, government, industry, and non-profit organizations in the Dallas-Fort Worth, state, national, and other arenas. Program graduates are expected to have the resources and skills that are necessary for analytical and administrative positions and responsibilities in areas that involve knowledge producers, private firms, and government agencies and departments. Graduates should be equipped to instruct and to conduct productive research in the traditional fields of Political Science as well as newer, state-of-the science, trans-disciplinary fields.

Facilities
Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University’s Computing Center. The School has two computing laboratories which house over 50 computers that are network linked and equipped with major social science software packages, including E-Views, R, RATS, SPSS, and STATA. A computerized geographic information system, the Lexis Nexis Database, and WestLaw are also available for student use. The University’s Computing Center provides personal computers and UNIX workstations.

Many important data and reference materials are available online from professional associations or at UTD via the Library’s and School’s memberships in the American Political Science Association, the European Consortium for Political Research (ECPR), the Inter-University Consortium for Political and Social Research (ICPSR), the Roper Center, the University Consortium for Geographic Information Science (UCGIS), and other organizations. The Library has a substantial number of Political Science journals.

Students have opportunities to participate in research programs directed by members of the faculty. As appropriate, some students may become involved in methodological development activities offered by the School’s membership in the ECPR, ICPSR, and UCGIS. In addition, some students may be eligible to participate in the professional development activities provided by faculty who edit or co-edit the American Journal of Political Science, Electoral Studies, and Political Research Quarterly.

To attract the best students, editorial, research and teaching assistantships are available. Fellowships are offered through the Center for The Study of Texas Politics. Editorial assistantships are available through several of the professional journals supported by the University. Other assistantships are provided to work with faculty at the Center for Texas Politics or on instructional activities.
Admission Requirements
The University’s general admission requirements are discussed on page 13.

The Doctor of Philosophy in Political Science Program seeks applications from individuals with a baccalaureate, Master of Arts, or Master of Science degree in Government and Politics, Political Science, Public Administration, Public Affairs or a relevant discipline. The degree must be from an accredited college or university. An undergraduate grade point average of at least 3.2 and a combined quantitative and verbal Graduate Record Examination (GRE) score of 1200 are desirable for students who expect to progress satisfactorily towards graduation. Applicants also may submit their score from the writing component of the GRE as additional evidence of their admission eligibility. Applicants should submit all transcripts, three letters of recommendation, and a one-page essay describing educational and professional objectives. Grade point average, GRE score, and other information pertaining to the applicants’ educational background and professional goals are among the factors that are considered in determining direct admission. Applications are reviewed by the Political Science Program Committee in the School of Economic, Political and Policy Sciences.

Students who lack the necessary background to start the Program are advised to take courses that strengthen their preparation, but these courses do not receive credit towards the Ph.D. Program. Undergraduate students who are interested in completing their undergraduate degrees while simultaneously taking graduate courses in the Political Science Ph.D. Program are expected to meet the School’s “fast-tracking” requirements.

Transfer Policies
Students who have previous graduate work in a discipline that is relevant to the Doctor of Philosophy in Political Science, such as a M.A. or M.S. in Government and Politics, Political Science, Public Administration, or Public Affairs, or a J.D., may be given transfer credit. The maximum amount of graduate program transfer credit is 45 hours of graduate coursework with no grade below B. However, transfer credit typically is not given for the core courses or other required courses in the Program may be required to demonstrate competence in these areas. Any award of transfer credit will be consistent with the University’s “Transfer of Credit” Policy.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

On admission to the Ph.D. in Political Science Program, the student earns a minimum of 90 semester credit hours of coursework and dissertation credit beyond the baccalaureate degree. Core hours include four courses in Political Science Methodology and Theory, and three proseminars in the Program fields. The three fields are Decision Making and Public Management; Democratization, Globalization, and International Relations; and Political and Government Institutions and Processes. Additional coursework includes four courses in the major field, two courses in the minor field, four courses of prescribed elective credit, and three-to-six courses of freely chosen credit. Prior to admission to doctoral candidacy and further work on the dissertation or practicum, the student must pass three examinations – in the core, in the major field, and in the minor field.

On examination completion, the student proceeds to present a doctoral dissertation or practicum proposal. The proposal must be approved by his/her Advisory Committee not later than two consecutive semesters after examination completion. Upon Committee approval, the student does further work on the doctoral dissertation or practicum while enrolling continuously for credit in research seminars and in dissertation or practicum research. The dissertation has multiple chapters that consist of a clear statement of the research problem, the theoretical framework and research design, the methods of analysis and findings, and an appropriately development conclusion. The practicum consists of three papers that may or may not be thematically related and are informed by the theories and methodology of the student’s major field. All three papers must be suitable for presentation at a major professional meeting and/or submission to a peer-reviewed professional journal.

Semester Credit Hour Requirements

<table>
<thead>
<tr>
<th>Category</th>
<th>Credit Hours</th>
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<tbody>
<tr>
<td>Core Courses in Political Science Methodology</td>
<td>12</td>
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<td>and Theory</td>
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<tr>
<td>Field Proseminars</td>
<td>9</td>
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<tr>
<td>Courses in Major Field</td>
<td>12</td>
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<tr>
<td>Courses in Minor Field</td>
<td>6</td>
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<tr>
<td>Prescribed Elective Credit (Research Seminars or</td>
<td>12</td>
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<tr>
<td>Special Topics)</td>
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<tr>
<td>Freely Chosen Elective Credit for DG&amp;IR or I&amp;P</td>
<td>9-18</td>
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<tr>
<td>as Major Field</td>
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</tbody>
</table>
Other Courses Required for PM&DM as Major Field 9-18
Dissertation or Practicum Research 21-30
Total (Minimum) 90

Core Courses
PSCI 5301 Proseminar in Democratization, Globalization and International Relations
PSCI 5303 Proseminar in Public Policymaking and Institutions
PSCI 5305 Proseminar in Decision Making and Public Management
PSCI 5350 Logic, Methodology and Scope of Political Science
PSCI 5352 Empirical Democratic Theory
PSCI 5360 Data Collection and Analysis in Political and Social Science Data
PSCI 5362 Multivariate Models for Analyzing Political and Social Science Data

Democratization, Globalization and International Relations
PSCI 6308 International Political Economy and Organizations
PSCI 6335 Institutions and Development
PSCI 6337 Comparative Institutions
PSCI 6362 Political Development
PSCI 7320 International Negotiations

Political and Government Institutions and Processes
PSCI 5302 Law and The Policy Process
PSCI 5304 Policy Processes, Implementation and Evaluation
PSCI 6324 Local and State Government and Politics
PSCI 6331 Executives, Legislatures and Public Policy
PSCI 6335 Political and Civic Organizations
PSCI 6336 Bureaucracy and Public Policy
PSCI 6337 Comparative Institutions
PSCI 7344 Gender and Public Policy
PSCI 7350 Institutions and Citizen Behavior
PSCI 7352 Theories of Choice and Decision Making

Decision Making and Public Management
PSCI 5302 Law and The Policy Process
PSCI 5315 Public Management
PSCI 5364 Mathematical Models in Political and Social Science
PSCI 6320 Organizational Theory
PSCI 6324 Public Choice
PSCI 6325 Decision Theory
PSCI 6326 Decision Tools for Managers
PSCI 6328 Management Process and Analysis
PSCI 7352 Theories of Choice and Decision Making
PSCI 7370 Decision Making, Complexity and Risk
PSCI 7375 Applied Studies in Human Decision Making
Students who select this field as their major field also are expected to take:
POEC 5305 Microeconomics
POEC 7340 Domestic Social Policy
ACN 6330 Cognitive Science

Other Courses
PSCI 7V81 Special Topics in Political Science
PSCI 7V83 Independent Study
PSCI 8381 Research Seminar in Political Science
PSCI 8V99 Dissertation or Practicum
Course Descriptions

PSCI 5301 Proseminar in Democratization, Globalization, and International Relations (3 semester hours) Studies major theories of democracy, democratization and globalization, relationships between democratization and globalization, and their implications for citizen politics, government performance, and regime legitimacy. (3-0) Y

PSCI 5302 Law and The Policy Process (3 semester hours) Provides the legal perspective on public policy and emphasizes the role of the judicial system in the recent evolution of public policy in selected problem areas. Same as PA 5302 and POEC 5302. (3-0) T

PSCI 5303 Proseminar in Public Policymaking and Institutions (3 semester hours) Surveys the major institutions associated with policymaking, including Congress, the Presidency, the bureaucracy, and interest groups. These institutions are studied by linking them to the decision-making theories or organizations, social choice and incrementalism. Same as PA 5303 and POEC 5303. (3-0) Y

PSCI 5304 Policy Processes, Implementation and Evaluation (3 semester hours) Applies models of the policy system to the analysis of legislative, administrative and judicial processes at different points in the policy cycle. Uses case studies, empirical analysis, direct observation, and group projects. Prerequisite: PSCI 5303 or consent of instructor. Same as PA 5304. (3-0) Y

PSCI 5305 Proseminar in Decision Making and Public Management (3 semester hours) Examines current scholarship on decisions made by public managers and associated efforts to calculate and examine the relative risks involved with the outcomes of management decisions. Considers management decisions that are internal to organizations, such as human resource decisions, and external decisions such as environmental management. Examines the mathematics and science of risk management. (3-0) Y

PSCI 5310 Administrative Law (3 semester hours) Course uses case study approach and examines the activities of Congress, the courts, and federal administrative agencies in the creation and implementation of laws that govern the behavior of these agencies. (3-0) T

PSCI 5315 Public Management (3 semester hours) The application of ideas and techniques of public management and decision making to examine the various roles of the general manager in public organizations. Uses the case method. Same as PA 5315. (3-0) Y

PSCI 5350 Logic, Methodology, and Scope of Political Science (3 semester hours) Promotes understanding of how and why research projects are conducted, and when and why research programs cease to contribute to knowledge production. Attention also is paid to major modes of analysis in Political Science, the state of the discipline, and future directions in field-specific, cross-field, and cross-disciplinary research. (3-0) T

PSCI 5352 Empirical Democratic Theory (3 semester hours) Encourages critical and constructive thinking about complex and simple, as well as stable and variable, developments in citizenship, government, and politics. Additional consideration is given to formal, game-theoretic, and other approaches to individual action, institutional design, and individual-institutional interactions. (3-0) T

PSCI 5360 Data Collection and Analysis in Political and Social Science (3 semester hours) Provides students with basic understanding of methodological issues in doing systematic empirical research. Covers the collection of survey and aggregate data, measurement, descriptive and inferential statistics, and introductory regression analysis. Uses statistical software, such as SPSS and STATA, together with individual- and aggregate-level data on government, politics, and public opinion. (3-0) Y

PSCI 5362 Multivariate Models for Analyzing Political and Social Science Data (3 semester hours) Focuses on the specification and analysis of multivariate models of individual- and aggregate-level data in the political and Economic, Political and Policy Sciences. Topics covered include the analysis of continuous and limited dependent variables, model diagnostics, model comparison, and exogeneity testing. Introduces structural equation modeling, with emphasis on the confirmatory factor analysis of multivariate measurement models. Prerequisite: PSCI 5360 or consent of instructor. (3-0) Y

PSCI 5363 Mathematical Models in Political and Social Science (3 semester hours) Introduces students to a variety of models in the Economic, Political and Policy Sciences, including primarily rational choice approaches but also some computational work. The course will allow students to understand and compose rudimentary models, including prisoner’s dilemma, assurance games, and strategic voting. (3-0) T

PSCI 5364 Public Opinion and Survey Research (3 semester hours) Introduces students to the principles and practices of survey research. Topics include the selection of an appropriate survey method, questionnaire design and testing, response problems, interviews and surveys, and the analysis of survey data, including those on political attitudes and public opinion dynamics. Also examines how these data are used in developing successful political campaign strategies. (3-0) T
PSCI 5366 Statistics in Law (3 semester hours) Course reviews topics in elementary statistics and data analysis, and examines the use of statistics in the legal profession, particularly in trials in appellate decisions, as well as in models of judicial decision making. (3-0) T

PSCI 6309 International Political Economy and Organizations (3 semester hours) An overview of important developments in the study of conflict and cooperation among countries, especially in the economic arena. (3-0) T

PSCI 6320 Organizational Theory (3 semester hours) Focuses on bureaucracy and rationality, formal and informal structures, and the role of the environment. Organizational factors such as technology, power, information and culture, as well as the implications of organizational theory for public policy are examined. Same as POEC 6320, PA 6320 and SOC 6320. (3-0) Y

PSCI 6323 Public Choice (3 semester hours) This course covers the application of economic reasoning to non-market decision making in situations involving collective choice. Topics include market and government failure, collective action, properties of different voting rules, design of constitutions, and the behavior of candidates, elected officials, bureaucrats, and voters. Prerequisite: POEC 5305 Microeconomics (3-0) R

PSCI 6324 Local and State Government and Politics (3 semester hours) Examines public policy institutions and processes at the local and state level in the United States, with particular attention to developments in the Dallas-Forth Worth Metroplex and the State of Texas. Addresses issues of policy convergence, divergence, and representation. (3-0) R

PSCI 6325 Decision Theory (3 semester hours) Explores the development of decision-making models and theories across organizational and institutional environments. Includes details analysis of decision making under conditions of certainty, risk and uncertainty. Same as PA 6325 and POEC 6325. (3-0) T

PSCI 6326 Decision Tools for Managers (3 semester hours) Course introduces students to the variety of analytical and mathematical tools intended to improve management decision making. Tools range from soft decision analysis to techniques of management science. Uses available software for management science studies. Same as PA 6326. (3-0) T

PSCI 6328 Management Process and Analysis (3 semester hours) This course examines rigorous methods for analyzing management processes and decision-making. Focuses on the examination, critique and design of management systems. Same as PA 6328. (3-0) Y

PSCI 6331 Executives, Legislatures and Public Policy (3 semester hours) An investigation of the role played by executives and legislatures in shaping public policy in the United States. Same as POEC 6331 (3-0) T

PSCI 6333 Political and Civic Organizations (3 semester hours) An institutional perspective on political parties, interest groups, and other organizations such as labor unions and nonprofit organizations that are important actors in political and civic affairs. The emphasis is on internal operations of organizations, their strategic behavior, and interactions with government, including both regulation by the state and attempts to influence public decision makers. (3-0) T

PSCI 6335 Institutions and Development (3 semester hours) An overview of leading theories, institutional perspectives, issues and policy debates concerning urban, regional, national and global development. Topics may include economic growth, technology and innovation, shifts in industrial structure, spatially imbalanced change, and their welfare consequences. Same as POEC 6335. (3-0) T

PSCI 6336 Bureaucracy and Public Policy (3 semester hours) Examination of processes involved in arriving at administrative decisions within the structure of the regime. Reciprocal ties of influence and control between official organizations and other public and private organizational actors, as well as organizational dynamics such as communication, power, and decision making in administrative agencies. Same as POEC 6336. (3-0) T

PSCI 6337 Comparative Institutions (3 semester hours) A comparative analysis of political and economic institutions in different settings. Includes a consideration of different theoretical approaches to the comparative study and design of institutions in the United States and elsewhere. Same as POEC 6337. (3-0) T

PSCI 6362 Political Development (3 semester hours) This course surveys different perspectives on and theories of political development. Topics covered include the role of the state, democratization, political stability, civil society and environmental concerns. Same as POEC 6362. (3-0) T

PSCI 7320 International Negotiations (3 semester hours) This course examines both the substance and the process of international negotiations. Students study the theory and analysis of negotiations and identify issues, interests and positions of the parties. The course covers the substantive areas of arms control, trade, and environmental negotiations. The course moves from the analysis of simple, bilateral negotiations with only a few issues in contention to complex multilateral negotiations. Same as POEC 7320. (3-0) T

PSCI 7344 Gender and Public Policy (3 semester hours) Explores issues of gender and public policy in the U.S. Topics include gender critiques of welfare state policy, gender and poverty, women in the military, the politics (and political economy) of sex and sexuality, anti-sexual harassment policies. Same as POEC 7344 and SOC 7344. (3-0) T
PSCI 7350 Institutions and Citizen Behavior (3 semester hours) Examines the major theories, concepts and models associated with relationships between public institutions and citizen behavior, particularly how such institutions as elections, interest groups, political parties and social movements mobilize behavior and how behavior, in turn, influences institutional processes and outcomes. (3-0) T

PSCI 7352 Choice and Decision Making (3 semester hours) This course integrates theories of political choice with models of decision making in the fields of social cognition, economics, and consumer behavior. (3-0) T

PSCI 7370 Decision Making, Complexity and Risk (3 semester hours) Examines the important elements of risk in decision-making environments typified by increasing complexity. Reviews the variety of decision-making tools and simulation techniques for contending with increasing complexity. Examines elements of decision making such as nonlinear effects and the problem of marginal returns. (3-0) T

PSCI 7375 Applied Studies in Human Decision Making (3 semester hours) Field research in a public organization/agency. Students examine actual decision making and decision systems. Students produce detailed academic analysis of the decision-making environment and the decision-making challenges faced by a particular public organization/agency. (3-0) R

PSCI 7381 Special Topics in Political Science (3 semester hours) Topics vary semester to semester and are rotated typically among the three fields of the program. May be repeated for credit to a maximum of 9 hours. (3-0) R

PSCI 7V83 Independent Study (3-9 semester hours) Provides faculty supervision of student's individual study of a topic that is directly relevant to dissertation or practicum research and is agreed on by the student and the faculty supervisor. Prerequisite: Consent of instructor and Political Science Program Director. (May be repeated for credit.) ([1-9]-0) R

PSCI 8381 Research Seminar in Political Science (3 semester hours) Promotes faculty-student research collaboration and students' dissertation or practicum and professional development. (3-0) Y

PSCI 8V99 Dissertation or Practicum (3-9 semester hours) Provides faculty supervision of a student's dissertation research. Prerequisite: Consent of instructor and student's Advisory Committee. (May be repeated for credit.) ([3-9]-0) S
Doctor of Philosophy in Public Affairs

http://www.utdallas.edu/dept/socsci/

Faculty


Associate Professors: Pamela Brandwein, Marie Chevrier, Simon Fass, Susan McElroy

Assistant Professors: Roxanne Ezzet-Lofstrom, Scott Robinson

Objectives

The Doctor of Philosophy in Public Affairs degree is an interdisciplinary doctoral program that prepares graduates to assume either positions in academe, research producing organizations or positions of administrative authority in public (government, public school districts), quasi-public (healthcare, insurance), and nonprofit (providers, foundations) organizations. The degree combines innovative and traditional methods of educational delivery and emphasizes the integration and application of theory to practice. The guiding philosophy of the degree is that “public affairs” involves more than mere functional administration, policy implementation or quantitative policy analysis. Rather, doctoral education in public affairs requires an interface between the traditions of public management, decision science, and policy analysis and processes with a practical appreciation for the challenges of maintaining and building institutions of governance and a civic culture in a complex, democratic society.

The Ph.D. degree is nontraditional in that it requires all students to conduct applied, field-based research as the foundation for the production of their dissertations. Students will be required to engage in a genuine effort in a public, quasi-public or non-profit organization to improve organizational performance. Organizational performance can be improved in many ways consistent with enhancing institutions and civic culture. Examples of such field-based research efforts may include efforts to improve outreach to clientele groups or to develop new methods of interorganizational/intersectoral functioning. These efforts, performed under the guidance of an Economic, Political and Policy Sciences faculty member, will be theory-driven, produce evaluative data and analysis, and expand the body of relevant knowledge.

The PhD program in Public Affairs is a cohort program. The program requires 45 hours plus relevant doctoral dissertation hours. Well-prepared students (for example, those with a master’s degree in public administration, public affairs, public policy, business administration, health administration, or education administration) may be able to complete the course requirements and the dissertation within 3 years from their initial enrollment. Students in each cohort take 6 hours of classes each fall, spring and summer semester. This allows students to complete the core courses, electives and 9 hours within the analysis/research tools area in 7 consecutive semesters of enrollment. Students will generally start the production of the dissertation during the seventh semester of enrollment. Entering cohorts begin each fall semester. This approach produces shared experiences and progress through the program that enrich student learning and student research. Students admitted to the program, but lacking some pre-requisites, may take those classes in the spring or summer semester prior to starting with a fall cohort.

A unique set of courses is also presented in this program as a means of expediting student learning and information sharing during the dissertation phase. The goals of these courses are to foster a research environment that is practical and focused on real problems, to enhance student learning via the sharing of learning experiences, and to allow students the opportunity to learn from the experiences of seasoned actors in the field of public affairs. Prior to the dissertation students must complete courses in evaluation research and advanced research techniques.

The PhD program in Public Affairs also requires that students select professional specializations in either public management or non-profit management. These professional specializations allow those interested in working in the academy to develop a specialty to guide their research and teaching interests. Students focused on the practice of public affairs will choose a specialization based on their career interest in either public management or the non-profit arena.
Facilities

Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University’s Computing Center. The School has two computing laboratories which house over 30 computers that are network linked and equipped with major social science software packages, including E-Views, R, RATS, SPSS, and STATA. A computerized geographic information system, the Lexis Nexis Database, and WestLaw are also available for student use. The University’s Computing Center provides personal computers and UNIX workstations.

Admission Procedures and Policies

Application Deadlines: The PhD program in Public Affairs is a cohort program allowing new groups of students to start each fall semester. Cohorts only start during fall semesters. Students intending to start with a fall cohort must submit their applications by July 1 of that year. Prospective students who do not hold a master’s degree in public affairs, public administration, public policy or a related field should apply by November 1 of the year prior to enrollment. This allows those students admitted to the program to complete pre-requisite courses in the spring or summer prior to joining a fall cohort. Students admitted to the program, but who do not hold one of the master’s degrees noted above, will generally be required to take master’s level courses in public management, basic statistics, financial management, budgeting or economics.

Application/Admission Requirements: Prospective students must complete the University’s graduate application form and arrange to have GRE scores and transcripts of all college coursework sent to UTD. A graduate GPA of 3.0 or better and a minimum combined math and verbal GRE score of 1000 are expected. Three letters of recommendation are also required. Applicants must submit a written statement that should, at a minimum, include: (1) the nature of the student’s current work situation and responsibilities; (2) responsibilities for large scale/strategic issues in their work environment; (3) the nature and frequency of interactions with organizational stakeholders; (4) the student’s current span of control in their work environment; and (5) their career goals upon completion of the Ph.D. All applicants must also submit a complete professional resume.

Graduate Assistantships: Students admitted to the program may receive teaching/research scholarships and/or assistantships. Prospective students interested in receiving the scholarship/assistantships must have submitted all application materials including an application form for a scholarship/assistantship by April 1 of the year they intend to start the program. Applications for the scholarships/assistantships may be obtained from the office of programs in public affairs. Offers of teaching/research scholarships and assistantships will be made by May 1 of the year of fall enrollment.

Ph.D. in Public Affairs

The Ph.D. requires a minimum of 45 hours of course work beyond the master’s degree. Students not holding a master’s degree in public affairs, public administration, public policy or other related field will be expected to complete additional course work. These courses will be determined by the program director. The curriculum consists of 27 hours of core coursework, 12 hours of analytical/research tool classes, and 6 hours of electives within the professional specialization. Students must also complete the doctoral dissertation.

Prerequisites

Prior to enrolling in core classes in the PhD program students must show evidence of completing graduate level course work in general public management, basic statistics, financial management and budgeting and economics or public finance. Students admitted to the Ph.D. program without these requirements may complete relevant courses in the Masters of Public Affairs program at UTD prior to taking Ph.D. level courses.

Required Core Courses (27 hours)

The Program will consist of course work in four substantive knowledge areas. These areas are the public affairs core which includes topics of Governance: Leadership, Change and Conflict Resolution. The three remaining substantive knowledge areas are: Social Policy and Development, Decision Analysis and Decision Tools, Organizational Management and Analysis.
Analytical/Research Tools (12 hours)

Students must also complete a four-course sequence in research tools. One of these courses will be a Master’s level basic statistics course completed at UTD or in another Master’s level program. Students must complete both POEC 6352 – Evaluation Research Methods in the Economic, Political and Policy Sciences and PA 7390 – Advanced Research Techniques in Public Affairs with a grade of “B” or better in each class prior to the dissertation stage. During the dissertation phase students will complete the following courses: PA 8340 – Capstone Seminar for Leadership in Public Affairs and PA 8370 - Public Affairs Research Practicum. These courses are designed to provide students a means for engaging in field-based research and for sharing lessons learned during their research. During the dissertation research students must be enrolled in PA 8V98 - Dissertation.

Professional Specializations Electives (6 hours)

Students choose either the public management specialization or the nonprofit management specialization. Students must complete 6 hours of elective courses from their chosen professional specialization. A list of those courses is provided below. Some of these courses may be found in other graduate programs in the School of Economic, Political and Policy Sciences.

Total Mix of Class Hours 27 Required Core Courses 12 Analytical/Research Tools 6 Professional Specialization Electives 45 TOTAL

Program Course Work

The interdisciplinary foundation of the PhD in Public Affairs requires that students complete courses across the disciplines within the School of Economic, Political and Policy Sciences. Several courses in the curriculum thus are from the other disciplines in the School of Economic, Political and Policy Sciences such as: Political Economy and Public Policy (POEC), Political Science (PSCI), and Sociology (SOC). Students thus should review the offerings of these other graduate programs for a full list of relevant Public Affairs program courses.

Required Core Courses: 27 hours
POEC 6326 Decision Tools
SOC 6340 Domestic Social Policy
PA 7305 Leadership of Public and Non-Profit Organizations
PA 7311 Models and Tools of Change Management
PA 7322 Negotiations for Effective Management
PA 7325 Survey of Public Affairs
PA 7332 Legal Environment of Public Affairs
PA 7336 Seminar in Financial Management
PA 7338 Seminar in Human Resources
PA 7375 Non-Profit Organizations: Theory and Practice

Analytical/Research Tools: 12 hours
POEC 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences
PA 7390 Advanced Research Techniques in Public Affairs
PA 8340 Capstone Seminar for Leadership in Public Affairs
PA 8360 Public Affairs Research Practicum

Elective Classes: 6 hours from either professional specializations
Public Management
PA - 6320 Organizational Theory
PA 6325 - Decision Theory
PSCI 6336 - Bureaucracy and Public Policy
POEC 6341 - Urban Development
PA 6365 - Local Economic Development
PA 7343 - Human Resources Management
PSCI 7370 Decision Making, Complexity and Risk
Dissertation – Students will complete field-based research (PA 8V98 – Dissertation) as a foundation for the production of a dissertation. A faculty mentor will be assigned to each student to guide the research activity. Students must successfully submit a dissertation proposal abstract to the entire Public Affairs faculty for approval of their chosen topic. Students may take up to 18 hours of dissertation enrollment.

Course Descriptions

PA 6325 Decision Theory (3 semester hours) explores the development of decision-making models across organizational and institutional environments. Includes detailed analysis of decision-making under conditions of certainty, risk and uncertainty. Same as PSCI 6325 and POEC 6325. (3-0) T

PA 6326 Decision Tools for Managers (3 semester hours) This course introduces students to the variety of analytical and mathematical tools intended to improve management decision making. Cognitive failures in decision-making and remedies are also explored. Tools range from systems analysis to techniques of management science. Uses available software for management science studies Same as PSCI 6326. (3-0) T

PA 6328 Management Process and Analysis (3 semester hours) This course examines rigorous methods for analyzing management processes and decision making. Focuses on the examination, critique and design of management systems. Examines various methods for improving organizational performance. Same as PSCI 6328. (3-0) T

PSCI 6331 Executives, Legislatures and Public Policy (3 semester hours) An investigation of the interaction between non-elected executives and elected officials in the making of public policy. Examines relationship ranging from city manager to city council relationships to relationships between federal bureaucrats and congress. Same as POEC 6331. (3-0) T

SOC 6340 Domestic Social Policy (3 semester hours) Overview of governmental and nongovernmental programs, policies, and institutions dealing with those who cannot function self-sufficiently within the American market economy, including low-income families, the elderly, the unemployed, and people with disabilities. Analyzes how social policy in the United States reflects the political economy and culture, as well as social and demographic trends. Same as POEC 7340. (3-0) Y

PA 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences (3 semester hours) A review of research methods used in program evaluation, with an emphasis on public and non-profit social programs. Issues to be addressed include research design, appropriate performance standards, measurement and selection of individuals, sampling, data collection, and data analysis. Same as SOC 6352, and POEC 6352. (3-0) T

PA 7305 Leadership of Public and Non-Profit Organizations (3 semester hours) Examines the range of contemporary theories of leadership with particular emphasis on Public and Non-Profit organizations. Explores cases of leadership success and failure in these environments. Examines the set of actions and behaviors requisite for leading contemporary organizations. (3-0) Y

PA 7311 Models and Tools of Change Management (3 semester hours) Examines the set of theories and models of change management as they relate to organizational change. Provides applied tools for enacting change in a variety of organizational environments. Provides tools for adapting models of change to scope and scale of changes required. (3-0) Y

PA 7322 Negotiations for Effective Management (3 semester hours) Students in this course will learn about negotiations, principally in the public sector, and will develop and practice skills to become more proficient negotiators and more efficient managers. The course will be a combination of learning about negotiations and participating in exercises and simulated negotiations. The exercises and simulations reinforce theories about the role of negotiations in effective management and enable students to develop their own negotiation skills. (3-0) Y

PA 7325 Survey of Public Affairs (3 semester hours) This class examines current issues and challenges in the field of public affairs, with emphasis on the four fields that comprise the PHD program: leadership, change and conflict resolution; social policy and development; decision-making; and management and organizational analysis. The concept and practice of action research will also be explored within the context of public affairs. Open only to PhD students in Public Affairs. (3-0) Y
PA 7330 Advanced Research Techniques for Public Affairs (3 semester hours) Includes a variety of applied research techniques aimed at enhancing analysis of intra-organizational and extra-organizational settings. Both qualitative and quantitative techniques will be explored and applied. Techniques range from ethnographic analysis of organizational and social cultures to development of survey research methods for needs assessment, environmental sensing and marketing. PA 5313 Descriptive and Inferential Statistics recommended. (3-0) Y

PA 7332 Legal Environment of Public Affairs (3 semester hours) This class explores how the law affects the operation, management and environment of public and non-profit organizations. Examines topics ranging from administrative law to legal relationships with other governmental and non-profit entities. The course also examines the relationship between legal and ethical mandates in the public realm. (3-0) T

PA 7336 Seminar in Financial Management (3 semester hours) This course is an advanced seminar for Ph.D. students in Public Affairs that will include readings and research on the major financial issues in the public and non-profit workplace. (3-0) Y

PA 7338 Seminar in Human Resources (3 semester hours) This course is an advanced seminar for Ph.D. students in Public Affairs that will include readings and research on the broader human resource issues in the public and non-profit workplace. (3-0) Y

PA 7375 Non-Profit Organizations: Theory and Practice (3 semester hours) This class explores the leading theories of non-profit organizations. Examines the unique elements of non-profit organizations and the academic and practical challenges produced by these distinctive elements. Examines how theory is applied to the practice of management in non-profit organizations. (3-0) T

PA 8340 Capstone Seminar for Leadership in Public Affairs (3 semester hours) Students will explore current issues in public affairs of relevance to their field experiences. The course will focus on the identification of these current issues as sources and challenges for ongoing research in public affairs. May be repeated. Prerequisite: Permission of the Program Director. (3-0) Y

PA 8360 Public Affairs Research Practicum (Total hours may not exceed 9 semester hours) This practicum will focus on the dissertation research. Students will be required to make oral and written reports that detail the progress of the dissertation. The group environment is designed to foster an appreciation for how the research experience influences decision-making and leadership characteristics. May be repeated. Prerequisite: Permission of the Program Director. (3-0) Y

PA 8V99 Dissertation (1-9 semester hours) May be repeated. Total hours may not exceed 18 semester hours. Students will design and implement an improvement effort within an organization in their chosen field of specialization. The goal of this course is to provide students an applied experience dealing with the challenges of institutional and organizational change. Prerequisite: Permission of the Program Director. ([1-9]-0) Y

Public Management Specialization Elective Courses

PA 6320 Organizational Theory (3 semester hours) Focuses on bureaucracy and rationality, formal and informal structures, and the role of the environment. Organizational factors such as technology, power, information, and culture, as well as the implications of organizational theory for public policy are examined. Same as POEC 6320, PSCI 6320 and SOC 6320. (3-0) T

PA 6326 Decision Tools for Managers (3 semester hours) This course introduces students to the variety of analytical and mathematical tools intended to improve management decision making. Cognitive failures in decision-making and remedies are also explored. Tools range from systems analysis to techniques of management science. Uses available software for management science studies. Same as PSCI 6326. (3-0) Y

PSCI 6336 Bureaucracy and Public Policy (3 semester hours) Examination of processes involved in arriving at administrative decisions within the structure of the regime. Reciprocal ties of influence and control between official organizations and other public and private organizational actors, as well as organizational dynamics such as communication, power, and decision making in administrative agencies. Same as POEC 6336. (3-0) T

POEC 6341 Urban Development (3 semester hours) Presents methods and models for understanding urban development processes. Topics of analysis include urban growth, land use patterns, transportation and local public goods systems. Welfare consequences of various urban policy options are explored. Same as ECO 6371 and SOC 6341. (3-0) Y

PA 6342 Local Economic Development (3 semester hours) This class will examine the role of local governments in promoting economic development in the United States, and will analyze the economic development process. Attention will be given to economic theories of local development and practical applications of those theories. Topics include local economic development and poverty, tax incentives, infrastructure credits, firm location decisions and effects of government competition for economic activity. Same as ECO 6372. (3-0) Y
Doctor of Philosophy in Public Policy and Political Economy

Faculty
Professors: Brian J. L. Berry, Ronald Briggs, Alexander L. Clark (emeritus), Lloyd J. Dumas, Euel Elliott, Donald A. Hicks, Irving J. Hoch (emeritus), Murray J. Leaf, Kimberly Kempf Leonard, Lawrence J. Redlinger, Richard K. Scotch, Paul Tracy,

Associate Professors: Bobby C. Alexander, Sheila Amin Gutiérrez De Piñeres, Kurt J. Beron, Pamela Brandwein, Marie Isabelle Chevrier, Simon Fass, Paul Jargowsky, Susan McElroy,

Assistant Professors: Roxanne Ezzet-Lofstrom, Jennifer Smith Holmes, Melinda D. Kane, Sheryl Skaggs

Objectives
The Ph.D. degree in Public Policy and Political Economy is an interdisciplinary, research degree in public policy. It emphasizes rigorous education in public policy analysis and the methods of economic, social and political research, and to develop professional competence in a substantive field of public policy. Graduates will be prepared to teach and conduct interdisciplinary research at both graduate and undergraduate levels in public policy and public affairs, public or business administration, urban affairs and planning programs and applied Economic, Political and Policy Sciences. They are also well prepared for demanding analytical and administrative posts in international and domestic research and policy institutions, and in the private sector.

Nonprofit Management Specialization Elective Courses

SOC 5371 Non-Profit Organizations (3 semester hours) This course examines issues related to the rise, scope, development and impact of non-profit organizations. The course explores both the unique missions of non-profit organizations and the management challenges posed by this expanding sector of the organizational environment. Same as POEC 5371. (3-0) T

PA 7315 Fundraising and Media Relations for Nonprofit Organizations (3 semester hours) Fundraising is one of the most important but least understood functions for a manager of non-profit organizations, universities, private (and increasingly public) schools, arts and social service organizations. This course is designed to prepare the manager to work effectively as a member of a fundraising team - either as staff or volunteer board member. (3-0) Y

PA 7V62 Policy Research Workshop in Social Policy (3-9 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 12 hours. MPA or doctoral students may not take more than 3 hours of their concentration requirement from policy research workshops and POEC 7376.). Same as POEC 7V62. ((3-9)-0) T

Doctor of Philosophy in Public Policy and Political Economy

http://www.utdallas.edu/dept/socsci/
Facilities

Students have access to the computing faculties in the School of Economic, Political and Policy Sciences and University’s Computing Center. The School has two computing laboratories which have over 30 computers that are network linked and equipped with major social science software packages, including E-Views, R, Rats, SPSS and STATA. A computerized geographic information system, the Lexis Nexis Database and WestLaw are also available for student use. The University’s Computing Center provides personal computers and UNIX Workstations. Many important data and reference materials are also available online via the library’s and school’s memberships in numerous organizations.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

The PhD. in Public Policy and Political Economy seeks applications from students with a baccalaureate degree from an accredited university or college. An undergraduate grade point average of at least 3.2, and a combined verbal and quantitative GRE score of 1200, or equivalent score on the GMAT, are desirable for direct admission. Students may also wish to consider submitting their score from the writing component of the GRE test as additional evidence of their writing skills. Standardized test scores are only one of the factors taken into account in determining admission. For example, a student also may be admitted to the Ph.D. program after being accepted by a master’s program and achieving at least a 3.3 grade point average in several core courses. Students should also submit all transcripts, three letters of recommendation, and a one-page essay outlining the applicant’s background, education and professional objectives.

Prerequisites

While there are no specific course prerequisites, entering students will benefit from exposure to undergraduate courses in the Economic, Political and Policy Sciences, college algebra, and research design.

Transfer Policies

Students who have previous graduate work pertinent to the requirements of the Ph.D. may be given up to 45 hours of transfer credit, and the hours of coursework required for the degree will be reduced accordingly. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s “Transfer of Credit” policy.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

The PhD in Public Policy and Political Economy requires a minimum of 90 post-baccalaureate graduate credit hours. students must maintain a grade point average (GPA) of 3.0 in order to graduate. A student is required to complete six program components:

- 33 hours of core courses
- 12 hours of field courses
- A qualifying examination in Quantitative Empirical Methods and Research Design, and matriculation to the dissertation phase
- Attend a Dissertation Seminar
- Complete requirements in a chosen area of specialization
- Write and defend a dissertation

The requirements are outlined in further detail below:

I. Core Requirements (33 hours)

Students complete a core sequence of courses as follows:

1. Six hours of coursework in Government and Public Policy:
   POEC 5303 Public Policymaking and Institutions
   POEC 5308 Ethics, Culture and Responsibility
2. **Six hours of Theories of Political Economy**
   POEC 5307 Economics for Public Policy
   And one of the following:
   POEC 6301 Political-Economic Theories
   POEC 6312 Social Economic Theories

3. **Fifteen hours of Empirical Methods**
   POEC 5313 Descriptive and Inferential Statistics
   POEC 5316 Advanced Regression Analysis for the Economic, Political and Policy Sciences
   Students will also take at least three additional courses from a set approved by the relevant graduate program committee. Students may obtain a list of those courses from the program office.

4. **Six hours of POEC 5310 Research Design I and POEC 6342 Research Design II**

II. **Field Courses (12 hours)**
   Students take a two course introductory sequence in two of the following five fields. The fields and required courses are as follows:

   **Business and Public Policy**
   ECO 6342 Economic Regulation of Business
   POEC 7321 Seminar in Business and Government

   **Criminology**
   POEC 6300 Crime, Criminals and Societal Responses
   POEC 6305 Law and Social Control

   **Development**
   POEC 6354 Theories and Issues of Development (Required), and:
   Select one of the following:
   ECO 6364 Development Economics
   POEC 6360 World Political Economy
   POEC 6362 Political Development
   POEC 6318 Population and Development

   **International Political Economy**
   POEC 6360 World Political Economy
   PSCI 5301 Proseminar in Democratization, Globalization and International Relations

   **Social Policy**
   SOC 6350 Social Stratification
   POEC 7340 Domestic Social Policy

   In certain cases, students may substitute alternative courses in a particular field with the approval of the program director.

III. **Qualifying Exams and Matriculation to the Dissertation Phase**
   To advance to the dissertation stage of the program, students are evaluated by the Program Committee based on (1) a Qualifying Examination in Methodology and (2) a portfolio consisting of papers written in core and field courses:

   1) **A qualifying examination in methods:**
      This examination will evaluate the students’ methodological skills in areas covering probability, statistics, regression analysis and research design. The exam will be graded by the Methods Examination Committee as Unsatisfactory, Satisfactory or Excellent. The exam will be administered early in the fall semester of a full time student’s third year, or the equivalent point in a part time student’s career. A student receiving a grade of unsatisfactory may take the exam for a second time at the end of the fall semester of the third year.

   2) **A portfolio consisting of papers written in core and field courses:**
      a) Two literature reviews written in the field survey courses;
      b) Two empirical and/or methodological papers written in the core methods courses;
      c) One research design project
      The program committee will review the portfolios annually, and advise students of any deficiencies or potential
problems. Upon completing the core courses and achieving a grade of Satisfactory or Excellent on the Qualifying Examination, the program committee will make a final evaluation of the student's total portfolio. The committee will assess whether the candidate's portfolio demonstrates the student has the skills and knowledge necessary to attempt to write a dissertation. If all of the items in the portfolio are satisfactory, the student is designated as doctoral level. Alternatively, the committee could recommend remedial or additional work in a specific area and specify a time frame for the completion of such work. A detailed discussion of the portfolio requirements can be found in the Public Policy Advising Guide. Students are urged to read and make sure they understand what is expected of them. The Advising Guide is available through the Public Policy and Political Economy program office. If, in the judgment of the committee, the student is not prepared to write a dissertation or the student, the student will either be asked to complete remedial work or will be designated as Masters level. Receipt of a Masters level designation means the student is not allowed to proceed to the doctoral stage. The student may continue taking courses and may pursue one of the school's Masters programs by completing the appropriate degree requirements (see previous page).

IV. Dissertation Seminar

Students must register for POEC 8398 Dissertation Seminar for a minimum of one semester. The aim of the Dissertation Seminar is to assist students in the formulation of a dissertation topic, and prepare a dissertation topic for submission to a dissertation Committee and defense of the proposal before the committee.

V. Area of Specialization

The student takes six to nine hours of additional coursework in one of the field areas as defined above. The specific required courses are designated by the faculty associated with that area of concentration and may be obtained from the program office. Students may request to the Associate Dean of Graduate Education that they be allowed to switch to a different field, however the student would be required to begin with the two semester basic sequence unless this requirement is waived. The student completes a dissertation in the area of specialization and must successfully defend the dissertation before a duly constituted dissertation committee, in accordance with the requirements of the University and the UT System.

VI. Electives

Students take free electives in areas of interest to fulfill the 90-hour PhD requirement. Ph.D. students should note that they are eligible to receive Master's degrees offered by the School of Economic, Political and Policy Sciences while they matriculate toward the doctorate. These degrees include the Master of Public Affairs (MPA) degree, MS in Applied Economics, MS in Geographic Information Sciences and the MS in Applied Sociology. Students interested in obtaining one of these degrees should consult the catalog requirements or the graduate advisor.

Public Policy and Political Economy Course Descriptions

POEC 5300 Analytical Methods for the Study of Public Policy (3 semester hours) Introduces students to the use of quantitative analytical tools for the study of economics and public policy. (3-0) Y

POEC 5302 Law and The Policy Process (3 semester hours) Provides the legal perspective on public policy and emphasizes the judicial system's role in the recent evolution of public policy in selected problem areas. Same as PA 5302 (3-0) T

POEC 5303 Public Policymaking and Institutions (3 semester hours) Surveys the major institutions associated with policymaking, including Congress, the Presidency, the bureaucracy, and interest groups. These institutions are studied by linking them to the decision-making theories of organizations, social choice and incrementalism. Same as PA 5303 and PSCI 5303. (3-0) Y

POEC 5305 Microeconomics for Policy I (3 semester hours) Develops the tools of economic analysis and demonstrates their uses for decision making and the evaluation of public policies. ECO 3310, POEC 5300, or equivalent recommended. Same as PA 5305. (3-0) Y

POEC 5306 Macroeconomic Theory and Policy (3 semester hours) Studies various schools of macroeconomic theory, their political and economic implications and the policies that flow from them. Discusses the design and implementation of policies related to inflation, unemployment, business fluctuations and long-term economic growth. Same as PA 5306 (3-0) Y
POEC 5307 Economics for Public Policy (3 semester hours) Economics for Public Policy is a doctoral level course designed to introduce students to the use of economic methods of the analysis of public policy. While the primary theoretical framework for the course is microeconomics, the course also includes macroeconomics. A variety of public policy topics are covered in the course such as education and education reform, employment and the labor market, taxes and redistribution, health and health care, poverty and inequality, and public assistance programs. A central theme in the course is the role of the government. Same as PA 5307. (3-0) Y

POEC 5306 Ethics, Culture and Public Responsibility (3 semester hours) This course provides a general consideration of traditions of ethical thought, the interactions between personal behavior and cultural groups/norms, and the implementation of public responsibility. Topics to be considered shall include tensions between personal and collective goals, the nature and limits of tolerance, and the role of institutions such as the family, government, business, churches and interest groups. Same as PA 5306. (3-0) Y

POEC 5310 Research Design I (3 semester hours) This course is the first in a two-course sequence devoted to the research enterprise and the study of data development strategies and techniques to facilitate effective statistical analysis. Topics generally covered include: (1) issues and techniques in social science research with emphasis on philosophy of science, theory testing, and hypothesis formulation; (2) measurement and data collection strategies, reliability and validity of measures and results, sampling, surveys; and (3) examination of qualitative versus quantitative research techniques, working with observational data, field research issues, and triangulation. (3-0) Y

POEC 5313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences (3 semester hours) This course is an introduction to data analysis, statistics, and regression. The only prerequisite is a sound foundation in algebra. The heart of the course is a rigorous introduction to statistical inference: sampling theory, confidence intervals, and hypothesis tests. The final section of the course covers regression analysis, which is developed in a fairly non-technical way, with an emphasis on interpretation of regression results, using examples from recent research. SOCS 3305 or equivalent recommended. Same as PA 5313. (3-0) Y

POEC 5316 Advanced Regression Analysis for the Economic, Political and Policy Sciences (3 semester hours) This course provides a detailed examination of the bivariate and multiple regression models estimated using Ordinary Least Squares (OLS), with an emphasis on using regression models to test social and economic hypotheses. Also covered are several special topics in regression analysis, including violations of OLS assumptions, the use of dummy variables, fixed effects models, and path analysis. Applications are demonstrated with examples drawn from economics, political science, public policy and sociology. POEC 5313 or equivalent recommended. (3-0) Y

POEC 5317 Computer Techniques in Policy Analysis (3 semester hours) General introduction to computing concepts for policy analysis. Topics covered include algorithms and data structures, object orientation, statistical computing, data base principles, Geographical Information Systems (GIS) and internet computing. Heavy emphasis on developing hands-on skills in rapid application development environments such as Visual Basic or Java. (3-0) T

POEC 5319 Special Topics in Political Economy (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) Y

POEC 5325 Managing Complexity (3 semester hours) Explores the multiple administrative challenges to the evolution of complexity across global, national and organizational systems. Provides practical means for meeting the growing dilemmas and prospects of managing in complex environments. (3-0) T

POEC 5370 Proseminar in Institutions and Processes (3 semester hours) Formal and informal relationships between markets and politics that define and sustain different kinds of regimes or political economies at the national and sub-national levels. Problems of collective action; the role of constitutions and rules in assigning private rights and public roles; the nature and basis of regime legitimacy: open or competitive vs. oligopolistic models; and the behavior of institutions and organizations developed to serve or influence the regime. (3-0) Y

POEC 5371 Non-Profit Organizations (3 semester hours) This course examines issues related to the rise, scope, development and impact of non-profit organizations. The course explores both the unique missions of non-profit organizations and the management challenges posed by this expanding sector of the organizational environment. Same as SOC 5371. (3-0) T

POEC 5372 Non-Profit Management and Leadership (3 semester hours) This course examines issues, strategies and techniques related to leadership and management in non-profit organizations. Same as SOC 5372. (3-0) R

POEC 6300 Crime, Criminals & Societal Responses (3 semester hours) Introduces students to graduate study in criminology. Students learn to examine critically theoretical, methodological and policy issues in criminology and criminal justice. Same as SOC 6300. (3-0) R
POEC 6301 Political-Economic Theories (3 semester hours) A critical analysis of theories of politics and economy. Focuses on such thinkers as Smith, Marx, and Keynes, and on bodies of theory about political and economic systems. Explores the controversies that have shaped the development of political economy and their implications for interdisciplinary policy analysis. (3-0) Y

POEC 6303 Etiology of Crime and Criminality (3 semester hours) Examines the history of criminological thought incorporating the major works of such theorists as Bentham, Beccaria, Marx, Durkheim, Lombroso, Shaw and McKay, Sutherland, Becker, and Merton. Same as SOC 6303. (3-0) R

POEC 6304 Advanced Analytic Techniques (3 semester hours) This course prepares students to use advanced methods in economic and policy analysis. Topics include matrices and matrix operations, input-output analysis, the Cobb-Douglas production function and linear programming. (3-0) T

POEC 6305 Law and Social Control (3 semester hours) Examines and analyses the various means by which society attempts to control the deviant and criminal conduct of its members. Same as SOC 6302. (3-0) R

POEC 6307 Extent of Crime and Criminals (3 semester hours) Provides an analysis of crime, criminals, and the reaction of the criminal justice systems to both. Same as SOC 6301. (3-0) R

POEC 6308 Victimology (3 semester hours) Examines risks and consequences of crime for its victims. Issues considered include victim-offender relationships, characteristics of victims, the nature of the injuries they experience, and criminal justice procedures that involve them. Same as SOC 6308. (3-0) R

POEC 6309 Communities and Crime (3 semester hours) Examines the trends and sources of crime and social disorder across communities. The course emphasizes relationships among crime, fear of crime, neighborhood change, neighborhood responses to crime, and public policies. Same as SOC 6309. (3-0) R

POEC 6310 Delinquency and Juvenile Justice (3 semester hours) Examines youth crime, child victimization, and juvenile justice. Students learn the processes by which specific behaviors are identified as delinquent, the historical evolution of juvenile justice, and current policies and practices. Same as SOC 6310. (3-0) R

POEC 6311 Crime and Justice Policy (3 semester hours) An introduction to crime and the efforts to control crime through public policy. Same as SOC 6305. (3-0) R

POEC 6312 Social-Economic Theories (3 semester hours) A critical analysis of theories of society and economy. These include class, culture, solidarity, rational choice, transaction cost theory, principal agent theory, ideology and hegemony, network theory, collective action, bureaucracy, and American exceptionalism. Same as SOC 6312. (3-0) Y

POEC 6313 Corrections (3 semester hours) Examines the history, forms, and functions of correctional philosophies, institutions, programs, and policies. Topics include the structure and functions of prisons and jails, community corrections, intermediate sanctions, and the growth of correctional control in modern society. Same as SOC 6313. (3-0) R

POEC 6314 Policing (3 semester hours) Provides historical, social and political analysis of the roles and functions of policing in America. Same as SOC 6314. (3-0) R

POEC 6315 Violent Crime (3 semester hours) Examines the sources and patterns of violent offending across time and space. Topics include conceptions and typologies of violent crimes and offenders, victim-offender relationships, and efforts to predict and control violent offending. (3-0) R

POEC 6316 Proseminar in Quantitative Methods (3 semester hours) Focuses on quantitative methodological techniques as they are employed in the substantive journal literature of political economy. Integrates policy data analysis and research design. (3-0) Y

POEC 6317 Courts (3 semester hours) Examines the objectives, institutions and processes involved in the adjudication of offenders. Topics address the structure and function of the judicial system and principal court actors. Same as SOC 6317. (3-0) R

POEC 6318 Structural Equation and Multilevel (Hierarchical) Modeling (3 semester hours) An introduction to structural equation modeling (SEM) and multilevel modeling (MLM), sometimes called hierarchical linear or mixed modeling. SEM represents a general approach to the statistical examination of the fit of a theoretical model to empirical data. Topics include observed variable (path) analysis, latent variable models (e.g., confirmatory factor analysis), and latent variable SEM analyses. MLM represents a general approach to handling data that are nested within each other or have random components. Topics include dealing with two-level data that may be cross-sectional, such as students within classes, or longitudinal, such as repeated observations on individuals, firms or countries. POEC 5316 or equivalent recommended. (3-0) R

POEC 6320 Organizational Theory (3 semester hours) Focuses on bureaucracy and rationality, formal and informal structures, and the role of the environment. Organizational factors such as technology, power, information, and culture, as well as the implications of organizational theory for public policy are examined. Same as PA 6320, PSCI 6320 and SOC 6320 (3-0) T
POEC 6322 Crime Prevention (3 semester hours) Examines situational, social, and legislative approaches to the prevention of crime and delinquency. Emphasis on theories, protective factors, implementation and consequences of these approaches. Same as SOC 6322. (3-0) R

POEC 6324 Correlates of Crime and Justice (3 semester hours) Examines the nature of relationships among attributes and indices at the individual, situational, and aggregate levels to various forms of crime and systems of justice. Same as SOC 6324. (3-0) R

POEC 6325 Decision Theory (3 semester hours) Explores the development of decision-making models and theories across organizational and institutional environments. Includes detailed analysis of decision-making under conditions of certainty, risk, and uncertainty. Serves as the theoretical foundation to POEC 6326 Decision Tools. Same as PA 6325 and PSCI 6325 (3-0) T

POEC 6331 Executives, Legislatures, and Public Policy (3 semester hours) An investigation of the role played by executives and legislators in shaping public policy in the United States. Same as PSCI 6331 (3-0) T

POEC 6332 GIS Applications in Criminology (3 semester hours) Examines spatial distributions of crime, criminals, and criminal justice interventions. Students conduct spatial analysis of point patterns and area-based data in studies of the locations of crime events and rates, offenders, police patrolling practices, judicial districts and community corrections and how they relate to physical and social characteristics of neighborhoods. Same as GISC 6332 (3-0) R

POEC 6335 Institutions and Development (3 semester hours) An overview of leading theories, institutional perspectives, issues and policy debates concerning urban, regional, national and global development. Topics may include economic growth, technology and innovation, shifts in industrial structure, spatially imbalanced change, and their welfare consequences. Same as PSCI 6335 (3-0) T

POEC 6336 Bureaucracy and Public Policy (3 semester hours) Examination of processes involved in arriving at administrative decisions within the structure of the regime. Reciprocal ties of influence and control between official organizations and other public and private organizational actors, as well as organizational dynamics such as communication, power, and decision making in administrative agencies. Same as PSCI 6336 (3-0) T

POEC 6337 Comparative Institutions (3 semester hours) A comparative analysis of political and economic institutions in different cultural settings. Includes a consideration of different theoretical approaches to the comparative study of institutions. Same as PSCI 6337 (3-0) T

POEC 6338 Program Design (3 semester hours) Concentrates on the parts of professional practice that begin where analysis ends. Explores wide array of ideas in linguistics, literature, psychology, theater, architecture, and the Social Sciences that encourage rigor and creativity in the design of public policies, programs, and projects. Same as PA 6338 (3-0) T

POEC 6340 Qualitative Criminology (3 semester hours) Examines ethnography and other qualitative approaches to studying crime, criminals, and criminal justice, particularly participant observation and informant and respondent interviewing. Topics include phenomenology, case study, in-depth interviewing, ethnomethodology, conversation analysis, historical methods, gaining access, sampling, data collection and analysis, and legal and ethical concerns. (3-0) R

POEC 6341 Urban Development (3 semester hours) Presents methods and models for understanding urban processes. Topics include analysis of urban growth, land use patterns, transportation and local public good delivery systems. Welfare consequences of various urban policy options are explored. Same as ECO 6371 and SOC 6341 3-0) Y

POEC 6342 Research Design II (3 semester hours) This course is the second in a two-course sequence devoted to the study of data development strategies and techniques to facilitate effective statistical analysis. Topics generally covered include: the logic of causal inquiry and inference in the Economic, Political and Policy Sciences, the elaboration paradigm and model specification, anticipating and handling threats to internal validity, hierarchies of design structure (experimental, quasi-experimental and non-experimental): linking design structure to effect estimation strategies and analyzing design elements in published literature. Students will be required to select a research topic in consultation with the instructor and prepare a written comparative design analysis. POEC 5310, POEC 5311, POEC 5316 or equivalents recommended. (3-0) Y

POEC 6344 Categorical and Limited Dependent Variables (3 semester hours) This course examines several types of advanced regression models that are frequently used in policy analysis and social science research. The key similarity of these models is that they involve dependent variables that violate one or more of the assumptions of the Ordinary Least Squares (OLS) regression model. The main models examined in the course are binary logit and probit, multinomial logit, ordinal probit, tobit, and the family of Poisson regression models. All these models are estimated using maximum likelihood estimation (MLE). The Heckman correction for selection is also addressed. POEC 5316 or the equivalent recommended. (3-0) Y
POEC 6345 Survey Research (3 semester hours) This course exposes students to the use of survey methods in social science research. Emphasis is placed on interview and questionnaire techniques and the construction and sequencing of survey questions. Attention is also devoted to sampling theory, sampling and non-sampling errors, and the use of recent advances in fieldwork to reduce measurement error in surveys. POEC 5312 and POEC 5313 recommended. (3-0) R

POEC 6346 Qualitative Research Methods (3 semester hours) This course provides an overview of qualitative research in the Economic, Political and Policy Sciences. Students will investigate the assumptions underlying qualitative research approaches and critically assess the strengths and weaknesses of such approaches. Possible topics may include participant observation, ethnographic interviewing, ethnomethodology, conversation analysis, case study, and the analysis of historical documents. Same as SOC 6360 (3-0) T

POEC 6348 Drugs and Crime (3 semester hours) This course provides students with a survey of the historical context of the legislative initiatives that have been attempted to combat the use of drugs, the relationship between drug use/abuse and crime, and the public policy problems surrounding the control of drugs. (3-0) R

POEC 6350 Social Stratification (3 semester hours) This seminar will examine the major theories and lines of research on social stratification, defined as the hierarchical ranking of groups based on the unequal distribution of societal resources and positions. Focusing primarily on the U.S. class system, topics covered include: class reproduction and mobility, the educational system and policy, empirical definitions, the implications of race and gender for social class, and forms of legitimation. Same as SOC 6350 (3-0) Y

POEC 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences (3 semester hours) A review of research methods used in program evaluation, with an emphasis on public and nonprofit social programs. Issues to be addressed include research design, appropriate performance standards, measurement and selection of indicators, sampling, data collection, and data analysis. Same as SOC 6352 and PA 6352. (3-0) T

POEC 6353 Industry, Technology, and Science Policy (3 semester hours) Focuses on the impact of social, economic, and political factors on industry as critical units of production, and how these interact with technology and science. Topics include availability of skilled labor, research and development in industry, business-university relationships, innovation, and international competitiveness of the U.S. economy. Same as ECO 6362 (3-0) T

POEC 6354 Theories and Issues of Development (3 semester hours) In approaching development, there is an important interaction between theories and issues, each to some extent defining the other. This course will review a number of prominent instances in which we see this interaction-where theory has shaped the way people defined and approached practical problems and also where pressing practical problems have sometimes demanded new theoretical developments. Specific theories and issues discussed vary. Possible theories of interest include arguments for and against slavery, mercantilism, the idea of economic “takeoff,” central planning versus pluralism, and the role of democracy and human rights. Issues include labor conditions, urban living conditions, population growth and population quality, environmental pollution and sustainability, and governmental ineffectiveness and corruption. (3-0) T

POEC 6360 World Political Economy (3 semester hours) An overview of the major social, political, economic, and cultural forces that influence the nature of international political and economic relations. Same as ECO 6352 (3-0) T

POEC 6362 Political Development (3 semester hours) This course will survey different perspectives and theories of political development. Topics covered include the role of the state, democratization, political stability, civil society and environmental concerns, among others. Same as PSCI 6362 (3-0) T

POEC 6364 Development Economics (3 semester hours) An overview of theories of national economic growth and development, with emphasis on economy-wide modeling, application of micro-economic theories, and domestic sectoral policy. Same as ECO 6351. (3-0) R

POEC 6366 International Economics (3 semester hours) The course focuses on international trade theory and the ongoing process of regional integration in the Americas, with particular emphasis on the North American Free Trade Agreement. (3-0) T

POEC 6368 Population and Development (3 semester hours) Examines the relations among population, resources, economic development, and the environment in light of conflicting Malthusian and anti-Malthusian paradigms. Topics include fertility, mortality, public health, human capital, use of resources, and environmental impacts at local, regional, and global scales. Same as SOC 6368 and ECO 6358. (3-0) T

POEC 6379 Special Topics in Development Studies (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours. However, MPA or doctoral students may not take more than 3 hours of their concentration requirement from POEC 6379 and POEC 6376.) (3-0) T

POEC 6V76 Policy Research Workshop in Development Studies (3-9 semester hours) Students join a faculty member in a group research project. Topics vary from semester to semester. However, students may substitute an individual Field Research Project for this workshop; the project must be approved by the faculty of the School
of Economic, Political and Policy Sciences. (May be repeated for credit to a maximum of 12 hours. However, MPA or doctoral students may not take more than 3 hours of their concentration requirement from POEC 6376 and POEC 6379.) Prerequisites: POEC 6341, POEC 6364, and an additional course in the concentration. ([3-9]-0) T

POEC 6V81 Special Topics in Political Economy (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S

POEC 6V91 Evaluation Research (3-6 semester hours) Individual or group project in evaluation research performed for a public or private community organization under faculty supervision. Students will normally enroll in this course for two consecutive semesters. The first semester of enrollment will culminate in the completion of a formal evaluation research proposal; the second will end with a final research report based on conclusions of the proposed research. Permission of the program coordinator required. May be repeated for a total of six semester credit hours. (([3-6]-0). Y

POEC 7300 Advances in Criminology Theory (3 semester hours) This course examines the contemporary criminological theory literature and analyzes the degree to which research has provided empirical support and validation for explanations of crime and criminality. POEC 6303 and POEC 6324 recommended. (3-0) T

POEC 7301 Seminar in Criminology Research (3 semester hours) Students plan and execute an independent research project from research design through data collection and analysis of quantitative or qualitative data. POEC 5312, POEC 5313, POEC 5316, POEC 6307 and POEC 6324 recommended. (3-0) R

POEC 7304 Cost-Benefit Analysis (3 semester hours) Examines methods for measuring costs and benefits of public projects and policies, and the application of cost-benefit analysis to areas such as economic development, water resources, recreation, transportation, regulation, and the environment. Same as ECO 6325. (3-0) T

POEC 7319 Economics of Education (3 semester hours) This seminar examines a number of important educational policy questions. To provide a basis for the discussion of these questions, members of the seminar read a common set of theoretical and empirical writings relating to educational policy. The issues considered will include the link between educational achievement and earnings, the role of early childhood assessments of head start and pre-school programs, the effectiveness of compensatory education and tutoring programs, the large and persistent achievement gap between children from minority and low-income families and those from middle-income Asian and white families, a critical examination of educational production functions, the extent and consequences of school segregation, bilingual education programs, special education programs, international comparisons of student achievement and schools, school finance and an examination of various school reform proposals. Same as ECO 6336. (3-0) T

POEC 7320 International Negotiations (3 semester hours) This course examines both the substance and the process of international negotiations. Students study the theory and analysis of negotiations and identify issues, interests and positions of the parties. The course covers the substantive areas of arms control, trade, and environmental negotiations. The course moves from the analysis of simple, bilateral negotiations with only a few issues in contention to complex multilateral negotiations. Same As PSCI 7320. (3-0) R

POEC 7321 Seminar on Business and Government (3 semester hours) Examines the interactions between markets and the state from a comparative and public policy perspective. Special emphasis will be placed on issues involving industry regulation/deregulation, antitrust/competition, innovation/industrial policy, infrastructure investment, intellectual property, social regulation, and global trade/investment. (3-0) Y

POEC 7323 Economic Regulation of Business (3 semester hours) Studies the rationale for, and the history and political-economic results of, government intervention in markets in the form of (1) direct regulation of prices, quantity, entry and exit, and product quality in industries (utility, communication, and transportation), and (2) indirect intervention through antitrust laws and the regulation of advertising. Government deregulation and changes in antitrust institutions also are explored. Same as ECO 6343. (3-0) T

POEC 7327 Innovation Dynamics and Economic Change (3 semester hours) Examines the convergence of the information technology and telecom industries. Explores the role of technological innovation together with economic, institutional, and legal-regulatory issues shaping the new IT-Telecom industry within both domestic and geopolitical contexts. Same as ECO 6345. (3-0) T

POEC 7329 Special Topics in Industry and Public Policy (3 semester hours) Topics vary from semester to semester. May be repeated for credit to a maximum of 9 hours. However, MPA or doctoral students may not take more than 3 hours of their concentration requirement from POEC 7329 and POEC 7345. Same as ECO7331(3-0)T

POEC 7330 Special Topics in Institutions and Processes (3 semester hours) Topics vary from semester to semester. May be repeated for credit to a maximum of 9 hours. However, MPA or doctoral students may not take more than 3 hours of the concentration requirement from POEC 7330 and POEC 7326. (3-0) T

POEC 7340 Domestic Social Policy (3 semester hours) Overview of governmental and nongovernmental programs, policies, and institutions dealing with those who cannot function self-sufficiently within the American market economy, including low-income families, the elderly, the unemployed, and people with disabilities. Analyzes how social policy in the United States reflects the political economy and culture, as well as social and demographic trends. Same as SOC 6340. (3-0) Y
POEC 7341 Health Policy (3 semester hours) The history and political economy of the U.S. health care system and a review of major governmental programs to expand access to appropriate services, control rising costs, ensure the quality of care, and promote health through prevention. Analysis of current and recent proposals for reform of health care policy. Same as SOC 6357. (3-0) Y

POEC 7344 Gender and Public Policy (3 semester hours) Explores issues of gender and public policy in the U.S. Topics include gender critiques of welfare state policy, gender and poverty, women in the military, the politics (and political economy) of sex and sexuality, anti-sexual harassment policies. Same as PSCI 7344 and SOC 7344. (3-0) R

POEC 7359 Special Topics in Policy Methods (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

POEC 7361 Spatial Econometrics (3 semester hours) The application of econometric techniques to the explicit treatment of space (geography) in social science models. Covers the specification of spatial regression models, estimation and specification testing. The emphasis is on the application of spatial econometric methods to an empirical data analysis project. Prerequisite: POEC 5331. Same as GISC 7361 Spatial Statistics. (3-0) R

POEC 7368 Spatial Epidemiology (3 semester hours) Examines the conceptual and analytic tools used to understand how spatial distributions of exposure impact on processes and patterns of disease. Emphasizes the special design, measurement, and analysis issues associated with spatial patterns of diseases. Contemporary diseases of public health importance are addressed, and the statistical and inferential skills are provided that can be used in understanding how spatial patterns arise and their implications for intervention. Prerequisite: descriptive and inferential statistics through regression analysis. Same as GISC 7368 and PA 7368. (3-0) R

POEC 7370 Time Series Analysis (3 semester hours) The course considers several important topics in applied time series analysis including the specification and testing Box-Jenkins transfer function/intervention models. Other topics include pooled cross-sectional time series models, VAR, the LSE Approach, unit-roots, cointegration, error correction models, encompassing and exogeneity tests, and ARFIMA models. Students also learn how to use programs such as Eviews and RATS. Same as ECO 6315. (3-0) R

POEC 7376 Special Topics in Social Policy (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours. MPA or doctoral students may not take more than 3 hours of their concentration requirement from policy research workshops and POEC 7376.) (3-0) T

POEC 7V26 Policy Research Workshop in Institutions and Processes (3-9 semester hours) Students join a faculty member in a group research project on the political economy of public policy decisions in the context of institutional settings, such as legislatures, executive or administrative agencies, courts, or metropolitan systems. (May be repeated for credit to a maximum of 6 hours. Same as PA 7V26) (3-9-0) T

POEC 7V45 Policy Research Workshop in Industry and Public Policy (3-9 semester hours) Students join a faculty member in a group research project. Topics vary from semester to semester. (May be repeated for credit to a maximum of 6 hours. Same as PA 7V45. (3-9-0) T

POEC 7V47 Policy Research Workshop in Health Care Policy (3-9 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 12 hours. MPA or doctoral students may not take more than 3 hours of their concentration requirement from policy research workshops and POEC 7376.) Same as PA 7V47 (3-9-0) T

POEC 7V62 Policy Research Workshop in Social Policy (3-9 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 6 hours. Same as PA 7V62. (3-9-0) T

POEC 8398 Dissertation Seminar (3 semester hours) A seminar for students preparing proposals or writing dissertations. Prerequisite: Successful completion of qualifying examination or consent of instructor. (May be repeated for credit.) (3-0) S

POEC 8V01 Independent Study (1-9 semester hours) Provides faculty supervision for student’s individual study of a topic agreed upon by the student and the faculty supervisor. Prerequisite: Consent of instructor. (May be repeated for credit.) (1-9-0) R

POEC 8V97 Internship (1-9 semester hours) Provides faculty supervision for a student’s internship. Internships must be related to the student’s coursework. Prerequisite: Consent of instructor. (1-9-0) R

POEC 8V99 Dissertation (3-9 semester hours) Provides faculty supervision of a student’s dissertation research. Prerequisite: Consent of instructor. (May be repeated for credit.) (3-9-0) S
Master of Public Affairs

http://www.utdallas.edu/dept/socsci/

Faculty


Associate Professors: Marie Isabelle Chevrier, Simon Fass, Susan McElroy

Assistant Professors: Flounsay Caver, Kevin Curtin, Roxanne Ezzet-Lofstrom, Scott Robinson,

Senior Lecturers: Ted Benavides, Wendy Hassett, Karl Ho

Objectives

The Master's degree in Public Affairs is a professional degree with a focus on public management, policy analysis, and applied technology. The MPA program emphasizes public management, management analysis, implementation, and evaluation of public policies. The curriculum is intended to train students who ultimately will assume senior staff, managerial and leadership roles in public agencies, nonprofit organizations, consulting firms, and businesses significantly affected by public policies.

Facilities

Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University’s Computing Center. The School has two computing laboratories which have over 30 computers that are network linked and equipped with major social science software packages, including E-Views, R, Rats, SPSS and STATA. A computerized geographic information system, the Lexis Nexis Database, and WestLaw are also available for student use. The University’s Computing Center provides personal computers and UNIX Workstations. Many important data and reference materials are also available online via the McDermott Library and School’s memberships in numerous organizations.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

The Master of Public Affairs program seeks applications from students with a baccalaureate degree from an accredited university or college. A 3.0 undergraduate grade point average (on a 4.0 scale) and a combined verbal and quantitative score of at least 1000 on the Graduate Records Examination (GRE) or equivalent score on the Graduate Management Aptitude Test (GMAT), are preferred. Students may also wish to consider submitting their score from the writing component of the GRE test as additional evidence of their writing skills. Standardized test scores are only one of the factors taken into account in determining admission. Students should also submit transcripts, three letters of recommendation and a one-page essay outlining the applicant’s background, education, and professional objectives.

Prerequisites

Some students may need to take courses that prepare them adequately for core coursework. In general, students who lack a background in mathematics or microcomputing may be required to take courses designed to prepare them for the material to which they will be exposed in these courses. Students should consult with the graduate advisor regarding specific courses to be taken.

Transfer Policies

Students who have previous graduate work pertinent to the requirements of a MPA may be given up to 15 hours of transfer credit, and the hours of coursework required for the degree will be reduced accordingly. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s “Transfer of Credit” policy.
Degree Requirements
The University’s general degree requirements are discussed on page 18.

Students seeking a Master of Public Affairs (MPA) degree must complete at least 42 semester credit hours of work in the program. The program has four components: a 24 hour core, 15 hours of directed electives, and 3 hours of internship or policy research workshop. Students must maintain at least a 3.0 grade point average in the core courses and an overall grade point average of 3.0 to graduate.

Core Courses (24 hours)
All MPA students should complete the core courses as soon as possible. A full-time student entering the program will normally take three core courses and one additional course each semester. The workshop or internship is usually undertaken when the student has completed most of the other degree requirements.

Required core courses for the MPA:
PA 5303 Public Policymaking and Institutions
PA 5307 Economics for Public Policy or PA 6342 Local Economic Development or PA 5305 Microeconomics for Policy
PA 5308 Ethics, Culture and Public Responsibility
PA 5313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences
PA 5315 Public Management
PA 5321 Government Financial Management and Budgeting
PA 6320 Organizational Theory
PA 5343 Human Resource Management

Professional Specialization Core Courses (9 hours)
Students who specialize in Public Management take 15 hours from: PA 5323 Quality and Productivity Improvement in Government, PA 6326 Decision Tools for Managers, PA 6328 Management Process and Analysis, POEC 6336 Bureaucracy and Public Policy, PA 7322 Negotiation Strategies for Effective Management, PA 6344 Local Government Management, or other appropriate courses approved by the MPA Director.


Students who wish to focus on the Nonprofit Management Track take 15 hours from: PA 5371 Nonprofit Organizations, PA 5372 Nonprofit Management and Leadership, PA 7315 Fundraising and Media Relations for Nonprofit Organizations, POEC 6352 Evaluation Research Methods and PA 7V62 Policy Research Workshop in Nonprofit Organizations.

Other courses may substitute for those listed in any specialization with the approval of the Associate Dean for Graduate Education or the Director of the MPA degree.

Elective Courses (9 hours)
Students in Local Government Management, Nonprofit Management and Public Management or Policy Analysis also select, in consultation with the MPA Coordinator, an additional 9 hours of appropriate coursework from the courses below. Students in Applied Technology also select another 9 hours, 6 of which are from appropriate electives described in the section on the Geographic Information Systems (GIS) certificate.
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Policy Analysis
PA 5306 Macroeconomic Theory and Policy
PA 5318 Information Systems in Policy Environment
ECO 5309 Mathematical Economics
ECO 5311 Applied Econometrics
POEC 5371 Non-Profit Organizations
ECO 5301 Microeconomics I
ECO 5302 Macroeconomics I
POEC 6304 Advanced Analytical Techniques
POEC 6318 Structural Equation Modeling
GISC 6381 Geographic Information Systems Fundamentals
GISC 6382 Applied GIS or GISC 6384 Spatial Analysis and Modeling

Public Management, Local Government Management and Nonprofit Management
POEC 5302 Law and The Policy Process
POEC 6341 Urban Development
POEC 6352 Evaluation Research Methods
GISC 6381 Geographic Information Systems Fundamentals
GISC 6383 GIS Management and Implementation
POEC 6V91 Evaluation Research
POEC 7320 International Negotiations
POEC 7340 Domestic Social Policy
POEC 7341 Health Policy
Other courses, including online offerings, may be authorized for all tracks at the discretion of the MPA Program Director.

Workshop or Internship (3 hours)
The Policy Research Workshop applies the student’s knowledge and professional skills to a research project. Problem definition and project development occur in a team environment under faculty direction, sometimes in concert with an external client who is funding the research. The effort places the student in an environment where cooperative skills and timely product delivery are essential. The workshop is recommended for students specializing in policy analysis, for those who already have substantial professional experience, and for part-time students for whom an internship is not practical. GISC 6387 GIS Workshop fulfills the policy workshop requirement for students who specialize in applied technology; in addition, these students may choose to do an internship.

The internship involves work in a professional capacity in an organization, under the joint supervision of an experienced professional mentor at the internship site and a member of the faculty. The standard three hour internship requires approximately a one-quarter time commitment to the work experience. Six-hour internships normally are half-time appointments for a semester or the summer. The objective of the internship is to provide an introduction to professional life and to establish sound approaches to the practice of public affairs. Full-time students choosing public management will normally choose the internship.

Course Descriptions
PA 5302 Law and The Policy Process (3 semester hours) Provides the legal perspective on public policy and emphasizes the judicial system’s role in the recent evolution of public policy in selected problem areas. Same as POEC 5302 and PSCI 5302. (3-0) T

PA 5303 Public Policymaking and Institutions (3 semester hours) Surveys the major institutions associated with policymaking, including Congress, the Presidency, the bureaucracy, and interest groups. These institutions are studied by linking them to the decision-making theories of organizations, social choice and incrementalism. Same as POEC 5303 and PSCI 5303. (3-0) Y

PA 5304 Policy Processes, Implementation and Evaluation (3 semester hours) Application of models of the policy system to the analysis of legislative, administrative and judicial processes at different points in the policy cycle. Use of case studies, empirical analysis, direct observation, and group projects. Prerequisite: PA 5303. Same as PSCI 5304. (3-0) Y
PA 5305 Microeconomics for Policy I (3 semester hours) Develops the tools of economic analysis and demonstrates their uses for decision-making and the evaluation of public policies. ECO 3310, POEC 5300, or equivalent recommended. Same as POEC 5305. (3-0) Y

PA 5306 Macroeconomic Theory and Policy (3 semester hours) Studies various schools of macroeconomic theory, their political and economic implications and the policies that flow from them. Discusses the design and implementation of policies related to inflation, unemployment, business fluctuations and long-term economic growth. Same as POEC 5306. (3-0) Y

PA 5307 Economics for Public Policy (3 semester hours) Economics for Public Policy is a doctoral level course designed to introduce students to the use of economic methods of the analysis of public policy. While the primary theoretical framework for the course is microeconomics, the course also includes macroeconomics. A variety of public policy topics are covered in the course such as education and education reform, employment and the labor market, taxes and redistribution, health and health care, poverty and inequality, and public assistance programs. A central theme in the course is the role of the government. Same as POEC 5307 (3-0) Y

PA 5308 Ethics, Culture and Public Responsibility (3 semester hours) This course provides a general consideration of traditions of ethical thought, the interactions between personal behavior and cultural groups/norms and the implementation of public responsibility. Topics to be considered shall include tensions between personal and collective goals, the nature and limits of tolerance, and the role of institutions such as the family, government, business, churches and interest groups. Same as POEC 5308. (3-0) Y

PA 5309 Fundamentals of Quantitative Reasoning (3 semester hours) This course prepares students for the required PA 5313 Descriptive and Inferential Statistics course. This course will use a hands-on approach to illustrate the utility of algebra and descriptive statistics in applied quantitative reasoning. Students will acquire the skills and quantitative foundation necessary to evaluate applied work issues, make recommendations, and evaluate decisions. (3-0) Y

PA 5313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences (3 semester hours) This course is an introduction to data analysis, statistics, and regression. The only prerequisite is a sound foundation in algebra. The heart of the course is a rigorous introduction to statistical inference: sampling theory, confidence intervals, and hypothesis tests. The final section of the course covers regression analysis, which is developed in a fairly non-technical way, with an emphasis on interpretation of regression results, using examples from recent research. SOCS 3303 or equivalent recommended. Same as POEC 5313 (3-0) Y

PA 5315 Public Management (3 semester hours) The application of ideas and techniques of public management and decision making to examine the various roles of the general manager in public organizations. Utilizes the case method. Same as PSCI 5315. (3-0) Y

PA 5316 Leadership in Public and Non-profit Management (3 semester hours) This course will examine the major theories and practices of leadership in public and non-profit organizations. Effective leaders from public and non-profit organizations will speak to the class about the challenges of leading in complex environments. (3-0) Y

PA 5318 Information Systems in Policy Environments (3 semester hours) Overview of the technology, role and management of computer-based information systems in policy environments. Provides the managerial foundation for effective decision making with respect to information technology implementation in public organizations. (3-0) Y

PA 5319. Topics in Public Affairs (3 semester hours) Topics vary from semester to semester. (May be repeated to a maximum of 9 hours.) (3-0) Y

PA 5320 Community Planning (3 semester hours) This course examines local issues involving growth and development on the local level of government. Specifically, it examines land use planning, zoning, subdivision regulations, and the processes that are involved with these issues. (3-0) Y

PA 5321 Government Financial Management and Budgeting (3 semester hours) Management of government finances, including revenue collection and enforcement, cash and debt management, investments, general and special funds, controllership, financial and program audits, purchasing, financial reporting, managerial use of governmental accounting systems, GAO and professional accounting standards. (3-0) Y

PA 5323 Quality and Productivity Improvement in Government (3 semester hours) Examines the implications and challenges of improving public sector quality and productivity. Provides practical methods for improving government productivity and quality efforts. Provides tools for measuring performance and for managing performance. (3-0) Y

PA 5328 Navigating the Government Workplace (3 semester hours) The governmental workplace is often a complicated work environment with numerous stakeholders. This practical course explores the challenges that public managers face at all levels of government in having successful careers. (3-0) Y

PA 5343 Human Resources Management (3 semester hours) Examines theories, principles, and practices of human resources management in public organizations. Explores implications of social and administrative values as expressed in current human resource policies. (3-0) Y
PA 6320 *Organizational Theory* (3 semester hours) Focuses on bureaucracy and rationality, formal and informal structures, and the role of the environment. Organizational factors such as technology, power, information, and culture, as well as the implications of organizational theory for public policy are examined. Same as POEC 6320, PSCI 6320 and SOC 6320. (3-0) T

PA 6326 *Decision Tools for Managers* (3 semester hours) This course introduces students to the variety of analytical and mathematical tools intended to improve management decision making. Cognitive failures in decision-making and remedies are also explored. Tools range from systems analysis to techniques of management science. Uses available software for management science studies. Same as PSCI 6326. (3-0) T

PA 6328 *Management Process and Analysis* (3 semester hours) This course examines rigorous methods for analyzing management processes and decision making. Focuses on the examination, critique and design of management systems. Same as PSCI 6328. (3-0) T

PA 6338 *Program Design* (3 semester hours) Concentrates on the parts of professional practice that begin where analysis ends. Explores wide array of ideas in linguistics, literature, psychology, theater, architecture, and the Economic, Political and Policy Sciences that encourage rigor and creativity in the design of public policies, programs, and projects. Same as POEC 6338. (3-0) T

PA 6342 *Local Economic Development* (3 semester hours) This class will examine the role of local governments in promoting economic development in the United States, and will analyze the economic development process. Attention will be given to economic theories of local development and practical implications of those theories. Topics include local economic development and poverty, tax incentives, infrastructure credits, firm location decisions and effects of government competition for economic activity. (Same as ECO 6372) (3-0) Y

PA 6344 *Local Government Management* (3 semester hours) This course examines structure of local governments, the roles of key elected and appointed officials, and numerous issues and problems that local government managers and policymakers face. It also presents for discussion and study some of the best management practices that local government managers use in achieving effective and efficient delivery of services. There is a focus on local government management in the Dallas metro area through interaction with elected and appointed officials. (3-0) T

PA 6381 *Geographic Information Systems Fundamentals* (3 semester hours) Examines the fundamentals of Geographic Information Systems and their applications. Emphasizes the concepts needed to use GIS effectively for manipulating, querying, analyzing, and visualizing spatial-based data. Industry-standard GIS software is used to analyze spatial patterns in social, economic and environmental data, and to generate cartographic output from the analysis. Same as GISC 6381. (3-0) Y

PA 7310 *Proseminar in Public Affairs* (3 semester hours) Explores current issues in public affairs faced by institutional leaders with an emphasis on issue definition and strategic problem-solving. Explores the gamut of issues that make institutions “public.” Topics include stakeholder management, social responsibilities of institutions and the management of complex networks. (3-0) Y

PA 7311 *Models and Tools of Change Management* (3 semester hours) Examines the set of theories and models of change management as they relate to organizational change. Provides applied tools for enacting change in a variety of organizational change. Provides applied tools for enacting change in a variety of organizational environments. Provides tools for adapting models of change to scope and scale of changes required. (3-0) Y

PA 7315 *Fundraising and Media Relations for Nonprofit Organizations* (3 semester hours) Fundraising is one of the most important but least understood functions for a manager of non-profit organizations, universities, private (and increasingly public) schools, arts and social service organizations. This course is designed to prepare the manager to work effectively as a member of a fundraising team – either as staff or volunteer board member. (3-0) Y

PA 7322 *Negotiations for Effective Management* (3 semester hours) Students in this course will learn about negotiations, principally in the public sector, and will develop and practice skills to become more proficient negotiators and more effective managers. The course will be a combination of learning about negotiations and participating in exercises and simulated negotiations. The exercises and simulations reinforce theories about the role of negotiations in effective management and enable students to develop their own negotiation skills. (3-0) Y

PA 7330 *Advanced Research Techniques for Public Affairs* (3 semester hours) Includes a variety of applied research techniques aimed at enhancing analysis of intra-organizational and extra-organizational settings. Both qualitative and quantitative techniques will be explored and applied. Techniques range from ethnographic analysis of organizational and social cultures to development of survey research methods for needs assessment, environmental sensing and marketing. PA 5313 Descriptive and Inferential Statistics recommended. (3-0) Y

PA 7332 *Legal Environment of Public Affairs* (3 semester hours) This class explores how the law affects the operation, management and environment of public and non-profit organizations. Examines topics ranging from administrative law to legal relationships with other governmental and non-profit entities. The course also examines the relationship between legal and ethical mandates in the public realm. (3-0) T
PA 7375 Non-Profit Organizations: Theory and Practice (3 semester hours) This class explores the leading theories of non-profit organizations. Examines the unique elements of non-profit organizations and the academic and practical challenges produced by these distinctive elements. Examines how theory is applied to the practice of management in non-profit organizations. (3-0) T

PA 7364 Demographic Analysis and Modeling (3 semester hours) Examines key demographic models for population analysis, their underlying theoretical foundations, and extensions into the spatial domain. Incorporates quantitative estimation and projection techniques and their use within a geographic information systems framework. Provides a solid understanding of spatio-temporal population dynamics, either local or global, which is essential to many disciplines engaged in planning for the public and private service sectors, for transportation networks or for regional development projects. (Same as GISC 7364 and SOC 6364). (3-0) Y

PA 7368 Spatial Epidemiology (3 semester hours) Examines the conceptual and analytic tools used to understand how spatial distributions of exposure impact on processes and patterns of disease. Emphasizes the special design, measurement, and analysis issues associated with spatial patterns of diseases. Contemporary diseases of public health importance are addressed, and the statistical and inferential skills are provided that can be used in understanding how spatial patterns arise and their implications for intervention. Prerequisite: Descriptive and inferential statistics through regression analysis. (Same as POEC 7368 and GISC 7368). (3-0) R

PA 7V26 Policy Research Workshop in Institutions and Processes (3-9 semester hours) Students join a faculty member in a group research project on the political economy of public policy decisions in the context of institutional settings, such as legislatures, executive or administrative agencies, courts, or metropolitan systems. (May be repeated for credit to a maximum of 12 hours. However, MPA or doctoral students may not take any more than 3 hours of their concentration requirement from POEC 7326 and POEC 7330.) Same as POEC 7V26. ([3-9]-0) T

PA 7V45 Policy Research Workshop in Industry and Public Policy (3-9 semester hours) Students join a faculty member in a group research project. Topics vary from semester to semester. (May be repeated for credit to a maximum of 12 hours. However, MPA or doctoral students may not take more than 3 hours of their concentration requirement from POEC 7345 and POEC 7329.) Same as POEC 7V45. ([3-9]-0) T

PA 7V47 Policy Research Workshop in Health Care Policy (3-9 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 12 hours. MPA or doctoral students may not take more than 3 hours of their concentration requirement from policy research workshops and POEC 7376.) Same as POEC 7V47. ([3-9]-0) T

PA 7V62 Policy Research Workshop in Social Policy (3-9 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 12 hours. MPA or doctoral students may not take more than 3 hours of their concentration requirement from policy research workshops and POEC 7376.). Same as POEC 7V62. ([3-9]-0) T

PA 7V64 Policy Research Workshop in Poverty Research and Policy (3-9 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 12 hours. MPA or doctoral students may not take more than 3 hours of their concentration requirement from policy research workshops and POEC 7376.). Same as POEC 7V64. ([3-9]-0) T

PA 8V97 Internship (1-9 semester hours) Provides faculty supervision for a student’s internship. Internships must be related to the student’s course work. ([1-9]-0) R
Master of Science in Geographic Information Sciences

http://www.utdallas.edu/dept/socsci/

Faculty
Professors: Carlos Aiken (Geosciences), Brian J. L. Berry, Ronald Briggs, Daniel Griffith, James Murdoch, Robert Stern (Geosciences)
Associate Professors: Tom Brikowski, John Ferguson (Geosciences), Paul Jargowsky, Michael Tiefelsdorf,
Assistant Professors: Mohammed Abdelsalam (Geosciences), Timothy Bray, Kevin Curtin, Karen Hayslett-McCall, Fang Qiu

Objectives
The Master of Science in Geographic Information Sciences is a professional program that is offered jointly by the School of Economic, Political and Policy Sciences and the School of Natural Sciences and Mathematics. The program focuses on the use of Geographic Information Systems (GIS) and associated technologies such as remote sensing and global positioning systems for acquiring, managing and analyzing spatially-referenced information. Students are provided with the concepts underlying GIS, the skills for implementing GIS projects in public or private sector organizations, and the ability to use GIS in pure or applied research in substantive areas.

Graduates of the program can apply their skills in a variety of areas such as public administration and policy analysis; public safety, criminology, and emergency preparedness management; environmental management; urban, regional, social service and transportation planning and analysis; private sector business, especially marketing, site selection, logistics and real estate; and resource exploration, including petroleum.

Facilities
Classes are offered through state-of-the-art GIS computing facilities housed at the Bruton Center in the School of Economic, Political and Policy Sciences and the NASA Center for Excellence in Remote Sensing in the Department of Geosciences. The University’s extensive instructional computing facilities are also available. Facilities are open extended hours including evenings and weekends. Enrollment in hands-on courses is controlled to ensure that a station is available for every student. All industry-standard GIS and remote sensing software is available. The University is a an Oracle Center of Excellence for Spatial Data Management and a member of the University Consortium for Geographic Information Science (UCGIS).

Admission Requirements
The University’s general admission requirements are discussed on page 13.
For the Masters in Geographic Information Sciences, a baccalaureate degree from an accredited university or college is required and Graduate Record Examination (GRE) or Graduate Management Aptitude Test (GMAT) scores must be presented. A 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1000 on the GRE, or equivalent score on the GMAT, are desirable. Students must also submit transcripts from all higher education institutions attended, three letters of recommendation, and a one page essay outlining their background, education and professional objectives.

Prerequisites
For the master’s degree in Geographic Information Sciences, beginning students must have the equivalent of GISC 6381 GIS Fundamentals and GISC 6382 Applied GIS or they must take these courses at UTD in addition to the 30 credit hours required for the Masters in Geographic Information Sciences. Additionally, beginning students are expected to have completed college mathematics through calculus and at least one programming or computer applications course, or have equivalent knowledge.
Transfer Policies

With permission, up to six hours of credit equivalent to courses at UTD may be transferred from another institution. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s “Transfer of Credit” policy. Up to 15 hours of courses taken as a non-degree student at UTD can be applied to the masters degree. Hours taken for the Graduate Certificate in Geographic Information Systems meet the prerequisites for, and provide credit toward, the Masters in Geographic Information Sciences. All courses required for the masters degree, including those transferred, must be taken within a single 6-year period.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

To earn the Master of Science in Geographic Information Sciences, students must complete a minimum of 30 semester credit hours of work in the program. The program consists of a base requirement of 9 hours (three courses), a core requirement of 9 hours, a research project requirement of 3 hours, and prescribed electives for 9 hours. Students must achieve at least a 3.0 grade point average in the core requirement and an overall grade point average of 3.0 to graduate.

Base Requirement (9 credit hours):
GEOS 5303 Computing for Geoscientists
GEOS 5306 Data Analysis for Geoscientists
POEC 5313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences
POEC 5317 Computer Techniques in Policy Analysis
GISC 5317 Computer Programming for GIS

Core Requirement (9 credit hours):
GISC 6383 Geographic Information Systems (GIS) Management and Implementation
GISC 6384 Spatial Analysis and Modeling or GEOS 5423 GIS Applications in Geosciences
GISC 6387 Geographic Information Systems Workshop (GEOS 5308 Special Topics may substitute with advisor consent.)

Research Project Requirement (3 hours):
GEOS 8000-level research course or GISC 6389 Master’s Project in GIS or GISC 7389 GI Sciences Ph.D. Research Project Qualifier

Elective Courses (at least 9 credit hours from the following, not duplicated elsewhere)
GISC 6385 Geographic Information Systems (GIS) Theories, Models, and Issues
GISC 6386 Urban and Environmental Applications for Geographic Information Systems (GIS)/Remote Sensing
GISC 6388 GIS Application Development
GISC 7361 Spatial Statistics
GISC 7362 GIS Network Modeling
GISC 7363 Internet Mapping and Information Processing
GISC 7365 Remote Sensing Digital Image Processing
GISC 7366 Applied Remote Sensing
GISC 7384 Advanced Raster Modeling
GEOS 5325 Introduction to Remote Sensing
GEOS 5326/GISC 7365 Remote Sensing Digital Image Processing
GEOS 5328 Radar Remote Sensing
GEOS 5329/GISC 7366 Applied Remote Sensing
GEOS 5422 Global Positioning System (GPS) Satellite Surveying Techniques
GEOS 5423 GIS Applications to Geosciences
CS 6359 Object Oriented Analysis and Design
CS 6360 Database Design
CS 6366 Computer Graphics
CS 6384 Computer Vision
Geographic Information Sciences Course Descriptions

GISC 5317 Computer Programming for GIS (3 semester hours) General introduction to Visual Basic and other languages with GIS related applications. Topics covered include fundamental data structures and algorithms, user-interface design, component object model, and data base management. Emphasis on rapid GIS application development with hands-on experiences. Students are expected to design and implement a project. (3-0) R

GISC 6332 GIS Applications in Criminology (3 semester hours) Examines spatial distribution of crime, criminals, and criminal justice interventions. Students conduct spatial analysis of point patterns and area-based data in studies of the locations of crime events and rates, offenders, police controlling practices, judicial districts and community corrections and how they relate to physical and social characteristics of neighborhoods. Same as POEC 6332 (3-0) R

GISC 6379 Special Topics in Geographic Information Sciences (3 semester hours) Topics vary from semester to semester. May be repeated for credit up to a maximum of 9 hours. Consult with adviser to determine appropriateness of topic for degree plan. (3-0) R

GISC 6381 Geographic Information Systems Fundamentals (3 semester hours) Examines the fundamentals of Geographic Information Systems and their applications. Emphasizes the concepts needed to use GIS effectively for manipulating, querying, analyzing, and visualizing spatial-based data. Industry-standard GIS software is used to analyze spatial patterns in social, economic and environmental data, and to generate cartographic output from the analysis. (3-0) Y

GISC 6382 Applied Geographic Information Systems (3 semester hours) Further develops hands-on skills with industry-standard GIS software for application in a wide variety of areas including urban infrastructure management, marketing and location analysis, environmental management, geologic and geophysical analysis and the social sciences. Prerequisite: GISC 6381, or equivalent with instructor’s permission. (3-0) Y

GISC 6383 Geographic Information Systems Management and Implementation (3 semester hours) Management strategies for GIS are examined by presenting GIS as an integrated system of people, computer hardware, software, applications and data. Implementation is examined as a systematic process of user needs assessment, system specification, database design, application development, implementation, operation, and maintenance. Includes design of implementation plans as case studies to explore various techniques associated with each step of this process. (3-0) Y

GISC 6384 Spatial Analysis and Modeling (3 semester hours) Treatment of more advanced topics in the application of spatial analysis in a GIS environment. Topics covered include raster-based cartographic modeling, 3-d visualization, geostatistics and network analysis. Student will be acquainted with state-of-the-art software through hands-on laboratory experiences. Prerequisite: GISC 6381. (3-0) Y

GISC 6385 Geographic Information Systems Theories, Models and Issues (3 semester hours) Provides an understanding of the theory, data models and associated issues (such as uncertainty) that underlie GIS and the way these are applied to, and effect, spatial analysis and spatial data management. Prerequisite: GISC 6381 and 6382, or equivalent with instructor’s permission. (3-0) Y

GISC 6386 Urban and Environmental Applications of GIS/Remote Sensing. (3 semester hours) Examines selected topics in the use of GIS and/or remote sensing techniques for the solution of urban and environmental problems. Prerequisites: GISC 6381 or GEOS 5325, or equivalent with instructor’s permission. (3-0) R

GISC 6387 Geographic Information Systems Workshop (3 semester hours) Provides a structured laboratory experience focused on the students’ substantive area of interest. Each participant develops a project which should include aspects of database design and manipulation, spatial analysis, and cartographic production. Projects may be designed in coordination with a local government, utility, business, or other entity that uses GIS in its operations and research. Prerequisites: GISC 6381 and GISC 6382. (3-0) Y

GISC 6388 GIS Application Development (3 semester hours) Provides instruction and hands-on experience in specific techniques and languages for developing application systems based on GIS concepts. Students will learn to use current generation commercial software to design and implement an application. Prerequisites: GISC 6381 and GISC 5317, or consent of instructor. (3-0) R
GISC 6389 Geographic Information Sciences Master’s Project (3 semester hours) Requires completion of an original GIS project by the student working alone or in a team. Team efforts must result in products that can be associated uniquely with each student. Projects normally continue efforts started in GISC 6387 or GISC 6386. (3-0) S

GISC 7361 Spatial Statistics (3 semester hours) The application of econometric techniques to the explicit treatment of space (geography) in social science models. Covers the specification of spatial regression models, estimation and specification testing. Emphasizes the application of spatial econometric methods to an empirical data analysis project. Prerequisite: POEC 5331. (3-0) R

GISC 7362 GIS Network Modeling (3 semester hours) Examines the theory of network analysis and its application in Geographic Information Systems. Topics covered include graph theoretic measures of network connectivity and proofs of network properties; optimization problems including shortest path algorithms, flow algorithms, and assignment problems on networks; special solution procedures for the classic transportation problem; procedures for linear referencing and urban travel demand modeling. The implementation of these algorithms and procedures with GIS data structures is explored using industry standard GIS software. Prerequisite: GISC 6381 or equivalent knowledge. (3-0) R

GISC 7363 Internet Mapping and Information Processing (3 semester hours) Provides a conceptual overview and hands-on experiences in Internet mapping and web-based geospatial information processing with state-of-the-art commercial software. Topics covered included client/server configuration, distributed data access and display, web-based user interaction and customization. (3-0) T

GISC 7365 Remote Sensing Digital Image Processing (3 semester hours) Introduction to remote sensing digital image processing techniques. Topics covered include principles of remote sensing and remote sensors, image visualization and statistics extraction, radiometric and geometric correction, image enhancement, image classification and change detection. Innovative image processing approaches will also be introduced. State-of-the-art commercial image processing software is used for labs and applications development. Same as GEOS 5326 (3-0) R

GISC 7366 Applied Remote Sensing (3 semester hours) Focuses on the application of remote sensing techniques to solving real world urban and environmental problems in areas such as urban and suburban landscape, lane use and land cover, transportation and communication, vegetation and forestry, biodiversity and ecology, water and water quality control, soils and minerals, geology and geomorphology studies. The current generation, industry standard software is used for labs and applications development. Pre-requisite: GEOS 5325 Same as GEOS 5329 (3-0) R

GISC 7367 Remote Sensing Workshop (3 semester hours) An independent project is designed and conducted by the student, after instructor approval. The project develops and demonstrates student’s competence in using remote sensing techniques in a substantive application appropriate to his/her field of interest. Projects may be developed in coordination with a local government, utility, business, or other entity, which uses remote sensing in its operations and research. A formal presentation and a project report are required. Prerequisites: GISC 6381 and GISC 7365 Same as GEOS 7327. (3-0) R

GISC 7384 Advanced Raster Modeling (3 semester hours) Examines advanced topics in raster modeling beyond those discussed in GISC 6384 Spatial Analysis. Prerequisite: GISC 6384 or equivalent knowledge. R

GISC 8V01 Independent Study in GIS (1-9 semester hours) Provides faculty supervision for a student’s individual study of a topic agreed upon by the student and the faculty supervisor. Prerequisite: Consent of instructor. (May be repeated for credit.) ([1-9]-0) S

GISC 8V27 Internship in GIS (1-9 semester hours) Provides faculty supervision for a student’s internship, which must be related to GIS. ([1-9]-0) S

GISC 8V29 Research in GIS (1-9 semester hours) Provides faculty supervision of research conducted by a student. Prerequisite: Consent of instructor. (May be repeated for credit.) ([3-9]-0) S
Master of Science in Applied Economics

http://www.utdallas.edu/dept/socsci/

Faculty
Professors: Brian J. L. Berry, Lloyd J. Dumas, Catherine Eckel, Donald A. Hicks, James Murdoch, Barry J. Seldon, Wim P.M. Vijverberg
Associate Professors: Sheila Amin Gutiérrez de Piñeres, Nathan Berg, Kurt J. Beron, Susan Williams McElroy
Assistant Professors: Roxanne Ezzet-Lofstrom, Magnus Lofstrom, Isaac McFarlin

Objectives
The master’s program in Applied Economics emphasizes the application of economic tools to real socio-economic problems and developments in Economics as evident in the growing Economics literature. Students are introduced to the micro- and macroeconomic theories that guide empirical applications in applied fields in Economics, quantitative methods for addressing economic problems and cross-disciplinary perspectives on such problems.

Graduates of the Applied Economics program will have an educational background that is conducive to employment in banking or financial institutions, insurance, corporate strategic planning, real estate, journalism, management, marketing, labor arbitration, regulation, environmental and urban and regional planning. Graduates may also choose to undertake further studies in Ph.D. programs in Economics, Political Economy, and Political Science, as well as additional studies in business or law.

Facilities
Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University's Computing Center. The School has two computing laboratories which have over 30 computers that are network linked and equipped with major social science software packages, including E-Views, R. Rats, SPSS and STATA. A computerized geographic information system, the Lexis Nexis Database and WestLaw are also available for student use. The University's Computing Center provides personal computers and UNIX Workstations. Many important data and reference materials are also available online via the library's and school's memberships in numerous organizations.

Admission Requirements
The University's general admission requirements are discussed on page 13.

The master’s program in Applied Economics seeks applications from students with a baccalaureate degree from an accredited university of college. A 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1200 on the Graduate Records Examination (GRE). Students may also wish to consider submitting their score from the writing component of the GRE test as additional evidence of their writing skills. Standardized test scores are only one of the factors taken into account in determining admission. Students should also submit all transcripts, three letters of recommendation, and a one-page essay outlining the applicant’s background, education and professional objectives.

Prerequisites
For the Master of Science in Applied Economics, students with a Bachelor of Science in Economics and courses in calculus and matrix or linear algebra will have the necessary foundation in economics, statistics and mathematics. Students who lack this foundation should complete the following undergraduate courses at UTD or their equivalents at another institution: ECO 3310 Intermediate Microeconomics, ECO 3311 Intermediate Macroeconomics, ECO 4351 Mathematical Economics, ECO 4355 Econometrics, and SOCS 3303 Introduction to Social Statistics, MATH 1325 Applied Calculus I, MATH 1326 Applied Calculus II, and MATH 2333 Matrices, Vectors, and their Applications in order to begin the program.
Transfer Policies

Students who have previous graduate work pertinent to the requirements of a master’s program may be given up to 15 hours of transfer credit, and the hours of coursework required for the degree will be reduced accordingly. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s "Transfer of Credit" policy.

Degree Requirements

The University's general degree requirements are discussed on page 18.

Students seeking a Master of Science in Applied Economics degree must complete 36 semester credit hours of work in the program. The program has three components: 12 hours (four courses) in Required Core Courses, 9 hours of Applied Economics Electives and 15 hours of Free Electives. Students must achieve at least a 3.0 grade point average in the required courses and an overall grade point average of 3.0 to graduate.

Required Core Courses in Economics (12 hours):

ECO 5321 Microeconomic Theory for Applications
ECO 5322 Macroeconomic Theory for Applications
ECO 5309 Mathematical Economics
ECO 5311 Applied Econometrics

Advising note: If the student intends to enter the Ph.D. program in Economics upon completion of the MSAE, then he or she should consider taking ECO 5301 instead of ECO 5321 and ECO 5302 instead of ECO 5322.

Applied Economics Elective Courses (9 credit hours):

ECO 6321 Financial Economics I
ECO 6331 Labor Economics I or ECO 6332 Labor Economics II
ECO 6340 Industrial Organization
ECO 6355 International Trade
ECO 6361 Public Sector Economics

Other Elective Courses (15 credit hours):

The student may select other Economics courses numbered 5000 and above, or any of the following:
POEC 6301 Political-Economic Theories
POEC 6312 Social-Economic Theories
POEC 6366 International Economics
POEC 7321 Seminar in Business and Government
POEC 7340 Domestic Social Policy
GISC 6381 Geographic Information System Fundamentals
Other courses subject to approval of Coordinator of M.S.A.E. programs

Advising note: If the student intends to enter the Ph.D. program in Economics upon completion of the M.S.A.E. then he or she should consider taking ECO 6307 Microeconomics Theory II and ECO 6308 Macroeconomic Theory II as electives.
Master of Science in Applied Sociology

http://www.utdallas.edu/dept/socsci/

Faculty

Professors: Donald A. Hicks, Murray J. Leaf, Kimberly Kempf-Leonard, Lawrence J. Redlinger, Richard K. Scotch, Paul Tracy

Associate Professors: Bobby C. Alexander, Philip K. Armour, Pamela Brandwein, Bruce Jacobs, Paul Jargowsky

Assistant Professors: Roxanne Ezzet-Lofstrom, Karen Hayslett-McCall, Melinda D. Kane, Danielle Lavin-Loucks, Sheryl Skaggs

Objectives

The M.S. in Applied Sociology is designed to prepare students for employment in the nonprofit and public sectors, as well as related for-profit settings, by providing training in applied social research, statistics, and program evaluation; sociological theory as it relates to social problems, social policy, and social institutions; and in substantive fields such as health care, education, criminal justice, mental health, social welfare, youth development, and community development. The degree program develops skills and competencies which also can lead to further study in doctoral programs in the Social Sciences, including the doctoral program in Public Policy and Political Economy at UT-Dallas.

Facilities

Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and the University's Computing Center. The School has two computing laboratories which have over 30 computers that are network linked and equipped with major social science software packages, including E-Views, R, Rats, SPSS and STATA. A computerized geographic information system, the Lexis Nexis Database, and WestLaw are also available for student use. The University's Computing Center provides personal computers and UNIX Workstations. Many important data and reference materials are also available online via the library's and School's memberships in numerous organizations.

Prerequisites

There are no required prerequisite courses in sociology for the Applied Sociology program, although prior coursework in social theory, research methods, and social statistics are desirable. Prospective students with concerns about their preparation for the Applied Sociology program are encouraged to consult with the program coordinator.

Transfer Policies

Students who have previous graduate work pertinent to the requirements of the Applied Sociology degree may be given up to 15 hours of transfer credit, and the hours of coursework required for the degree will be reduced accordingly. Students desiring to transfer graduate courses thought to be equivalent to core courses may be required to demonstrate competency through examination. The award of such transfer credit must be consistent with the University’s “Transfer of Credit” policy.
Degree Requirements

The University’s general degree requirements are discussed on page 18.

The Master of Science (M.S.) in Applied Sociology has three components and requires the completion of 36 semester credit hours: 12 credit hours of core courses in Applied Sociology, 15 credit hours of Applied Sociology guided electives, and 9 credit hours of Economic, Political and Policy Sciences electives. Students must achieve at least a 3.0 grade point average in the Applied Sociology core courses and an overall grade point average of 3.0 to graduate.

Core Courses in Applied Sociology (12 hours):
POEC 5313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences
SOC 6312 Social-Economic Theories
SOC 6350 Social Stratification
SOC 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences
Or POEC 5310 Research Design I

Applied Sociology Guided Elective Courses (15 hours):
Any graduate-level course with a SOC prefix outside of the core may be applied to this requirement. Students may apply other graduate social science courses with the permission of the program coordinator.

Social Science Electives (9 hours):
Any graduate-level courses in the School of Economic, Political and Policy Sciences may be applied to this requirement. Students are encouraged to consult with the program coordinator in order to select courses appropriate for their academic and professional career goals.

Applied Sociology Course Descriptions

SOC 5371 Non-Profit Organizations (3 semester hours) This course examines issues related to the rise, scope, development and impact of non-profit organizations. The course explores both the unique missions of non-profit organizations and the management challenges posed by this expanding sector of the organizational environment. Same as POEC 5371. (3-0) T

SOC 5372 Non-Profit Management and Leadership (3 semester hours) This course examines issues, strategies, and techniques related to leadership and management in non-profit organizations. Same as POEC 5372. (3-0) R

SOC 5390 Special Topics in Applied Sociology (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) T

SOC 5V91 Independent Study in Applied Sociology (1-9 semester hours) Provides faculty supervision for student’s individual study of a topic agreed upon by the student and the faculty supervisor. Prerequisite: Consent of instructor. (May be repeated for credit.) ([1-9]-0) R

SOC 5V92 Internship in Applied Sociology (1-9 semester hours) Provides faculty supervision for a student’s internship. Internships must be related to the student’s course work. Prerequisite: Consent of instructor. ([1-9]-0) R

SOC 6300 Crime, Criminals and Societal Responses (3 semester hours) Introduces students to graduate study in criminology. Students learn to examine critically theoretical, methodological and policy issues in criminology and criminal justice. Same as POEC 6300. (3-0) R

SOC 6301 Extent of Crime and Criminals (3 semester hours) Provides an analysis of crime, criminals, and the reaction of the criminal justice systems to both. Same as POEC 6307. (3-0) R

SOC 6302 Law and Social Control (3 semester hours) Examines and analyses the various means by which society attempts to control the deviant and criminal conduct of its members. Same as POEC 6305. (3-0) R

SOC 6303 Etiology of Crime and Criminality (3 semester hours) Examines the history of criminological thought incorporating the major works of such theorists as Bentham, Beccaria, Marx, Durkheim, Lombroso, Shaw and McKay, Sutherland, Becker and Merton. Same as POEC 6303. (3-0) R

SOC 6305 Crime and Justice Policy (3 semester hours) An introduction to crime and the efforts to control crime through public policy. Same as POEC 6311. (3-0) R

SOC 6308 Victimology (3 semester hours) Examines risks and consequences of crime for its victims. Issues considered include victim-offender relationships, characteristics of victims, the nature of the injuries they experience, and criminal justice procedures that involve them. Same as POEC 6308. (3-0) R
SOC 6309 **Communities and Crime** (3 semester hours) Examines the trends and sources of crime and social disorder across communities. The course emphasizes relationships among crime, fear of crime, neighborhood change, neighborhood responses to crime, and public policies. Same as POEC 6309. (3-0) R

SOC 6310 **Delinquency and Juvenile Justice** (3 semester hours) Examines youth crime, child victimization, and juvenile justice. Students learn the processes by which specific behaviors are identified as delinquent, the historical evolution of juvenile justice, and current policies and practices. Same as POEC 6310. (3-0) R

SOC 6312 **Social-Economic Theories** (3 semester hours) A critical analysis of theories of society and economy. These include class, culture, solidarity, rational choice, transaction cost theory, principal agent theory, ideology and hegemony, network theory, collective action, bureaucracy, and American exceptionalism. Same as POEC 6312. (3-0) Y

SOC 6313 **Corrections** (3 semester hours) Examines the history, forms, and functions of correctional philosophies, institutions, programs, and policies. Topics include the structure and functions of prisons and jails, community corrections, intermediate sanctions, and the growth of correctional control in modern society. Same as POEC 6313. (3-0) R

SOC 6314 **Policing** (3 semester hours) Provides historical, social and political analysis of the roles and functions of policing in America. Same as POEC 6314. (3-0) R

SOC 6317 **Courts** (3 semester hours) Examines the objectives, institutions and processes involved in the adjudication of offenders. Topics address the structure and function of the judicial system and principal court actors. Same as POEC 6317. (3-0) R

SOC 6320 **Organizational Theory** (3 semester hours) Focuses on bureaucracy and rationality, formal and informal structures, and the role of the environment. Organizational factors such as technology, power, information, and culture, as well as the implications of organizational theory for public policy are examined. Same as POEC 6320, POEC 6320 and PSCI 6320. (3-0) Y

SOC 6322 **Crime Prevention** (3 semester hours) Examines situational, social, and legislative approaches to the prevention of crime and delinquency. Emphasis on theories, protective factors, implementation and consequences of these approaches. Same as POEC 6322. (3-0) R

SOC 6324 **Correlates of Crime and Justice** (3 semester hours) Examines the nature of relationships among attributes and indices at the individual, situational, and aggregate levels to various forms of crime and systems of justice. Same as POEC 6324. (3-0) R

SOC 6340 **Domestic Social Policy** (3 semester hours) Overview of governmental and nongovernmental programs, policies, and institutions dealing with those who cannot function self-sufficiently within the American market economy, including low-income families, the elderly, the unemployed, and people with disabilities. Analyzes how social policy in the United States reflects the political economy and culture, as well as social and demographic trends. Same as POEC 7340. (3-0) Y

SOC 6341 **Urban Development** (3 semester hours) Presents methods and models for understanding urban processes. Topics include analysis of urban growth, land use patterns, transportation and local public good delivery systems. Welfare consequences of various urban policy options are explored. Same as ECO 6371 and POEC 6341 (3-0) Y

SOC 6344 **Gender and Policy** (3 semester hours) Explores issues of gender and public policy in the U.S. Topics include gender critiques of welfare state policy, gender and poverty, women in the military, the politics (and political economy) of sex and sexuality, anti-sexual harassment policies. Same as POEC and PSCI 7344. (3-0) R

SOC 6350 **Social Stratification** (3 semester hours) This seminar will examine the major theories and lines of research on social stratification, defined as the hierarchical ranking of groups based on the unequal distribution of societal resources and positions. Focusing primarily on the U.S. class system, topics covered include: class reproduction and mobility, the educational system and policy, empirical definitions, the implications of race and gender for social class, and forms of legitimation. Same as POEC 6350 (3-0) Y

SOC 6351 **Sociology of Work and the Economy** (3 semester hours) This seminar will focus on the social infrastructure of the economy as it pertains to work. In particular, issues related to the changing nature of jobs and the increasingly global character of our economy will be addressed. Additional topics will include technology and the information economy, unemployment and underemployment, the informal economy, and immigration. (3-0) R

SOC 6352 **Evaluation Research Methods in the Economic, Political and Policy Sciences** (3 semester hours) A review of research methods used in program evaluation, with an emphasis on public and nonprofit social programs. Issues to be addressed include research design, appropriate performance standards, measurement and selection of indicators, sampling, data collection, and data analysis. Same as POEC 6352 (3-0) T

SOC 6354 **Social Movements** (3 semester hours) This course will survey the sociological and political research on social movements. Topics include: movement origins, tactics, recruitment, outcomes, and relationship to the state. A wide variety of movements will be covered including labor, civil rights, feminist, and environmental. Students will also conduct research on a movement of their choice. (3-0) R
SOC 6355 Race, Ethnicity, and Community (3 semester hours) Considers cultural and social behavior in multiracial and multiethnic societies. Issues include the formation and maintenance of individual and group identity, patterns of socioeconomic achievement, intergroup conflict, and the causes and consequences of public policy. (3-0) R

SOC 6356 Health and Illness (3 semester hours) A review of medical sociology and related fields, including social epidemiology and the social demography of health and illness; health and illness behavior; health institutions and professions; economic factors and trends in health care; and health policies and programs. (3-0) R

SOC 6357 Health Policy (3 semester hours) The history and political economy of the U.S. health care system and a review of major governmental programs to expand access to appropriate services, control rising costs, ensure the quality of care, and promote health through prevention. Analysis of current and recent proposals for reform of health care policy. Same as POEC 7341. (3-0) Y

SOC 6360 Qualitative Research Methods (3 semester hours) This course provides an overview of qualitative research in the Economic, Political and Policy Sciences. Students will investigate the assumptions underlying qualitative research approaches and critically assess the strengths and weaknesses of such approaches. Possible topics may include participant observation, ethnographic interviewing, ethnomethodology, conversation analysis, case study, and the analysis of historical documents. Same as POEC 6346 (3-0) T

SOC 6364 Demographic Analysis and Modeling (3 semester hours). Examines key demographic models for population analysis, their underlying theoretical foundations, and extensions into the spatial domain. Incorporates quantitative estimation and projection techniques and their use within a geographic information systems framework. Provides a solid understanding of spatio-temporal population dynamics, either local or global, which is essential to many disciplines engaged in planning for the public and private service sectors, for transportation networks or for regional development projects. Prerequisites: descriptive and inferential statistics through regression analysis Same as GISC 7364 (3-0) R

SOC 6368 Population and Development (3 semester hours) Examines the relations among population, resources, economic development, and the environment in light of conflicting Malthusian and anti-Malthusian paradigms. Topics include fertility, mortality, public health, human capital, use of resources, and environmental impacts at local, regional, and global scales. Same as ECO 6358 and POEC 6368. (3-0) T

SOC 6V91 Evaluation Research (3-6 semester hours) Individual or group project in evaluation research performed for a public or private community organization under faculty supervision. Students will normally enroll in this course for two consecutive fall/spring semesters. The first semester of enrollment will culminate in the completion of a formal evaluation research proposal; the second will end with a final research report based on conclusions of the proposed research. Students also are expected to participate in a weekly seminar on topics in evaluation research featuring faculty and student presentations, guest speakers, and group discussion. Permission of the program coordinator required. May be repeated for a total of six semester credit hours. Same as HCS 6V91 and POEC 6V91. ((3-6)-0). Y

SOC 6V92 Research Workshop in Applied Sociology (3-6 semester hours) Students join a faculty member in a group research project. (May be repeated for credit to a maximum of 6 hours. ((3-6)-0) T
Certificate Programs

The School of Economic, Political and Policy Sciences offers six certificate programs for both degree and non-degree seeking students. Certificate programs are a valuable component of the School’s educational mission and can be an important resource for both mid-career professionals and others seeking to advance their knowledge and expertise. The Certificates are offered in: Crime and Justice Analysis, Evaluation Research, Financial Economics, Geographic Information Systems (GIS), Nonprofit Management and Quantitative Analysis of Social and Economic Data (QASED).

Certificate in Crime and Justice Analysis

This program introduces students to graduate study and the field of criminology. The certificate in Crime and Justice Analysis is available to both non-degree and degree-seeking students. Professionals employed in positions within criminal justice agencies and related private organizations pursue the certificate to obtain additional education related to their jobs. Other students obtain the certificate while progressing toward a master’s or doctoral degree. This fifteen-credit hour certificate is designed to introduce students to a variety of foundation courses and the substantive areas that comprise the field of criminology.

The certificate program allows students to choose courses within four designated areas.

1. Foundation courses (3 hours):
   POEC 6300 Crime, Criminals and Societal Responses;
   POEC 6303 Etiology of Crime and Criminality;
   POEC 6311 Crime and Justice Policy.

2. Nature and Distribution of Crime courses (3 hours):
   POEC 6307 Extent of Crime and Criminals;
   POEC 6308 Victimology;
   POEC 6309 Communities and Crime;
   POEC 6324 Correlates of Crime and Justice;

3. Criminal Justice and Policy courses (3 hours):
   POEC 6305 Law and Social Control;
   POEC 6310 Delinquency and Juvenile Justice;
   POEC 6313 Corrections;
   POEC 6314 Policing;
   POEC 6317 Courts;
   POEC 6322 Crime Prevention.

4. Research Methods courses (6 hours):
   All students are required to take POEC 5313 Descriptive and Inferential Statistics and choose one of the following:
   POEC 6332 GIS Applications in Criminology;
   POEC 6340 Qualitative Criminology.

   Students can also receive credit for other courses that are relevant to one of the above substantive areas and are offered on a periodic basis. Students should consult the coordinator for the Graduate Program for additional information.
Certificate in Economic and Demographic Data Analysis

The School of Economic, Political and Policy Sciences also offers a certificate in the quantitative analysis of demographic and economic data. The certificate may be acquired by graduate degree-seeking and non-degree-seeking students. For the certificate, students must complete 15 graduate hours (5 courses). Students are required to take (A) POEC 5313 Descriptive and Inferential Statistics and POEC 5316 Advanced Regression Analysis. (B) Students must choose at least one of the following courses: ECO 5311 Applied Econometrics or POEC 6318 Structural Equation Modeling or POEC 6344 Categorical and Limited Dependent Variables. (C) In addition, two other empirically oriented courses must be completed. Students should check with the Director of the Certificate Program or the program office for details as to the list of acceptable courses.

Students seeking the certificate who do not plan to seek a degree should (1) submit an application and (2) an undergraduate transcript. No GRE score is required. Note: (a) up to 15 hours of coursework taken as a non-degree seeking student can be applied later to a graduate degree. (b) a maximum of 6 hours may be formally transferred from another institution with the approval of the certificate director. Students with equivalent knowledge, but no formal transfer, may substitute an additional course for Descriptive and Inferential Statistical with the approval of the certificate director. (c) Currently enrolled students may use up to 9 hours of courses required for their degree for the certificate.

Certificate in Evaluation Research

A graduate-level certificate program in Evaluation Research is offered jointly by the Schools of Economic, Political and Policy Sciences and Behavioral and Brain Sciences. Students who complete this program will have an opportunity to gain competencies in the design and implementation of program evaluations in fields such as education, health care, human services, criminal justice, and economic development. The Certificate in Evaluation Research program may be incorporated into graduate degree programs in the Schools of Economic, Political and Policy Sciences or Behavioral and Brain Sciences, or may be taken on its own by non-degree seeking students. Students in the Evaluation Research certificate program are normally expected to have completed undergraduate courses in social statistics and research design; students lacking appropriate preparation may be asked to take needed courses prior to admission to the program.

In order to receive the certificate, students must successfully complete three required courses and a two-semester long evaluation research project that culminates in a final report. The courses in the School of Economic, Political and Policy Sciences leading to the Certificate in Evaluation Research are POEC 5313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences, POEC 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences. An elective course approved by the Evaluation Research certificate program coordinator, and POEC 6V91 Evaluation Research (six credit hours) for a total of 15 semester credit hours. With permission of the Evaluation Research program coordinator, students may substitute appropriate courses from the School of Behavioral and Brain Sciences or prior coursework taken at other institutions. This is discussed in the Behavioral and Brain Sciences section of the catalog.

Students interested in applying for admission to the Certificate in Evaluation Research program should consult the graduate advising office in the School of Economic, Political and Policy Sciences or the School of Behavioral and Brain Sciences.

Certificate in Financial Economics

The Certificate in Financial Economics is a 12-hour program that provides students with the fundamentals necessary to prepare them for a career path in financial economics. Students wishing to complete the Certificate take POEC 5313 Descriptive and Inferential Statistics, ECO 6321 and ECO 6322 (Financial Economics I and II, respectively) or alternatives, subject to approval by Director of Economic Programs, and AIM 6333 Advanced Financial Reporting. Students should be aware that the AIM 6333 course is available only for degree-seeking students. Therefore, this certificate would be appropriate, for instance, for a student in the Master of Science in Applied Economics program or the Ph. D. in Economics. In addition, the student should have taken ECO 5301 Microeconomics Theory I or an equivalent course at another university.
Certificate in Geographic Information Systems (GIS)

The School of Economic, Political and Policy Sciences offers a certificate in Geographic Information Systems for both novice and experienced GIS professionals. The certificate is available to both graduate degree-seeking and non-degree-seeking students. The certificate requires 15 graduate hours (5 classes). Students must complete GISC 6381 Geographic Information Systems Fundamentals, GISC 6382 Applied GIS, GISC 6383 GIS Management and Implementation, GISC 6387 Geographic Information Systems Workshop, and one course from: GISC 5317 Computer Programming for GIS, GISC 6384 Spatial Analysis and Modeling, GISC 6386 Urban and Environmental Applications of GIS/Remote Sensing, GISC 6388 GIS Application Development, GISC 7360 GIS Pattern Analysis, GISC 7361 Spatial Statistics, GISC 7362 GIS Network Modeling, GISC 7363 Internet Mapping and Information Processing, GISC 7365/GEOS 5326 Remote Sensing Digital Image Processing, GISC 7366 Applied Remote Sensing, GEOS 5325 Introduction to Remote Sensing, GEOS 5322 Global Positioning System Satellite Surveying Techniques, GEOS 5424 3D Data Capture and Ground Lidar or other approved courses in Geosciences, Computer Science, Management or Social Science. All courses applied to the Certificate must have been taken within the three year period prior to the award of the Certificate. No more than two courses can be transferred from another institution.

Admission requirements: Students seeking the GIS certificate must have completed an undergraduate degree. Admissions requirements include (1) an application to U.T. Dallas and (2) an undergraduate transcript. You do not need a GRE (Graduate Records Examination) for the certificate program. Students seeking the GIS certificate should apply as “non-degree-seeking” students to the Master of Science in Geospatial Information Sciences program. Admissions requirements are the same for students who would simply like to take one or more of the related courses without pursuing a certificate.

Certificate in Local Government Management

The School of Economic, Political and Policy Sciences offers a Graduate Certificate in Local Government Management for local government professionals and for MPA students who desire to broaden their knowledge of important issues and approaches employed by professional local public administrators. Local governments in the United States play an important role in our democratic system. They are the place in our democratic system where citizens have the most direct contact with elected and appointed officials on numerous issues.

Local government managers operate in a complex legal and political environment. They are responsible for the provision of varied services directly to citizens, such as land use planning, law enforcement, water and sewer services, and recreation. Both the method and quality of service delivery are greatly influenced by managers who are hired by elected officials. The management of cities and counties has become increasingly professional over the past several decades. How the professional staff delivers services to the public within the political environment in which it works is the topic of many of the courses in this program.

Requirements for admission to the certificate program are the same as for a non-degree-seeking graduate student. Completion of fifteen (15) semester credit hours is required to attain the Graduate Certificate in Local Government Management and those hours may count toward a degree if the student completes all requirements for full admission as a graduate student. Required courses in the certificate program are PA 5343 Human Resource Management, PA 5321 Government Financial Management and Budgeting, and PA 6344 Local Government Management. The other two courses may be selected from among courses that pertain to local government offered in the graduate programs of the School of Economic, Political and Policy Sciences. Permission of the certificate coordinator must be obtained for the two elective courses.
Certificate in Nonprofit Management

Nonprofit organizations constitute an increasingly significant sector of the American economy as well as an essential element in American civic life. Nonprofits are found in such diverse fields as health care, education, human services, and criminal justice, as well as in cultural and civic activities. Faced with resource constraints and rising demands for accountability, nonprofit organizations require professional managers with an understanding of both administrative principles and techniques and of the distinctive legal, economic, and social environment within which nonprofits operate.

The Certificate in Nonprofit Management is designed to provide an overview of the nature and context of nonprofit organizations combined with skill-based courses to develop the competencies needed by nonprofit managers. The Certificate is intended for professionals already working in the nonprofit sector, those working in private for-profit or governmental settings who would like to work or volunteer in the nonprofit sector, and students without professional experience who seek to prepare themselves for nonprofit careers.

Completion of fifteen (15) semester credit hours are required to attain the Certificate in Nonprofit Management, including the core courses SOC 5371 Non Profit Organization and SOC 5372 Non-profit Management and Leadership and three guided electives from the list given below.

Students may petition the program coordinator to include other graduate courses offered by the School of Economic, Political and Policy Sciences as guided electives; however, courses from other institutions may not be applied to the required fifteen semester credit hours. Courses currently recognized for elective credit are:

PA 5315 Public Management
PA 5321 Government Financial Management and Budgeting
PA 6326 Decision Tools for Managers
PA 7315 Fundraising and Media Relations for Nonprofit Organizations
PA 7343 Human Resource Management
SOC 6340 Domestic Social Policy (Same as POEC 7340)
SOC 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences (Same as POEC 6352)
SOC 5390 Policy Research Workshop in Nonprofit Organizations (Same as POEC 7V62)
The impact of today’s advancing technologies are causing some of the most dramatic changes in the history of civilization. With a mandate from the State of Texas, Texas Instruments and industry, the Jonsson School is emerging as a national leader in the technological revolution. The achievements of the School in its short 20-year history include:

- SAT scores of freshmen that are the highest of any public university in Texas.
- The enrollment of women in computer science is the highest of any public university.
- During the 2002-03 and 2003-04 academic years, the School awarded more computer science degrees—bachelor’s, master’s and doctoral degrees combined—than any other public U.S. university, according to the Survey of the American Society for Engineering Education (ASEE).
- The School is home to some of the world’s top faculty in several fields.
- The School established the nation’s first accredited telecommunications engineering program.

With 900 high tech companies nearby, the Jonsson School’s location means that students and industry benefit from cutting edge research and development, top-notch internships and cooperative education programs and highly qualified employees. These are just a few benefits of a strong alliance between industry and academe. At The University of Texas at Dallas, the strong tie that binds the University to corporations was present even at UTD’s inception. Some 31 years ago, the founders of Texas Instruments (TI) offered their private research and development institution to the State of Texas to become part of the University of Texas System. Seventeen years later, the Texas Higher Education Coordinating Board authorized UTD’s Erik Jonsson School of Engineering & Computer Science to prepare students to tackle the rapidly changing world of technology and communications.

A strategic collaboration between UTD, Texas Instruments, and the State of Texas is helping to ensure that the Erik Jonsson School will be recognized as one of the nation’s elite engineering school. This $300 million investment features construction of a 200,000 sq. ft. research building, the addition of 40 faculty members, recruitment of 400 full-time graduate research students, and the formation of new degree programs. Focusing strong interest in the investment, TI built a $3 billion semiconductor chip manufacturing facility near the university if the State of Texas allocated $50 million for research at UTD. The investment includes a commitment from UTD to raise $100 million from public and private sources.

UTD and the Jonsson School have maintained close ties with TI, but as enrollment and programs have grown, so have strong relationships with other corporations such as Alcatel, Nortel, Ericsson, Nokia, Verizon, Lucent, Zvyx, Raytheon, EDS, SBC Communications, Tri-Quint Semiconductor, Cisco Systems, Lockheed Martin, Intervoice, and many others. (The Jonsson School has recently been named as one of 5 world-wide research partners in Alcatel’s Preferred Partner program). Industry leaders have joined with UTD and the Jonsson School to conduct research, share resources, enhance educational opportunities, and develop new technologies.

DEGREES OFFERED
- Master of Science in Computer Engineering
- Master of Science in Computer Science
- Master of Science in Computer Science (Major in Software Engineering)
- Master of Science in Electrical Engineering
- Master of Science in Electrical Engineering (Major in Telecommunications)
- Master of Science in Electrical Engineering (Major in Microelectronics)
- Master of Science in Materials Science and Engineering
- Master of Science in Telecommunications Engineering
- Doctor of Philosophy in Computer Engineering
- Doctor of Philosophy in Computer Science
- Doctor of Philosophy in Electrical Engineering
- Doctor of Philosophy in Electrical Engineering (Major in Microelectronics)
- Doctor of Philosophy in Materials Science and Engineering
- Doctor of Philosophy in Software Engineering
- Doctor of Philosophy in Telecommunications Engineering
Faculty

**Professors:** Farokh Bastani, Ramaswamy Chandrasekaran, Ding-Zhu. Du, András Faragó, Gopal Gupta, Dung T. Huynh, Dan Moldovan, Simeon C. Ntafos, Balaji Raghavachari, Hsing-Mean (Edwin) Sha, Ivan H. Sudborough, Bhavani Thuraisingham, Klaus Truemper (Emeritus), Kang Zhang, Si Qing Zheng

**Associate Professors:** Sergei Bereg, Lawrence Chung, Jorge A. Cobb, Galigekere R. Dattatreya, Sandra Harabagiu, Vasileios Hatzivassiloglou, Jason Jue, Rym Mili, Ivor P. Page, B. Prabhakaran, Ravi Prakash, Haim Schweitzer, Subbarayan Venkatesan, Yuke Wang, W. Eric Wong, I-Ling Yen

**Assistant Professors:** Joao Cangussu, Kendra M.L. Cooper, Ovidiu Daescu, Jing Dong, Murat Kantarcioglu, Latifur Khan, Yang Liu, Ying Liu, Vincent Ng, Neeraj Mittal, Kamil Sarac, R.N. Uma, Weili Wu, Youtao Zhang

**Senior Lecturers:** Tim Farage, Herman Harrison, Sam Karrah, Lawrence King, Radha Krishnan, Rafael Lacambara, Greg Ozbirn, David Russo, Martha Sanchez, Cort Steinhorst, Anthony Sullivan, Laurie Thompson, Nancy Van Ness

Objectives

The Graduate Program in Computer Science provides intensive preparation in the design, programming, theory, and applications of computers. The Department of Computer Science offers courses of study leading to the M.S. in Computer Science, the M.S. in Computer Science with Major in Software Engineering, Ph.D. degree in Computer Science, and the PhD degree in Software Engineering. Training is provided for both academically oriented students and students with professional goals in the many business, industrial or governmental occupations requiring advanced knowledge of computer theory and technology. Courses and research are offered in a variety of subfields of computer science, including operating systems, computer architecture, computer graphics, pattern recognition, automata theory, combinatorics, artificial intelligence, natural language processing, database design, computer networks, programming languages, software systems, analysis of algorithms, computational complexity, software engineering, software testing, software reliability, scheduling, visualization, fault-tolerant computing, parallel processing, telecommunications networks, telecommunications software, performance of systems, VLSI, computational geometry, and design automation.

A comprehensive program of evening courses is offered which enables part-time students to earn the master's degree or to select individual courses of interest.

Facilities

The Department of Computer Science has a large number of PCs, Sun Workstations, and several servers for research use. Laboratories are available for parallel processing, distributed systems, software engineering, high-performance computing, graphics, programming languages and systems, telecommunications, CAD and graph visualization, image understanding and processing, artificial intelligence, data mining, natural language processing, speech processing, and web technologies. The Department of Computer Science has an Internet 2 connection and all major computers on campus are linked by an Ethernet network.

In addition to the Computer Science faculty, there are individuals who are involved in computer related work in many other areas of the university, including the several physical and social sciences and in various areas of business and management. Students majoring in computer science with interest in these important application areas have the opportunity to consult and work with talented faculty from a wide range of disciplines. The department actively participates in a number of interdisciplinary degree programs which include MS and Ph.D. in Computer Engineering, MS and Ph.D. in Telecommunications Engineering, and Ph.D in Geospatial information Sciences.

Admission Requirements

The University's general admission requirements are discussed on page 13.

The student entering the Computer Science M.S. program should have an undergraduate preparation equivalent to a baccalaureate in a quantitative science, including calculus and linear algebra. However, special arrangements (requiring more than the minimal number of hours) can be made for students with good undergraduate preparation in other fields. Minimum requirements are:
• Bachelor’s degree which includes 2 semesters of calculus and 1 semester of linear algebra.
• GPA of at least 3.0 (last 60 hours). GPA in quantitative courses of at least 3.3.
• GRE scores of at least 1200 (verbal + quantitative) or 1800 (verbal + quantitative + analytical) is advisable based on our experience with student success in the program.

Students lacking undergraduate preparation in Computer Science must complete the courses listed below. At the discretion of the graduate adviser, a diagnostic exam may be required. The required prerequisite courses common to all Master’s students are:

CS 5301 Advanced Professional and Technical Communication
CS 5303 Computer Science I
CS 5330 Computer Science II
CS 5333 Discrete Structures
CS 5343 Algorithm Analysis and Data Structures
CS 5348 Operating Systems Concepts

Substitution of CS 5303, 5330 by professional experience will be considered. Additional prerequisite courses required for the various degree plans are:

For the Traditional Computer Science Track:
CS 5349 Automata Theory
CS 5390 Computer Networks

For the Networks and Telecommunications Track:
CS 3341 Probability and Statistics
CS 5390 Computer Networks

For the Intelligent Systems Track:
CS 5349 Automata Theory

For the Major in Software Engineering:
CS/SE 5354 Software Engineering

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The student may choose a thesis plan or a non-thesis plan. The thesis plan requires a minimum of 27 hours of courses, plus completion of an approved thesis (six thesis hours). This thesis is directed by a supervising professor and must be approved by the head of the Department of Computer Science. The non-thesis plan also requires a minimum of 33 hours of courses.

By a judicious planning of courses chosen from the computer science curriculum, supervised and approved by the graduate adviser, students may pursue the M.S. degree in Computer Science while emphasizing specific areas of the discipline. Students may also choose to receive the M.S. degree in Computer Science with a Major in Software Engineering. Because of the rapidly changing nature of the computer science discipline, the specific courses required may change by the time of the student’s admission. A listing of the required courses will be specified by the student’s adviser. Specific degree requirements follow.

Core Requirements (15 hours)
Students are required to complete one of the following:

Traditional Computer Science Track
CS 6363 Design & Analysis of Computer Algorithms
CS 6378 Advanced Operating Systems
CS 6390 Advanced Computer Networks Two of the following three courses:
CS 6353 Compiler Construction
CS/SE 6360 Database Design
CS 6371 Structure & Design of Programming Languages
Networks and Telecommunications Track
CS 6352 Performance of Computer Systems and Networks
CS 6363 Design & Analysis of Computer Algorithms
CS 6378 Advanced Operating Systems
CS 6385 Algorithmic Aspects of Telecommunication Networks
CS 6390 Advanced Computer Networks

Intelligent Systems Track
CS/SE 6360 Database Design
CS 6363 Design & Analysis of Computer Algorithms
CS 6364 Artificial Intelligence
CS 6375 Machine Learning
CS 6378 Advanced Operating Systems

Major in Software Engineering (M. S. C. S.)
CS/SE 6354 Advanced Software Engineering
CS/SE 6361 Requirements Engineering
CS/SE 6362 Software Architecture and Design
CS/SE 6367 Software Testing, Validation and Verification
CS/SE 6388 Software Project Planning and Management

Students must satisfy the core requirements by either earning a 3.2 minimum grade point average OR by earning a 3.0 minimum grade point average in the five core courses and taking an extra approved elective (beyond the minimum degree requirements of 33 hours) and earning a grade of B or better in this additional elective.

Electives (minimum of 18 hours)
Five [15 credit hours] 6000/7000/8000 level elective CS courses, or six hours of thesis or project courses plus three elective courses [9 + 6 = 15 credit hours], with approval of a graduate adviser; a minimum grade point average of 3.0 is required. Courses that are prerequisites to the student’s core requirements are especially recommended. Approved electives must be taken to make a minimum of 33 hours.

Research Track
Admission Requirements
Full-time students with strong Computer Science background and contemplating a career in research may choose to be considered for a limited number of openings in the Research Track for the Master of Science degree. Students can enter the Research Track only in the Fall semester. All students admitted together in the Research Track are required to take their core courses together. While not required, it is expected that most students in the Research Track will continue on to the Ph.D. degree.
The admission requirements for the Research Track are:
• A B.S. in Computer Science (or equivalent) that includes two semesters of calculus and one semester
  of linear algebra with
• GPA of at least 3.5 in the last 60 hours, and
• A GRE of at least 1300 (verbal and quantitative) is advisable based on our experience with student
  success in the program.

Degree Requirements
Students admitted to the Research Track are expected to have strong Computer Science background that includes the following courses (or equivalents):
CS 5303 Computer Science I
CS 5330 Computer Science II
CS 5333 Discrete Structures
CS 5343 Algorithm Analysis and Data Structures
CS 5348 Operating Systems Concepts
CS 5349 Automata Theory
CS/SE 5354 Software Engineering
CS 5390 Computer Networks
CS 5301 Advanced Professional and Technical Communication is also a required prerequisite but it may be taken after admission.

Core Requirements:
CS/SE 6354 Advanced Software Engineering
CS/SE 6362 Software Architecture and Design
CS 6363 Design & Analysis of Computer Algorithms
CS 6378 Advanced Operating Systems***
CS 6390 Advanced Computer Networks***

Electives:
Students in the Research Track will have to complete six 6000 and above level elective CS, SE courses that include at least one 7000 level course and six hours of Master’s thesis [18 credit hours]. A minimum grade point average of 3.0 is required.

Students in the Research Track are encouraged to take PhD qualifying exams in the core classes during the first year. Students that make satisfactory progress will be admitted to the PhD degree programs in Computer Science or Software Engineering after their first year. Such students will receive the M.S. degree in Computer Science or the M.S. degree in Computer Science with Major in Software Engineering upon approval of their dissertation proposal and completion of the required hours for the MS degree (i.e., the dissertation proposal and 6 hours of coursework will replace the MS Thesis requirement).

Doctor of Philosophy
The Department of Computer Science offers Ph.D. degrees in Computer Science and in Software Engineering.

Each degree program is tailored to the student. The student must arrange a course program with the guidance and approval of a faculty member chosen as his/her graduate adviser. Adjustments can be made as the student’s interests develop and a specific dissertation topic is chosen.

Admission Requirements
The University’s general admission requirements are discussed on page 13.

A student may be admitted under two possible options. The student must have:
• A Master’s degree in computer science or its equivalent, and
• A GPA of at least 3.5 and GRE of at least 1200 (verbal and quantitative) or 1800 (verbal, quantitative, and analytical) is advisable based on our experience with student success in the program; or
  • A B.S. in related area that includes two semesters of calculus and linear algebra with
  • GPA of at least 3.5 in the last 60 hours, and
  • A GRE of at least 1300 (verbal and quantitative) is advisable based on our experience with student success in the program.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

Core requirements:
The core requirements for the Ph.D. degree in Computer Science are the same as the ones for the M.S. in Computer Science or the M.S. in Computer Science with Major in Software Engineering; the core requirements for the Ph.D. degree in Software Engineering are the same as those for the M.S. in Computer Science with Major in Software Engineering.

• Pass a qualifying examination.
• Pass, with a grade of B or better, courses chosen as follows:
  • CS 6382 Theory of Computation; in addition, students pursuing the Ph.D. degree in Software Engineering should take CS/SE 6389 _ Formal Methods and Programming Methodology.
  • Two CS/SE 7000 and above level courses
• Sufficient CS electives for a total of at least 90 hours beyond the baccalaureate degree. At least 9 hours
of organized advanced Computer Science electives must be taken at UT Dallas. The student is encouraged to consult with an adviser in choosing electives.

Dissertation

A dissertation is required and must be approved by the graduate program. A student must arrange for a dissertation adviser willing to guide this dissertation. The student must have a dissertation supervising committee that consists of no less than four members of whom at least three must be from the Computer Science faculty. The dissertation may be in computer science exclusively or it may involve considerable work in an area of application.

Course Descriptions

Computer Science

CS 5301 (EE 5301) Advanced Professional and Technical Communication (3 semester hours) CS 5301 utilizes an integrated approach to writing and speaking for the technical professions. The advanced writing components of the course focus on writing professional quality technical documents such as proposals, memos, abstracts, reports, letters, emails, etc. The advanced oral communication components of the course focus on planning, developing, and delivering dynamic, informative and persuasive presentations. Advanced skills in effective teamwork, leadership, listening, multimedia and computer generated visual aids are also emphasized. Graduate students will have a successful communication experience working in a functional team environment using a real time, online learning environment. (3-0) Y

CS 5303 Computer Science I (3 semester hours) Computer science problem solving. The structure and nature of algorithms and their corresponding computer program implementation. Programming in a high level block-structured language (e.g., PASCAL, Ada, C++, or JAVA). Elementary data structures: arrays, records, linked lists, trees, stacks and queues. (3-0) S

CS 5330 Computer Science II (3 semester hours) Basic concepts of computer organization: Numbering systems, two's complement notation, multi-level machine concepts, machine language, assembly programming and optimization, subroutine calls, addressing modes, code generation process, CPU datapath, pipelining, RISC vs. CISC, performance calculation. Corequisite: CS 5303. (3-0) S

CS 5333 Discrete Structures (3 semester hours) Mathematical foundations of computer science. Logic, sets, relations, graphs and algebraic structures. Combinatorics and metrics for performance evaluation of algorithms. (3-0) S

CS 5335 Programming Projects in C and C++ (3 semester hours) Numerous programming projects in both C and C++. All fundamentals of C, with special emphasis on use of pointers. Use of C++ extensions to create and extend (by inheritance) abstract data types. The use/advantages of virtual functions (dynamic polymorphism). Prerequisites: CS 5303 and CS 5330 or equivalent experience. (3-0) S

CS 5336 Programming Projects in Java (3 semester hours) Overview of the object-oriented philosophy. Implementation of object-oriented designs using the Java programming environment. Emphasis on using the browser to access and extend the Java class library. Prerequisite: CS 5303 or equivalent experience. (3-0) Y

CS 5343 Algorithm Analysis & Data Structures (3 semester hours) Formal specifications and representation of lists, arrays, trees, graphs, multilinked structures, strings and recursive pattern structures. Analysis of associated algorithms. Sorting and searching, file structures. Relational data models. Prerequisites: CS 5303, CS 5333. (3-0) S

CS 5348 Operating Systems Concepts (3 semester hours) An introduction to fundamental concepts in operating systems, their design, implementation, and usage. Topics include: process management, main memory management, virtual memory, I/O and device drivers, file systems, secondary storage management, introduction to critical sections and deadlocks. Prerequisites: CS 5330 and CS 5343 (may be taken concurrently) and a working knowledge of C and Unix. (3-0) S

CS 5349 Automata Theory (3 semester hours) Deterministic and nondeterministic finite automata; regular expressions, regular sets, context-free grammars, pushdown automata, context free languages. Selected topics from Turing Machines and undecidability. Prerequisite: CS 5333. (3-0) S

CS 5354 (CE 5354, SE 5354) Software Engineering (3 semester hours) Formal specification and program verification. Software life-cycle models and their stages. System and software requirements engineering; user-interface design. Software architecture, design, and analysis. Software testing, validation, and quality assurance. Corequisite: CS 5343 (CS 5343 can be taken before or at the same time as CS 5354) (3-0) S
CS 5375 Principles of UNIX (3 semester hours) Design and history of the UNIX operating system. Detailed study of process and file system data structures. Shell programming in UNIX. Use of process-forking functionality of UNIX to simplify complex problems. Interprocess communication and coordination. Device drivers and streams as interfaces to hardware features. TCP/IP and other UNIX inter-machine communication facilities. Prerequisite: CS 5335. (3-0) S

CS 5390 Computer Networks (3 semester hours) The design and analysis of computer networks. Topics include: the OSI reference model, transmission media, medium-access protocols, LANs, data link protocols, routing, congestion control, internetworking, and connection management. Prerequisite: CS 5343. (3-0) S

CS 5V71 Cooperative Education (1-3 semester hours) Placement in a faculty-supervised work environment in industry or government. Sites may be local or out-of-state. The cooperative education program provides exposure to a professional working environment, application of theory to working realities, and an opportunity to test skills and clarify goals. Experience gained may also serve as a work credential after graduation. (May be repeated to a maximum of 9 credit hours.) Departmental approval is required. ((1-3)-0) S

CS 5V81 (SE 5V81) Special Topics in Computer Science (1-9 semester hours) Selected topics in Computer Science. (May be repeated to a maximum of 9 credit hours.) ((1-9)-0) S

CS 6304 (CE 6304, EE 6304) Computer Architecture (3 semester hours) Trends in processor, memory, I/O and system design. Techniques for quantitative analysis and evaluation of computer systems to understand and compare alternative design choices in system design. Components in high performance processors in computers: pipelining, instruction level parallelism, memory hierarchies, and input/output. Students will undertake a major computing system analysis and design project. Prerequisites: EE 2310, EE 4320, and C/C++. (3-0) Y

CS 6320 Natural Language Processing (3 semester hours) This course covers state-of-the-art methods for natural language processing. After an introduction to the basics of syntax, semantic, and discourse analysis, the focus shifts to the integration of these modules into natural-language processing systems. In addition to natural language understanding, the course presents advanced material on lexical knowledge acquisition, natural language generation, machine translation, and parallel processing of natural language. Prerequisite: CS 5343. (3-0) Y

CS 6321 Discourse Processing (3 semester hours) Introduction to discourse processing from natural language texts. Automatic clustering of utterances into coherent units (segments) with hierarchical structures. State-of-the-art research in textual cohesion, coherence, and discourse understanding. Included topics are anaphoric reference and ellipsis, notion of textual context, and relationship between tense, aspect, and discourse states. Prerequisite: CS 6320 or consent of the instructor (3-0) T

CS 6322 Information Retrieval (3 semester hours) The course covers modern techniques for storing and retrieving unformatted textual data and providing answers to natural language queries. Current research topics and applications of information retrieval in data mining, data warehousing, text mining, digital libraries, hypertext, multimedia data, and query processing are also presented. Prerequisite: CS 5343. (3-0) Y

CS 6324 Information Security (3 semester hours) A comprehensive study of security vulnerabilities in information systems and the basic techniques for developing secure applications and practicing safe computing. Topics include common attacking techniques such as buffer overflow, Trojan, virus, etc. UNIX, Windows and Java security. Conventional encryption. Hashing functions and data integrity. Public-key encryption (RSA, Elliptic-Curve). Digital signature. Watermarking for multimedia. Security standards and applications. Building secure software and systems. Management and analysis of security. Legal and ethical issues in computer security. Prerequisite: CS 5348 and CS 5343 (3-0) Y

CS 6351 Computer Systems Design (3 semester hours) Design of instruction sets, memory addressing modes, interleaved memory, cache memory design. Instruction pipelines, techniques for removing dependency delays. Computer bus systems and interfaces for various input/output device types. Pipelined and parallel functional units and their associated code generation algorithms. RISC architectures, support of high level languages, data flow machines, functional languages, lazy evaluation and graph reduction machines. Prerequisite: CS 6349. (3-0) T

CS 6352 (CE 6352) Performance of Computer Systems and Networks*** (3 semester hours) Overview of case studies. Quick review of principles of probability theory. Queuing models and physical origin of random variables used in queuing models. Important variants of the M/M/m/N queuing system. Little’s law. The M/G/1 queuing system. Simulation of queuing systems. Product form solutions of open and closed queuing networks. Convolution algorithms and Mean Value Analysis for closed queuing networks. Discrete time queuing systems. Prerequisite: a first course on probability theory. (3-0) T

CS 6353 Compiler Construction (3 semester hours) Lexical analyzers, context-free grammars. Top-down and bottom-up parsing; shift reduce and LR parsing. Operator-precedence, recursive-descent, predictive, and LL parsing. LR(k), LL(k) and precedence grammars will be covered. Prerequisites: CS 5343 and CS 5349. (3-0) Y
CS 6354 (CE 6354, SE 6354) Advanced Software Engineering (3 semester hours) This course covers advanced theoretical concepts in software engineering and provides an extensive hands-on experience in dealing with various issues of software development. It involves a semester-long group software development project spanning software project planning and management, analysis of requirements, construction of software architecture and design, implementation, and quality assessment. The course will introduce formal specification, component-based software engineering, and software maintenance and evolution. Prerequisite: CS 5354 (or equivalent) and knowledge of Java (3-0) S

CS 6356 (SE 6356) Software Maintenance, Evolution, and Re-Engineering (3 semester hours) Principles and techniques of software maintenance. Impact of software development process on software justifiability, maintainability, evolvability, and planning of release cycles. Use of very high-level languages and dependencies for forward engineering and reverse engineering. Achievements, pitfalls, and trends in software reuse, reverse engineering, and re-engineering. Prerequisite: CS 5354. (3-0) Y

CS 6357 (SE 6357) Software Quality Assurance and Metrics (3 semester hours) Concepts of the pervasive system attributes: reliability, efficiency, maintainability, reusability, etc. Software complexity and measures. Software process measures, product measures and resource measure. Validation of software measures. Software measures and measurement theory. Measuring, monitoring and controlling reliability. Supporting tools. Prerequisite: CS 5354. (3-0) Y

CS 6359 (SE 6359) Object-Oriented Analysis and Design*** (3 semester hours) Analysis and practice of modern tools and concepts that can help produce software that is tolerant of change. Consideration of the primary tools of encapsulation and inheritance. Construction of software-ICs, which show the parallel with hardware construction. Prerequisites: CS 5354 and either CS 5335 or CS 5336. (3-0) S

CS 6360 (SE 6360) Database Design (3 semester hours) Methods, principles, and concepts that are relevant to the practice of database software design. Database system architecture; conceptual database models; relational and object-oriented databases; database system implementation; query processing and optimization; transaction processing concepts, concurrency, and recovery; security. Prerequisite: CS 5343. (3-0) S

CS 6361 (SE 6361) Requirements Engineering (3 semester hours) System and software requirements engineering. Identification, elicitation, modeling, analysis, specification, management, and evolution of functional and non-functional requirements. Strengths and weaknesses of different techniques, tools, and object-oriented methodologies. Interactions and trade-offs among hardware, software, and organization. System and sub-system integration with software and organization as components of complex, composite systems. Transition from requirements to design. Critical issues in requirements engineering. Prerequisite: CS 5354. (3-0) S

CS 6362 (SE 6362) Software Architecture and Design (3 semester hours) Concepts and methodologies for the development, evolution, and reuse of software architecture and design, with an emphasis on object-orientation. Identification, analysis, and synthesis of system data, process, communication, and control components. Decomposition, assignment, and composition of functionality to design elements and connectors. Use of non-functional requirements for analyzing trade-offs and selecting among design alternatives. Transition from requirements to software architecture, design, and to implementation. State of the practice and art. Prerequisite: CS 5354. (3-0) S

CS 6363 Design and Analysis of Computer Algorithms (3 semester hours) The study of efficient algorithms for various computational problems. Algorithm design techniques. Sorting, manipulation of data structures, graphs, matrix multiplication, and pattern matching. Complexity of algorithms, lower bounds, NP completeness. Prerequisite: CS 5343 (3-0) S

CS 6364 Artificial Intelligence (3 semester hours) Design of machines that exhibit intelligence. Particular topics include: representation of knowledge, vision, natural language processing, search, logic and deduction, expert systems, planning, language comprehension, machine learning. Prerequisite: CS 5343. (3-0) Y


CS 6367 (CE 6387, SE 6367) Software Testing, Validation, and Verification (3 semester hours) Methods for evaluating software for correctness, performance and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code walkthroughs, code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models and performance measurement techniques. Prerequisite: CS 5354. (3-0) Y

CS 6368 Telecommunication Network Management (3 semester hours) In-depth study of network management issues and standards in telecommunication networks. OSI management protocols including CMIP, CMISE, SNMP, and MIB. ITU’s TMN (Telecommunication Management Network) standards, TMN functional architecture
and information architecture. NMF (Network Management Forum) and service management, service modeling and network management API. Issues of telecommunication network management in distributed processing environment. Prerequisite: One of CS 5390, CS 6390, CS 6385 or equivalent. (3-0) Y

**CS 6369 Complexity of Combinatorial Algorithms** (3 semester hours) Topics include bounded reducibility and completeness, approximation algorithms and heuristics for NP-hard problems, randomized algorithms, additional complexity classes. Prerequisite: CS 6363. (3-0) T

**CS 6370 (SE 6370) Information Systems Engineering** (3 semester hours) Study of characteristics, analysis and synthesis of information systems in industrial, business, and governmental organizations. Building conventional information systems through requirements modeling and analysis, design, and implementation. Approaches and issues in engineering and re-engineering intelligent, cooperative, and distributed information systems. Prerequisite: CS 6360. (3-0) Y

**CS 6371 Advanced Programming Languages** (3 semester hours) Functional Programming, Lambda Calculus, Logic Programming, Abstract Syntax, Denotational Semantics of Imperative Languages, Fixpoints semantics, Verification of Programs, Partial Evaluation, Interpretation and Automatic Compilation, Axiomatic Semantics, Applications of semantics to software engineering. Prerequisite: CS 5343, CS 5349 (3-0) S

**CS 6373 Intelligent Systems** (3 semester hours) Logical formalizations of knowledge for the purpose of implementing intelligent systems that can reason in a way that mimics human reasoning. Topics include: syntax and semantics of common logic, description logic, modal epistemic logic; reasoning about uncertainties, beliefs, defaults and counterfactuals; reasoning within contexts; implementations of knowledge base and textual inference reasoning systems; and applications. Prerequisite: CS 5343.(3-0) Y

**CS 6374 Computational Logic** (3 semester hours) Methods and algorithms for the solution of logic problems. Topics include problem formulation in first order logic and extensions, theorem proving algorithms, polynomially solvable cases, logic programming, and applications. Prerequisites: CS 5343, and knowledge of _C._ (3-0) Y


**CS 6376 Parallel Processing** (3 semester hours) Topics include parallel machine models, parallel algorithms for sorting, searching and matrix operations. Parallel graph algorithms. Selected topics in parallel processing. Prerequisite: CS 6363. (3-0) T

**CS 6378 (CE 6378) Advanced Operating Systems*** (3 semester hours) Concurrent processing, inter-process communication, process synchronization, deadlocks, introduction to queuing theory and operational analysis, topics in distributed systems and algorithms, checkpointing, recovery, multiprocessor operating systems. Prerequisites: CS 5348 or equivalent; knowledge of C and UNIX. (3-0) S

**CS 6379 Biological Database Systems and Data Mining** (3 semester Hours) Relational data models and database management systems; theories and techniques of constructing relational databases to store biological data, including sequences, structures, genetic linkages and maps, and signal pathways. Introduction to a relational database query language (SQL) with emphasis on answering biologically important questions. Summary of current biological databases. Data integration from various sources and security. Novel data mining methods in bioinformatics with an emphasis on protein structure prediction, homology search, genomic sequence analysis, gene finding and gene mapping. Future directions for biological database development. Prerequisites: BIOL 5373, BIOL 5381, and CS 5343 or consent of the instructor (3-0) T

**CS 6380 (CE 6380) Distributed Computing** (3 semester hours) Topics include distributed algorithms, election algorithms, synchronizers, mutual exclusion, resource allocation, deadlocks, Byzantine agreement and clock synchronization, knowledge and common knowledge, reliability in distributed networks, proving distributed programs correct. Prerequisite: CS 5348. (3-0) S

**CS 6381 Combinatorics and Graph Algorithms** (3 semester hours) Fundamentals of combinatorics and graph theory. Combinatorial optimization, optimization algorithms for graphs (max flow, shortest routes, Euler tour, Hamiltonian tour). Prerequisites: CS 5343, CS 6363. (3-0) T

**CS 6382 Theory of Computation** (3 semester hours) Formal models of computation. Recursive function theory. Undecidability and incompleteness. Selected topics in theory of computation. Prerequisite: Consent of Instructor. (3-0) Y

**CS 6384 Computer Vision** (3 semester hours) Algorithms for extracting information from digital pictures. Particular topics include: analysis of motion in time varying image sequences, recovering depth from a pair of stereo images, image separation, recovering shape from textured images and shadows, object matching techniques, model based recognition, the Hough transform. Prerequisite: CS 5343. (3-0) Y
CS 6385 (TE 6385) Algorithmic Aspects of Telecommunication Networks*** (3 semester hours) This is an advanced course on topics related to the design, analysis, and development of telecommunications systems and networks. The focus is on the efficient algorithmic solutions for key problems in modern telecommunications networks, in centralized and distributed models. Topics include: main concepts in the design of distributed algorithms in synchronous and asynchronous models, analysis techniques for distributed algorithms, centralized and distributed solutions for handling design and optimization problems concerning network topology, architecture, routing, survivability, reliability, congestion, dimensioning and traffic management in modern telecommunication networks. Prerequisites: CS 5343, CS 5348, and TE 3341 or equivalents. (3-0) Y

CS 6386 Telecommunication Software Design*** (3 semester hours) Programming with sockets and remote procedure calls, real time programming concepts and strategies. Operating system design for real time systems. Encryption, file compression, and implementation of firewalls. An in-depth study of TCP/IP implementation. Introduction to discrete event simulation of networks. Prerequisites: CS 5390. (3-0) Y

CS 6387 (SE 6387) Computer-Aided Software Engineering (3 semester hours) Tools for development, maintenance, evolution and reuse of software. Development, selection, use, and management of such tools. Traditional and emerging methodologies, including structured systems methodologies and knowledge-based approaches to software development. Opening and closing CASEs: benefits, pitfalls, and critical issues. Prerequisite: CS 5354. (3-0) Y

CS 6388 (SE 6388) Software Project Planning and Management (3 semester hours) Techniques and disciplines for successful management of software projects. Planning, scheduling, tracking, cost and size estimation, risk management, configuration management and version control. Identification, definition, management, and optimization of software engineering processes. Benefits and pitfalls of both conventional and emerging technologies. Prerequisite: CS 5354. (3-0) Y

CS 6389 (SE 6389) Formal Methods and Programming Methodology (3 semester hours) Formal techniques for building highly reliable systems. Use of abstractions for concisely and precisely defining system behavior. Formal logic and proof techniques for verifying the correctness of programs. Hierarchies of abstractions, state transition models, Petri Nets, communicating processes. Operational and definitional specification languages. Applications to reliability-critical, safety-critical, and mission-critical systems, ranging from commercial computer communication systems to strategic command control systems. Prerequisite: CS 5354. (3-0) Y

CS 6390 (CE 6390) Advanced Computer Networks*** (3 semester hours) Survey of recent advancements in high-speed network technologies. Application of quantitative approach to the study of broadband integrated networks including admission control, access control, and quality of service guarantee. Prerequisite: CS 5390. (3-0) S


CS 6392 (CE 6392) Mobile Computing Systems (3 semester hours) Topics include coping with mobility of computing systems, data management, reliability issues, packet transmission, mobile IP, end-to-end reliable communication, channel and other resource allocation, slot assignment, routing protocols, and issues in mobile wireless networks (without base stations). Prerequisite: CS 6378 or CS 6390. (3-0) Y


CS 6396 (CE 6308) Real Time Systems (3 semester hours) Introduction to real-time applications and concepts. Real-time operating systems and resource management. Specification and design methods for real-time systems. System performance analysis and optimization techniques, task assignment and scheduling, real-time communication, case studies of real-time operating systems. Prerequisite: CS 5348 or equivalent. (3-0) Y

CS 6397 (CE 6397) Synthesis and Optimization of High-Performance Systems (3 semester hours) A comprehensive study of the high-level synthesis and optimization algorithms for designing high performance systems with multiple CPUs or functional units for critical applications such as Multimedia, Signal processing, Telecommunications, Networks, and Graphics applications, etc. Topics including algorithms for architecture-level synthesis, scheduling, resource binding, real-time systems, parallel processor array design and mapping, code generations for DSP processors, embedded systems and hardware/software codesigns. Prerequisite: CS 5343 (3-0) T
CS 6398 (CE 6398, EE 6398) DSP Architectures (3 semester hours) Typical DSP algorithms, representation of DSP algorithms, Data-graph, FIR filters, Convolutions, Fast Fourier Transform, Discrete Cosine Transform, Low power design, VLSI implementation of DSP algorithms, implementation of DSP algorithms on DSP processors, DSP applications including wireless communication and multimedia. Prerequisite: CS 5343. (3-0) T

CS 6399 (CE 6399) Parallel Architectures and Systems (3 semester hours) A comprehensive study of the fundamentals of parallel systems and architecture. Topics including parallel programming environment, fine-grain parallelism such as VLIW and superscalar, parallel computing paradigm of shared-memory, distributed-memory, data-parallel and data-flow models, cache coherence, compiling techniques to improve parallelism, scheduling theory, loop transformations, loop parallelizations and run-time systems. Prerequisite: CS 5348. (3-0) T

CS 6V81 (SE 6V81) Special Topics in Computer Science (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S

CS 7301 (SE 7301) Recent Advances in Computing (3 semester hours) Advanced topics and publications will be selected from the theory, design, and implementation issues in computing. May be repeated for credit as topics vary. Prerequisite: Consent of the instructor. (3-0) Y

CS 8V02 (SE 8V02) Topics in Computer Science (1-6 semester hours) (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

CS 8V07 (SE 8V07) Research (1-9 semester hours) Open to students with advanced standing subject to approval of the graduate adviser. ([1-9]-0) S

CS 8V98 (SE 8V98) Thesis (3-9 semester hours) (May be repeated for credit.) ([3-9]-0) S

CS 8V99 (SE 8V99) Dissertation (3-9 semester hours) (May be repeated for credit.) ([3-9]-0) S

Software Engineering

SE 5354 (CE 5354, CS 5354) Software Engineering (3 semester hours) Formal specification and program verification. Software life-cycle models and their stages. System and software requirements engineering; user-interface design. Software architecture, design, and analysis. Software testing, validation, and quality assurance. Corequisite: CS 5343 (CS 5343 can be taken before or at the same time as CS 5354) (3-0) S

SE 5V81 (CS 5V81) Special Topics in Computer Science (1-9 semester hours) Selected topics in Computer Science. (May be repeated to a maximum of 9 credit hours.) ([1-9]-0) S

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SE 6356 (CS 6356) Software Maintenance, Evolution, and Re-Engineering (3 semester hours) Principles and techniques of software maintenance. Impact of software development process on software justifiability, maintainability, evolvability, and planning of release cycles. Use of very high-level languages and dependencies for forward engineering and reverse engineering. Achievements, pitfalls, and trends in software reuse, reverse engineering, and re-engineering. Prerequisite: CS 5354. (3-0) Y

SE 6357 (CS 6357) Software Quality Assurance and Metrics (3 semester hours) Concepts of the pervasive system attributes: reliability, efficiency, maintainability, reusability, etc. Software complexity and measures. Software process measures, product measures and resource measure. Validation of software measures. Software measures and measurement theory. Measuring, monitoring and controlling reliability. Supporting tools. Prerequisite: SE 5354. (3-0) Y

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SE 6360 (CS 6360) Database Design (3 semester hours) Methods, principles, and concepts that are relevant to the practice of database software design. Database system architecture; conceptual database models; relational and object-oriented databases; database system implementation; query processing and optimization; transaction processing concepts, concurrency, and recovery; security. Prerequisite: CS 5343. (3-0) S

SE 6361 (CS 6361) Requirements Engineering (3 semester hours) System and software requirements engineering. Identification, elicitation, modeling, analysis, specification, management, and evolution of functional and non-functional requirements. Strengths and weaknesses of different techniques, tools, and object-oriented
methodologies. Interactions and trade-offs among hardware, software, and organization. System and sub-system integration with software and organization as components of complex, composite systems. Transition from requirements to design. Critical issues in requirements engineering. Prerequisite: SE 5354. (3-0) S

**SE 6362 (CS 6362) Software Architecture and Design** (3 semester hours) Concepts and methodologies for the development, evolution, and reuse of software architecture and design, with an emphasis on object-orientation. Identification, analysis, and synthesis of system data, process, communication, and control components. Decomposition, assignment, and composition of functionality to design elements and connectors. Use of non-functional requirements for analyzing trade-offs and selecting among design alternatives. Transition from requirements to software architecture, design, and to implementation. State of the practice and art. Prerequisite: SE 5354. (3-0) S

**SE 6367 (CS 6367) Software Testing, Validation, and Verification** (3 semester hours) Methods for evaluating software for correctness, performance and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code walkthroughs, code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models and performance measurement techniques. Prerequisite: CS 5354. (3-0) Y

**SE 6370 (CS 6370) Information Systems Engineering** (3 semester hours) Study of characteristics, analysis and synthesis of information systems in industrial, business, and governmental organizations. Building conventional information systems through requirements modeling and analysis, design, and implementation. Approaches and issues in engineering and re-engineering intelligent, cooperative, and distributed information systems. Prerequisite: CS 6360. (3-0) Y

**SE 6387 (CS 6387) Computer-Aided Software Engineering** (3 semester hours) Tools for development, maintenance, evolution and reuse of software. Development, selection, use, and management of such tools. Traditional and emerging methodologies, including structured systems methodologies and knowledge-based approaches to software development. Opening and closing CASEs: benefits, pitfalls, and critical issues. Prerequisite: CS 5354. (3-0) Y

**SE 6388 (CS 6388) Software Project Planning and Management** (3 semester hours) Techniques and disciplines for successful management of software projects. Planning, scheduling, tracking, cost and size estimation, risk management, configuration management and version control. Identification, definition, management, and optimization of software engineering processes. Benefits and pitfalls of both conventional and emerging technologies. Prerequisite: CS 5354. (3-0) Y

**SE 6389 (CS 6389) Formal Methods and Programming Methodology** (3 semester hours) Formal techniques for building highly reliable systems. Use of abstractions for concisely and precisely defining system behavior. Formal logic and proof techniques for verifying the correctness of programs. Hierarchies of abstractions, state transition models, Petri Nets, communicating processes. Operational and definitional specification languages. Applications to reliability-critical, safety-critical, and mission-critical systems, ranging from commercial computer communication systems to strategic command control systems. Prerequisite: CS 5354. (3-0) Y

**SE 6V81 (CS 6V81) Special Topics in Computer Science** (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ((1-9]-0) S

**SE 7301 (CS 7301) Recent Advances in Computing** (3 semester hours) Advanced topics and publications will be selected from the theory, design, and implementation issues in computing. May be repeated for credit as topics vary. Prerequisite: Consent of the instructor. (3-0) Y

**SE 8V02 (CS 8V02) Topics in Computer Science** (1-6 semester hours) (May be repeated to a maximum of 9 hours.) ((1-6]-0) S

**SE 8V07 (CS 8V07) Research** (1-9 semester hours) Open to students with advanced standing subject to approval of the graduate adviser. ((1-9]-0) S

**SE 8V98 (CS 8V98) Thesis** (3-9 semester hours) (May be repeated for credit.) ((3-9]-0) S

**SE 8V99 (CS 8V99) Dissertation** (3-9 semester hours) (May be repeated for credit.) ((3-9]-0) S

P completeness. Prerequisite: CS 5343 (3-0) S

***Part of UT TeleCampus.***
Department of Electrical Engineering

http://www.utdallas.edu/dept/ee

Faculty
Associate Professors: Naofal Al-Dhahir, Dinesh Bhatia, Gerald O. Burnham, Dale M. Byrne, Matthew Goeckner, Jiyoung Kim, Jeong-Bong Lee, Jin Liu, Aria Nosratinia, Mehrdad Nourani, Murat Torlak
Assistant Professors: Walter Hu, Hoi Lee, Hlaing Minn, Issa Panahi, Rama Sangireddy, Mohammed Saqib.

Objectives
The program leading to the M.S.E.E. degree provides intensive preparation for professional practice in the high technology microelectronic and telecommunications aspects of electrical engineering. It is designed to serve the needs of engineers who wish to continue their education. Courses are offered at a time and location convenient for the student who is employed on a full-time basis.

The objective of the doctoral program in electrical engineering is to prepare individuals to perform original, leading edge research in the broad areas of communications and signal processing; digital systems; microelectronics and nanoelectronics, optics, optoelectronics; lightwave devices and systems; and wireless communications. Because of our strong collaborative programs with Dallas-area microelectronics and telecommunications companies, special emphasis is placed on preparation for research and development positions in these high technology industries.

Facilities
The Erik Jonsson School of Engineering and Computer Science has developed a state-of-the-art computational facility consisting of a network of Sun servers and Sun Engineering Workstations. All systems are connected via an extensive fiber-optic Ethernet and, through the Texas Higher Education Network, have direct access to most major national and international networks. In addition, many personal computers are available for student use.

The Engineering and Computer Science Building provides extensive facilities for research in microelectronics, telecommunications, and computer science. A Class 1000 microelectronics clean room facility, including ebeam lithography, sputter deposition, PECVD, LPCVD, etch, ash and evaporation, is available for student projects and research. An electron beam lithography pattern generator capable of sub-micron resolution is also available for microelectronics research. The Plasma Applications and Science Laboratories have state-of-the-art facilities for mass spectrometry, microwave interferometry, optical spectroscopy, optical detection, in situ ellipsometry and FTIR spectroscopy. In addition, a modified Gaseous Electronics Conference Reference Reactor has been installed for plasma processing and particulate generation studies. Research in characterization and fabrication of nanoscale materials and devices is performed in the Nanoelectronics Laboratory. The Optical Measurements Laboratory has dual wavelength (visible and near infrared) Gaertner Ellipsometer for optical inspection of materials systems, a variety of interferometric configurations, high precision positioning devices, and supporting optical and electrical components. The Optical Communications Laboratory includes attenuators, optical power meters, lasers, APD/p-i-n photodetectors, optical tables, and couplers and is available to support system level research in optical communications. The Photonic Technology and Engineering Laboratory supports research in photonics and optical communications with current-generation optical networking test equipment. The Nonlinear Optics Laboratory has a network of Sun workstations for the numerical simulation of optical transmission systems, optical routers and all-optical networks. The Electronic Materials Processing laboratory has extensive facilities for fabricating and characterizing semiconductor and optical devices. The Laser Electronics Laboratory houses graduate research projects centered on the characterization, development and application of ultrafast dye and diode lasers.

The Center for Integrated Circuits and Systems (CICS) promotes education and research in the following areas: digital, analog and mixed-signal integrated circuit design and test; multimedia, DSP and telecom circuits and systems; rapid-prototyping; computer architecture and CAD algorithms. There are several laboratories
affiliated with this center. These laboratories are equipped with a network of workstations, personal computers, FPGA development systems, prototyping equipment, and a wide spectrum of state-of-the-art commercial and academic design tools to support graduate research in circuits and systems.

The Multimedia Communications Laboratory has a dedicated network of PC’s, Linux stations, and multi-processor, high performance workstations for analysis, design and simulation of image and video processing systems. The Signal and Image Processing (SIP) Laboratory has a dedicated network of PC’s equipped with digital camera and signal processing hardware platforms allowing the implementation of advanced image processing algorithms. The Speech Processing Laboratory has a network of PC’s with audio I/O capability for analysis and processing of speech signals. The laboratory is also equipped with several Texas Instruments processors for real-time processing of speech signals. The Broadband Communication Laboratory has design and modeling tools for fiber and wireless transmission systems and networks, and all-optical packet routing and switching. The Advanced Communications Technologies (ACT) Laboratory provides a design and evaluation environment for the study of telecommunication systems and wireless and optical networks. ACT has facilities for designing network hardware, software, components, and applications.

The Center for Systems, Communications, and Signal Processing, with the purpose of promoting research and education in general communications, signal processing, control systems, medical and biological systems, circuits and systems and related software, is located in the Erik Jonsson School.

The faculty of the Erik Jonsson School’s Photonic Technology and Engineering Center (PhoTEC) carry out research in enabling technologies for microelectronics and telecommunications. Current research areas include nonlinear optics, Raman amplification in fibers, optical switching, applications of optical lattice filters, microarrays, integrated optics, and optical networking.

In addition to the facilities on campus, cooperative arrangements have been established with many local industries to make their facilities available to U.T. Dallas graduate engineering students.

**Master of Science in Electrical Engineering**

**Admission Requirements**

The University’s general admission requirements are discussed on page 13.

A student lacking undergraduate prerequisites for graduate courses in electrical engineering must complete these prerequisites or receive approval from the graduate adviser and the course instructor. A diagnostic exam may be required. Specific admission requirements follow.

The student entering the M.S.E.E. program should meet the following guidelines:

- An undergraduate preparation equivalent to a baccalaureate in electrical engineering from an accredited engineering program,
- A grade point average in upper-division quantitative course work of 3.0 or better on a 4-point scale, and
- GRE examination scores of 500, 700 and 600 for the verbal, quantitative and analytical components respectively, or 1800 for the total score is advisable based on our experience with student success in the program.

Applicants must submit three letters of recommendation from individuals who are able to judge the candidate’s probability of success in pursuing a program of study leading to the master’s degree. Applicants must also submit an essay outlining the candidate’s background, education and professional goals. Students from other engineering disciplines or from other science and math areas may be considered for admission to the program; however, some additional course work may be necessary before starting the master’s program.

**Degree Requirements**

The University’s general degree requirements are discussed on page 18.

The M.S.E.E. requires a minimum of 33 semester hours.

All students must have an academic advisor and an approved degree plan. These are based upon the student’s choice of concentration (Communications and Signal Processing; Digital Systems; Circuits and Systems; Solid State Devices and Micro Systems Fabrication; Optical Devices, Materials and Systems). Courses taken without advisor approval will not count toward the 33 semester-hour requirement. Successful completion of the approved course of studies leads to the M.S.E.E., M.S.E.E. with major in Telecommunications, or M.S.E.E. with major in Microelectronics degree.
The M.S.E.E. program has both a thesis and a non-thesis option. All part-time M.S.E.E. students will be assigned initially to the non-thesis option. Those wishing to elect the thesis option may do so by obtaining the approval of a faculty thesis supervisor.

All full-time, supported students are required to participate in the thesis option. The thesis option requires six semester hours of research, a written thesis submitted to the graduate school, and a formal public defense of the thesis. The supervising committee administers this defense and is chosen in consultation with the student’s thesis adviser prior to enrolling for thesis credit. Research and thesis hours cannot be counted in a M.S.E.E. degree plan unless a thesis is written and successfully defended.

M.S.E.E.

This degree program is designed for students who want a M.S.E.E. without a designated degree specialization. Any of the five concentrations listed below, subject to approval by a graduate adviser, may be used to fulfill the requirements of this program. The department and a graduate adviser may approve individualized degree plans. In each of the concentrations, only grades of B or better are acceptable in the four required courses.

M.S.E.E. with Major in Telecommunications
Within Telecommunications, there are two concentrations: Communications and Signal Processing, and Digital Systems.

Communications and Signal Processing
This curriculum emphasizes the application and theory of all phases of modern communications and signal processing used in telecommunications.

Each student electing this concentration must take EE 6349, EE 6352, and EE 6360, and one of the following: EE 6331, EE 6340, EE 6350 (12 hours). Approved electives must be taken to make a total of 33 hours.

Digital Systems
The goal of the curriculum is to educate students about issues arising in the design and analysis of digital systems, an area relevant to a variety of high-technology industries. Because the emphasis is on systems, course work focuses on three areas: hardware design, software design, analysis and modeling.

Each student electing this concentration must take four required courses. Two of the courses are EE 6301 and EE 6304. The remaining two must be selected from EE 6302, EE 6325, and EE 6345 (12 hours). Approved electives must be taken to make a total of 33 hours.

M.S.E.E. with Major in Microelectronics
Within Microelectronics, there are three concentrations: Circuits and Systems; Solid State Devices and Micro Systems Fabrication; and Optical Devices, Materials and Systems.

Circuits and Systems
The courses in this curriculum emphasize the design and test of circuits and systems, and the analysis and modeling of integrated circuits.

Each student electing this concentration must take four required courses: Two of the courses are EE 6325 and EE 6326. The remaining two must be selected from EE 6301, EE 6303, EE 6306 and EE 6375 (12 hours). Approved electives must be taken to make a total of 33 hours.

Solid State Devices and Micro Systems Fabrication
This concentration is focused on the fundamental principles, design, fabrication and analysis of solid-state devices and associated micro systems.

Each student electing this concentration must take the following two courses: EE 6316, EE 6319 and at least two of the following four courses: EE 6320, EE 6321, EE 6322 and EE 7382. Additional standard electives include but are not limited to: EE 5383/EE 5283, EE 6324, EE 6325, EE 6372, EE 6383/EE 6283, EE 6384, EE 7320, EE 7325, EE 7371, EE 7383/EE 7283. Approved electives must be taken to make a total of 33 hours.
Optical Devices, Materials and Systems

This curriculum is focused on the application and theory of modern optical devices, with emphasis on lightwave communications and laser applications.

Each student electing this concentration must take the following four required courses: EE 6314, EE 6316, EE 6317, and at least one of the following two courses: EE 6310 and EE 6329. (12 hours). Approved electives must be taken to make a total of 33 hours.

Doctor of Philosophy in Electrical Engineering

Admission Requirements

The University’s general admission requirements are discussed on page 13.

The Ph.D. in Electrical Engineering is awarded primarily to acknowledge the student’s success in an original research project, the description of which is a significant contribution to the literature of the discipline. Applicants for the doctoral program are therefore selected by the Electrical Engineering Program Graduate Committee on the basis of research aptitude, as well as academic record. Applications for the doctoral program are considered on an individual basis.

The following are guidelines for admission to the Ph.D. program in Electrical Engineering:

- A master’s degree in electrical engineering or a closely associated discipline from an accredited U.S. institution, or from an acceptable foreign university. Consideration will be given to highly qualified students wishing to pursue the doctorate without satisfying all of the requirements for a master’s degree.
- A grade point average in graduate course work of 3.5 or better on a 4-point scale.
- GRE examination scores of 500, 700 and 600 for the verbal, quantitative and analytical components, respectively, or 1800 for the total score is advisable based on our experience with student success in the program.

Applicants must submit three letters of recommendation on official school or business letterhead or the UTD Letter of Recommendation Form from individuals who are familiar with the student’s record and able to judge the candidate’s probability of success in pursuing doctoral study in electrical engineering.

Applicants must also submit a narrative describing their motivation for doctoral study and how it relates to their professional goals.

For students who are interested in a Ph.D. but are unable to attend school full-time, there is a part-time option. The guidelines for admission to the program and the degree requirements are the same as for full-time Ph.D. students. All students must have an academic adviser and an approved plan of study.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

The M.S.E.E. requires a minimum of 33 semester hours.

Each program for doctoral study is individually tailored to the student’s background and research objectives by the student’s supervisory committee. The program will require a minimum of 90 semester credit hours beyond the baccalaureate degree. These credits must include at least 30 semester hours of graduate level courses beyond the baccalaureate level in the major concentration.

Also required are:

- A qualifying exam over four core courses in an M.S.E.E. concentration that is closest to the Ph.D. research area. A student entering the Ph.D. program with a M.S. must pass this exam within 3 long semesters, and a student entering with a B.S. and no M.S. must pass this exam within 5 long semesters. A student has at most two attempts at this qualifying exam. The exam will be given near the end of the fall and spring semesters.
- A comprehensive exam consisting of: a written dissertation proposal, a public seminar, and a private oral examination conducted by the student’s supervising committee.

Completion of a major research project culminating in a dissertation demonstrating an original contribution to scientific knowledge and engineering practice. The dissertation will be defended publicly. The rules for this defense are specified by the Office of the Dean of Graduate Studies. Neither a foreign language nor a minor is required for the Ph.D. However, the student’s supervisory committee may impose these or other requirements that it feels are necessary and appropriate to the student’s degree program.

Research

The principal concentration areas for the M.S.E.E. program are: Communications and Signal Processing; Digital Systems; Circuits and Systems; Optical Devices, Materials, and Systems; and Solid-State Devices and
transmission, channel capacity, modulation and demodulation techniques are introduced. Signaling schemes and Z transforms and digital systems. Fundamentals of digital communication systems such as information, digital of linear systems to step, impulse, and sinusoidal inputs. Convolution, system functions, and frequency response. of electrical networks and linear systems. Laplace transforms, Fourier series, and Fourier transforms. Response fundamental simulation concepts. Students are also exposed to the subset of VHDL that may be used for simulation of custom logic. VHDL simulation and synthesis labs and projects are performed using commercial and/ or academic VLSI CAD tools. Prerequisite: EE 3320 or equivalent. (3-0) T

EE 5320 Introduction to Devices and Circuits (3 semester hours) This course provides a background in Electrical Engineering for students entering the M.S.E.E. program from other fields of science and engineering. Topics include circuit analysis and simulation, semiconductor device fundamentals and operation, and basic transistor circuits. Credit does not apply to the 33 hour M.S.E.E. requirement. Prerequisite: differential equations. (3-0) T

EE 5321 Introduction to Circuits and Systems (3 semester hours) Continuation of EE 5320. Topics include analog circuits, digital circuits, digital systems and communication systems. Credit does not apply to the 33 hour M.S.E.E. requirement. (3-0) T

EE 5325 (CE 5325) Hardware Modeling Using VHDL (3 semester hours) This course introduces students to VHDL beginning with simple examples and describing tools and methodologies. It covers the language, dwelling on fundamental simulation concepts. Students are also exposed to the subset of VHDL that may be used for synthesis of custom logic. VHDL simulation and synthesis labs and projects are performed using commercial and/ or academic VLSI CAD tools. Prerequisite: EE 3320 or equivalent. (3-0) T

EE 5350 Signals, Systems, and Digital Communications (3 semester hours) Advanced methods of analysis of electrical networks and linear systems. Laplace transforms, Fourier series, and Fourier transforms. Response of linear systems to step, impulse, and sinusoidal inputs. Convolution, system functions, and frequency response. Z transforms and digital systems. Fundamentals of digital communication systems such as information, digital transmission, channel capacity, modulation and demodulation techniques are introduced. Signaling schemes and
EE 6301 (CE 6301) Advanced Digital Logic

PHYS 6283 (2-0) T

of important plasma diagnostics. Co-requisite: EE 6383, Recommended Co-requisite: EE 7171. Cross listed with: accompanying EE 6383. Experiments will include measurements of fundamental plasma properties and understanding of students who need additional training in engineering practice. Credit does not apply to the 33 hour M.S.E.E. requirement. Consent of Graduate Adviser required. (May be repeated to a maximum of 9 hours.) (1-6)-0) S

EE 6305 (CE 6305) Computer Arithmetic

(3 semester hours) This course discusses the design of application specific integrated circuits (ASIC). Specific topics include: VLSI system design specification, ASIC circuit structures, synthesis, and implementation of an ASIC digital signal processing (DSP) chip. Prerequisites: EE 3320 or equivalent. (3-0) T
EE 6307 (CE 6307) Fault-Tolerant Digital Systems (3 semester hours) Concepts in hardware and software fault tolerance. Topics include fault models, coding in computer systems, fault diagnosis and fault-tolerant routing, clock synchronization, system reconfiguration, etc. Survey of practical fault-tolerant systems. Prerequisite: EE 6301, EE 3341 or equivalent. (3-0) R

EE 6308 (CE 6308, CS 6396) Real-Time Systems (3 semester hours) Introduction to real-time applications and concepts. Real-time operating systems and resource management. Specification and design methods for real-time systems. System performance analysis and optimization techniques. Project to specify, analyze, design, implement and test small real-time system. Prerequisite: CS 5348. (3-0) R

EE 6309 Fourier Optics (3 semester hours) Description of coherent optics using a linear systems approach. The concepts of impulse response and transfer functions for unbounded wave propagation, diffraction, and image formation. Introduction to holography and optical data processing. Prerequisites: EE 3302 and EE 4301 or equivalents. Cross-listed with: PHYS 5361 (3-0) R

EE 6310 Optical Communication Systems (3 semester hours) Operating principles of optical communications systems and fiber optic communication technology. Characteristics of optical fibers, laser diodes, laser modulation, fiber amplifiers, detection, modulation, dispersion compensation, and network topologies. System topology, star network, bus networks, layered architectures, all-optical networks. Prerequisite: EE 3350 or equivalent. (3-0) T

EE 6311 Microwave Circuits and Systems (3 semester hours) Operating principles of devices at microwave and millimeter wave frequencies. Sources, detectors, waveguides, cavities, antennas, scattering parameters, impedance matching, system design. Prerequisite: EE 4368 or equivalent. (3-0) R

EE 6312 Laser and Modern Optics (3 semester hours) Theory and applications of lasers, including ray and beam optics. Design issues include power maximization, noise properties, spectral purity and high-speed modulation. Particular emphasis on semiconductor lasers and their relevance to optical communications. Prerequisite: EE 4301 or equivalent. (3-0) Y

EE 6313 Semiconductor Opto-Electronic Devices (3 semester hours) Physical principles of semiconductor optoelectronic devices: optical properties of semiconductors, optical gain and absorption, wave guiding, laser oscillation in semiconductors; LEDs, physics of detectors, applications. Prerequisite: EE 3310 or equivalent. (3-0) T

EE 6314 Principles of Fiber and Integrated Optics (3 semester hours) Theory of dielectric waveguides, modes of planar waveguides, strip waveguides, optical fibers, coupled-mode formalism, directional couplers, diffractive elements, switches, wavelength-tunable filters, polarization properties of devices and fibers, step and graded-index fibers, devices for fiber measurements, fiber splices, polarization properties, and fiber systems. Prerequisites: EE 3300 and EE 4301 or equivalents. (3-0) T

EE 6315 Engineering Optics (3 semester hours) Fundamental concepts of geometrical optics, first-order optical system design and analysis, paraxial ray tracing, aperture and field stops. Optical materials and properties; third order aberration theory. Prerequisite: PHYS 2326 or equivalent. (3-0) T

EE 6316 Fields and Waves (3 semester hours) Study of electromagnetic wave propagation beginning with Maxwell's equations; reflection and refraction at plane boundaries; guided wave propagation; radiation from dipole antennas and arrays; reciprocity theory; basics of transmission line theory and waveguides. Prerequisite: EE 4301 or equivalent. (3-0) Y

EE 6317 Physical Optics (3 semester hours) Study of optical phenomena based primarily on the electromagnetic nature of light; mathematical description of polarized light; Jones and Mueller matrices; interference of polarized waves; interferometers, diffractive phenomena based on scalar formalisms; diffraction gratings; and diffraction in optical instruments. Prerequisite: EE 4301 or equivalent. (3-0) T

EE 6319 Quantum Physical Electronics (3 semester hours) Quantum-mechanical foundation for study of nanometer-scale electronic devices. Principles of quantum physics, stationary-state eigenfunctions and eigenvalues for one-dimensional potentials, interaction with the electromagnetic field, electronic conduction in solids, applications of quantum structures. Prerequisite: EE 3300 or equivalent. (3-0) Y

EE 6320 Fundamentals of Semiconductor Devices (3 semester hours) Semiconductor material properties, equilibrium carrier distribution and non-equilibrium current-transport processes; properties of semiconductor interfaces, including MOS, Schottky-barrier and p-n junctions. Prerequisite: EE 3310. (3-0) Y

EE 6321 Active Semiconductor Devices (3 semester hours) The physics of operation of active devices will be examined, including bipolar junction transistors and field-effect transistors: MOSFETs, JFETS, and MESFETs. Special-purpose MOS devices including memories and imagers will be presented. Prerequisite: EE 6320. (3-0) Y

EE 6322 Semiconductor Processing Technology (3 semester hours) Modern techniques for the manufacture of semiconductor devices and circuits. Techniques for both silicon and compound semiconductor processing are studied as well as an introduction to the design of experiments. Topics include: wafer growth, oxidation, diffusion, ion implantation, lithography, etch and deposition. (3-0) T
EE 6323 Circuit Modeling of Solid-State Devices (3 semester hours) Provide physical insight into the operation of MOSFETs and BJTs, with particular emphasis on new physical effects in advanced devices. Compact (SPICE-level) transistor models will be derived from basic semiconductor physics; common simplifications made in the derivations of model equations will be detailed to provide an appreciation for the limits of model capabilities. Prerequisites: EE 6320 and EE 6321. (3-0) R

EE 6324 Electronic Materials (3 semester hours) Principles of selection, preparation, and characterization of electronic materials with emphasis on semiconductors. Fundamentals of crystallography and crystal growth. Defect and impurity control. Thermodynamics and phase equilibria as applied to semiconductor processing. Preparation and properties of epitaxial and heteroepitaxial structures. Advanced techniques for structural, chemical and electrical characterization of electronic materials. Prerequisite: EE 6320 or equivalent. (3-0) R

EE 6325 (CE 6325) VLSI Design (3 semester hours) Introduction to MOS transistors. Analysis of the CMOS inverter. Combinational and sequential design techniques in VLSI; issues in static, transmission gate and dynamic logic design. Design and layout of complex gates, latches and flip-flops, arithmetic circuits, memory structures. Low power digital design. The method of logical effort. CMOS technology, and rationale behind various design rules. Use of CAD tools to design, layout, check, extract and simulate a small project. Prerequisite: EE 3320 or equivalent. (3-0) R

EE 6326 Analog Integrated Circuit Design (3 semester hours) Introduction to MOS transistor, CMOS technology and analog circuit modeling. Basic analog circuits: MOS switches, active resistors, current sources, current mirrors, current amplifiers, inverting amplifier, differential amplifier, cascade amplifier and the output amplifier. Complex circuits: comparators and operational amplifiers. Use of CAD tools to layout and simulate analog circuits. Prerequisite: EE 4340 (3-0) Y-T

EE 6327 Digital Integrated Circuit Design (3 semester hours) The design and implementation of logic, memory, buffer, and conversion circuits in CMOS, BiCMOS, ECL, and TTL technologies will be discussed in this course. Circuit design and their electrical characteristics such as the transfer function, propagation delay, output rise and fall times, noise margin, fan out, and power dissipation will be emphasized. Circuit configurations which implement combinational logic, flip-flops, memory structures, logic arrays, analog to digital and digital to analog conversion will be discussed. (3-0) Y

EE 6328 Nonlinear Optics (3 semester hours) Survey of nonlinear optical effects; origins of optical nonlinearities; second-order nonlinear effects (second harmonic generation, optical rectification, parametric mixing and amplification); third-order nonlinear optical effects in fiber optic communication systems (self-phase modulation, cross-phase modulation, stimulated Brillouin scattering, stimulated Raman scattering, four-wave mixing, nonlinear polarization mode dispersion); self-focusing and self-defocusing in bulk media; computational methods for nonlinear optics. Prerequisite: EE 4301 or equivalent; EE 6310 recommended. (3-0) T

EE 6329 Optical Signal Conditioning (3 semester hours) Engineering principles and applications of laser beam modulation and deflection (acousto-optics and electro-optics), harmonic generation and optical parametric processes, optical pulse compression and shaping. Prerequisites: EE 4301 or equivalent and EE 6317 recommended. (3-0) T

EE 6331 Linear Systems and Signals (3 semester hours) Systems and control theory: state space, convolution integrals, transfer functions, stability, controllability, observability, and feedback. Prerequisites: EE 2300 and EE 4310. (3-0) Y

EE 6332 Advanced Control (3 semester hours) Modern control techniques in state space and frequency domain: optimal control, robust control, and stability. Prerequisite: EE 6331. (3-0) T

EE 6333 Statistical Optics (3 semester hours) Statistical description of optical phenomena with an emphasis on coherence and propagation effects; power spectral density of coherent and partially coherent wave fields; Van Cittert-Zernike theorem; coherence properties of single-mode and multimode laser radiation; intensity interferometer; laser speckle; imaging through random media; detection of optical radiation; photon statistics. Prerequisite: EE 6317 recommended. (3-0) R

EE 6334 Advanced Geometrical and Physical Optics (3 semester hours) Geometrical optics as a limiting case of the propagation of electromagnetic waves; geometrical theory of optical aberrations; the diffraction theory of aberrations; image formation with partially coherent and partially polarized light; computational methods for physical optics. Other topics may be selected from the following: diffraction theory of vector electromagnetic fields, diffraction of light by ultrasonic waves, optics of metals, Lorenz-Mie theory of the scattering of light by small particles, and optics of crystals. Prerequisite: EE 6317. (3-0) R

EE 6336 Nonlinear Control Systems (3 semester hours) Differential geometric tools, feedback linearization, input-output linearization, output injection, output tracking, stability. Prerequisite: EE 6331. (3-0) T
EE 6340 Introduction to Telecommunications Networks (3 semester hours) Circuit, message and packet switching. The hierarchy of the ISO-OSI Layers. The physical layer: channel characteristics, coding, error detection. The data link control layer: retransmission strategies, framing, multiaccess protocols, e.g., Aloha, slotted Aloha, CSMA, CSMA/CD. The network layer: routing, broadcasting, multicasting, flow control schemes. Co-requisite or prerequisite: EE 6349. (3-0) Y

EE 6341 Information Theory I (3 semester hours) Self information, mutual information, discrete memoryless sources, entropy, source coding for discrete memoryless channels, homogeneous Markov sources, discrete memoryless channels, channel capacity, converse to the coding theorem, noisy channel coding theorem, random coding exponent, Shannon limit. Prerequisite: EE 6352. (3-0) R


EE 6344 Coding Theory (3 semester hours) Groups, fields, construction and properties of Galois fields, error detection and correction, Hamming distance, linear block codes, syndrome decoding of linear block codes, cyclic codes, BCH codes, error trapping decoding and majority logic decoding of cyclic codes, non-binary codes, Reed Solomon codes, burst error correcting codes, convolutional codes, Viterbi decoding of convolutional codes. Prerequisite: EE 6352. (3-0) R

EE 6345(CE 6345) Engineering of Packet-Switched Networks (3 semester hours) Detailed coverage, from the point of view of engineering design, of the physical, data-link, network and transport layers of IP (Internet Protocol) networks. This course is a Master’s-level introduction to packet networks. Prior knowledge of digital communication systems is strongly recommended. Prerequisite: EE 3350 or equivalent. (3-0) Y

EE 6349 Random Processes (3 semester hours) Random processes concept. Stationarity and independence. Auto-correlation and cross-correlation functions, spectral characteristics. Linear systems with random inputs. Special topics and applications. Prerequisites: EE 3302 and EE 3341 or equivalents. (3-0) Y

EE 6350 Signal Theory (3 semester hours) Signal processing applications and signal spaces, vector spaces, matrix inverses and orthogonal projections, four fundamental subspaces, least squares and minimum norm solutions, the SVD and principal component analysis, subspace approximation, infinite dimensional spaces, linear operators, norms, inner products and Hilbert spaces, projection theorems, spectral properties of Hermitian operators, Hilbert spaces of random variables, linear minimum variance estimation and the Levinson-Durbin algorithm, general optimization over Hilbert spaces, methods and applications of optimization. Prerequisite: EE 3302 or equivalent. (3-0) Y

EE 6351 Computational Electromagnetics (3 semester hours) Review of Maxwell’s equations; numerical propagation of scalar waves; finite-difference time-domain solutions of Maxwell’s equations; numerical implementations of boundary conditions; numerical stability; numerical dispersion; absorbing boundary conditions for free space and waveguides; selected applications in telecommunications, antennas, microelectronics and digital systems. Prerequisite: EE 4301 or equivalent. (3-0) Y

EE 6352 Digital Communication Systems (3 semester hours) Digital communication systems are discussed. Source coding and channel coding techniques are introduced. Signaling schemes and performance of binary and M-ary modulated digital communication systems. The overall design considerations and performance evaluations of various digital communication systems are emphasized. Prerequisite: EE 6349 or equivalent. (3-0) Y

EE 6353 Broadband Digital Communication (3 semester hours) Characterization of broadband wireline and wireless channels. Intersymbol Interference (ISI) effects. Equalization methods to mitigate ISI including single-carrier and multi-carrier techniques. Equalization techniques and structures including linear, decision-feedback, precoding, zero-forcing, mean square-error, FIR versus IIR. Multi-Input Multi-Output (MIMO) Equalization. Implementation issues including complexity, channel estimation, error propagation, etc. Real-world case studies from Digital Subscriber Lines (DSL) and wireless systems. Students work individually or in small teams on project and present their findings to class. Prerequisite: EE 6352, EE 6360 or equivalents and knowledge of Matlab. (3-0) T

EE 6355 RF and Microwave Communication Circuits (3 semester hours) Design of high-frequency communication circuits. Prerequisite: EE 4368 or equivalent. (3-0) Y

EE 6360 Digital Signal Processing I (3 semester hours) Analysis of discrete time signals and systems, Z-transform, discrete Fourier transform, fast Fourier transform, analysis and design of digital filters. Prerequisite: EE 3302 or EE 4361 or equivalent. (3-0) Y

EE 6361 Digital Signal Processing II (3 semester hours) Continuation of EE 6360. Includes advanced topics in signal processing such as: Digital filter structures and finite-word-length effects, digital filter design and implementation methods, multirate digital signal processing, linear prediction and optimum filtering, spectral analysis and estimation methods. Prerequisite: EE 6360. Co-requisite: EE 6350. (3-0) T
EE 6362 Speech Processing (3 semester hours) Introduction to the fundamentals of speech signal processing and speech applications. Speech analysis and synthesis techniques, speech recognition using hidden Markov models, speech enhancement and speech coding techniques including ADPCM and linear-predictive based methods such as CELP. Prerequisites: EE 6350, EE 6360 and EE 6349. (3-0) Y

EE 6363 Digital Image Processing (3 semester hours) Image formation, image sampling, 2D Fourier transform and properties, image wavelet transform, image enhancement in spatial and frequency domains, image restoration, color image processing, image segmentation, edge detection, morphological operations, object representation and description, introduction to image compression. Prerequisites: EE 6360, knowledge of C or MATLAB. (3-0) T

EE 6364 Pattern Recognition (3 semester hours) Pattern recognition system, Bayes decision theory, maximum likelihood and Bayesian parametric classifiers, linear discriminant functions and decision boundaries, density estimation and nonparametric classifiers, unsupervised classification and clustering, multilayer neural networks, decision trees, classifier comparison. Prerequisites: EE 6349 and knowledge of C or Matlab. (3-0) T

EE 6365 Adaptive Signal Processing (3 semester hours) Adaptive signal processing algorithms learn the properties of their environments. Transversal and lattice versions of the Least Mean Squares (LMS) and Recursive Least Squares (RLS) adaptive filter algorithms and other modern algorithms will be studied. These algorithms will be applied to network and acoustic echo cancellations, speech enhancement, channel equalization, interference rejection, beam forming, direction finding, active noise control, wireless systems, and others. Prerequisites: EE 6349, EE 6350, EE 6360 and knowledge of matrix algebra. (3-0) T

EE 6366 Applied Digital Signal Processing (3 semester hours) Implementation of signal processing algorithms, graphical programming of DSP systems, fixed-point versus floating-point, DSP chip architecture, DSP software development tools, code optimization, application project. Prerequisites: EE 6360, knowledge of C. (2-3) Y

EE 6370 (CE 6370) Design and Analysis of Reconfigurable Systems (3 semester hours) Introduction to reconfigurable computing, programmable logic: FPGAS, CPLDs, CAD issues with FPGA based design, reconfigurable systems: emulation, custom computing, and embedded application based computing, static and dynamic hardware, evolutionary design, software environments for reconfigurable systems. Prerequisite: EE 3320 or equivalent. (3-0) Y

EE 6372 Semiconductor Process Integration (3 semester hours) The integration of semiconductor processing technology to yield integrated circuits. The course will emphasize MOSFET design based upon process integration, in particular as it applies to short channel devices of current interest. Process simulation will be used to study diffusion, oxidation, and ion implantation. (3-0) T

EE 6375 (CE 6375) Design Automation of VLSI Systems (3 semester hours) This course deals with various topics related to the development of CAD tools for VLSI systems design. Algorithms, data structures, heuristics and design methodologies behind CAD tools. Design and analysis of algorithms for layout, circuit partitioning, placement, routing, chip floor planning, design rule checking (DRC). Introduction to CAD algorithms for RTL and behavior level synthesis, module generators, and silicon compilation. Prerequisite: CS 5343. Co-requisite: CE 6325. (3-0) Y

EE 6383 Plasma Science (3 semester hours) Theoretically oriented study of plasmas. Topics to include: fundamental properties of plasmas, fundamental equations (kinetic and fluid theory, electromagnetic waves, plasma waves, plasma sheaths) plasma chemistry and plasma diagnostics. Cross listed with: PHYS 6383 (3-0) T

EE 6390 Introduction to Wireless Communication Systems (3 semester hours) Principles, practice, and system overview of mobile systems. Modulation, demodulation, coding, encoding, and multiple-access techniques. Performance characterization of mobile systems. MMIC and low-power mobile devices. Prerequisite: EE 4350 or equivalent. (3-0) Y

EE 6391 Signaling and Coding for Wireless Communication Systems (3 semester hours) Study of signaling and coding for wireless communication systems. Topics which will be covered include digital modulation schemes, digital multiple access technologies, their performance under wireless channel impairments, equalization, channel coding, interleaving, and diversity schemes. Prerequisites: EE 6352 and EE 6390. (3-0) T

EE 6392 Propagation and Devices for Wireless Communications (3 semester hours) Mobile communication fundamentals, models of wave propagation, simulation of electromagnetic waves in the cellular environment, multipath propagation, compensation for fading, mobile and cell antenna designs, problems of interference and incompatibility, design of active and passive cellular components, comparison of analog and digital cellular designs. Prerequisites: EE 4301 or equivalent; EE 6390. (3-0) T

EE 6394 Antenna Engineering for Wireless Communications (3 semester hours) Operating principles for microwave antennas used in modern wireless communication systems. Prerequisite: EE 6316 or equivalent. (3-0) T

EE 6395 Advanced Radio Frequency Engineering (3 semester hours) Sources, components, antennas, and detectors used in wireless communication systems. Microwave-frequency component technology. Propagation paths and their effects on communications. Prerequisite: EE 5305 or equivalent. (2-3) R
EE 6398 (CE 6398, CS 6398) DSP Architectures (3 semester hours) Typical DSP algorithms, representation of DSP algorithms, data-graph, FIR filters, convolutions, Fast Fourier Transform, Discrete Cosine Transform, low power design, VLSI implementation of DSP algorithms, implementation of DSP algorithms on DSP processors, DSP applications including wireless communication and multimedia. Prerequisite: CS 5343. (3-0) Y

EE 6481 Numerical Methods In Engineering (4 semester hours) Numerical techniques in engineering and their applications, with an emphasis on practical implementation. Topics will include some or all of the following: numerical methods of linear algebra, interpolation, solution of nonlinear equations, numerical integration, Monte Carlo methods, numerical solution of ordinary and partial differential equations, and numerical solution of integral equations. Prerequisites: EE 2300 and EE 3300 or equivalents, and knowledge of C or C++. (3-0) Y

EE 7171 Current Topics in Plasma Processing (1 semester hour) Discussion of current literature on plasma processing; applications, diagnostics, sources, chemistry and technology. May be repeated for credit. Prerequisite: Knowledge of plasma processing technology (EE 5383 or EE 6383 preferred) or consent of instructor. Cross-listed with: EE 7171(1-0) Y

EE 7283 Advanced Plasma Processing Laboratory (2 semester hours) Laboratory will provide advanced studies of individual plasma diagnostics and/or plasma properties. Intended to foster research project development. Co/Prerequisite: EE 7383. (May be repeated by consent of instructor for a total of 6 hours.) Recommended co-requisite: EE 7171. (2-0) T

EE 7304 (CE 7304) Advanced Computer Architecture (3 semester hours) Advanced research topics in multi-processor, network and reconfigurable architectures. Focuses on current research in the area of computer system architecture to prepare students for a career in computer architecture research. Course will use articles from current technical literature to discuss relevant topics, such as digital signal processors and VLIW processors. Prerequisites: EE 6304, CS 5348, EE 3341 and knowledge of C/C++. (3-0) R

EE 7320 Advanced Semiconductor Device Theory (3 semester hours) Quantum mechanical description of fundamental semiconductor devices; carrier transport on the submicron scale; heterostructure devices; quantum-effect devices. Prerequisite: EE 6320. (3-0) R

EE 7325 (CE 7325) Advanced VLSI Design (3 semester hours) Advanced topics in VLSI design covering topics beyond the first course (EE 6325). Topics include: use of high-level design, synthesis, and simulation tools, design for testability, clock distribution and routing problems, synchronous circuits, low-power design techniques, study of various VLSI-based computations, systolic arrays, etc. Discussions on current research topics in VLSI design. Prerequisite: EE 6325 or equivalent. (3-0) R

EE 7326 Analog Integrated Systems Design (3 semester hours) Introduction to the types of systems environment in which analog integrated circuit design is employed. The topics are A/D and D/A converters, including over-sampled S-D A/D converters, switched capacitor amplifiers, multipliers, wave-shaping circuits, oscillators, PLLs, and the design of filters. Prerequisite: EE 6326 (3-0) Y

EE 7327 Analog to Digital and Digital to Analog Converters (3 semester hours) This course provides the basic and the specific knowledge for the design and the use of data converters. Topics include fundamentals on sampling and quantization, Nyquist-rate and oversampled techniques, circuit design issues, testing, digital calibration and correction. Prerequisite: Analog Integrated circuit design. EE 6326. (3-0) Y

EE 7328 (CE7328) Physical Design of High-Speed VLSI Circuits (3 semester hours) Techniques for the physical design of high-speed VLSI circuits. Topics related to connection circuit modeling, performance-driven routing, buffer and wire sizing, placement and floor planning, technology mapping and performance evaluation issues encountered in high-speed VLSI circuit designs. Discussion of state-of-the-art practical industrial design examples. A project related to the development of a prototype CAD tool. Prerequisites: EE 6325 and knowledge of programming in C. (3-0) T

EE 7329 Advanced Analog Integrated Circuit Design (3 semester hours) The course will cover, but not be limited to, advanced architectures for voltage references, current references, operational amplifiers (including voltage, current, transconductance, and transresistance), comparators, linear regulators, etc. Emphasis will be on why one topology might be better than another for a given set of specifications or applications. Prerequisite: EE 6326 (3-0)

EE 7331 Physics of Noise (3 semester hours) The physics of fluctuation phenomena, generically called Noise. The class will cover the fundamental physical principles underlying generation-recombination, thermal, shot, 1/f noise and other, related fluctuation phenomena. The statistical nature of these physical processes will be developed. The physics of noise in resistors, diodes, bipolar, JFETS, and MOSFETS will be discussed and how to model it in circuits. Approximately two thirds of the class will be devoted to the physics of noise and the rest will cover how to use this knowledge to design low-noise integrated circuits. Prerequisite: EE 6326. Y
Faculty

The M.S.C.E. is an interdisciplinary degree program jointly administered by the faculty members from the Departments of Electrical Engineering and Computer Science in the Erik Jonsson School of Engineering and Computer Science (see Electrical Engineering and Computer Science sections for listing of faculty).

Objectives

The M.S. and Ph.D. degrees in Computer Engineering emerged as a bridge between the increasingly overlapping disciplines of Computer Science and Electrical Engineering. The M.S.C.E. degree program provides intensive preparation for engineers who seek knowledge and skills necessary for the design of complex systems comprised of both hardware and software components. It has a heavy emphasis on the design of high speed and complex hardware and highly reliable and time critical software systems.

Computer Engineering at UTD is a broadly based engineering discipline dealing with the sensing, processing, and transmission of information by making extensive use of electrical engineering and computer science principles. The CE program at UTD also encourages students and faculty to develop synergies with disciplines outside of engineering, such as medicine and the life sciences. CE faculty members are actively involved in advanced research and teaching in all major areas of computer engineering. The Erik Jonsson School is home to several research centers, and promotes graduate and undergraduate curriculum innovation. It is the driving force behind computer engineering’s rapid success and growth. The Erik Jonsson School has a large infrastructure of interdisciplinary programs in the School of Engineering and Computer Science

Graduate Program in Computer Engineering

http://www.ce.utdallas.edu

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**EE 7382 Introduction to MEMS** (3 semester hours) Study of micro-electro-mechanical devices and systems and their applications. Microfabrication techniques and other emerging fabrication processes for MEMS are studied along with their process physics. Principles of operations of various MEMS devices such as mechanical, optical, thermal, magnetic, chemical/biological sensors/actuators are studied. Topics include: bulk/surface micromachining, LIGA, microsensors and microactuators in multi-physics domain. (3-0) T

**EE 7383 Advanced Plasma Processing Systems** (3 semester hours) An in-depth study of advanced plasma processing environments. Topics to include detailed studies of hardware and theory behind modern plasma processing tools, modern plasma chemistry and advanced diagnostics. (3-0) T

**EE 7V81 Special Topics In Digital Systems** (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

**EE 7V82 Special Topics In Microelectronics** (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) Cross-listed with: PHYS 5376 and PHYS 6379 ([1-6]-0) S

**EE 7V83 Special Topics in Optics and Fields** (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

**EE 7V84 Special Topics in Telecommunications** (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

**EE 7V85 Special Topics in Signal Processing** (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

**EE 7V86 Special Topics in Wireless Communications** (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

**EE 8V40 Individual Instruction in Electrical Engineering** (1-6 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-6]-0) R

**EE 8V70 Research In Electrical Engineering** (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) R

**EE 8V98 Thesis** (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

**EE 8V99 Dissertation** (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S
computing and other laboratory resources. The M.S.C.E. degree program provides intensive preparation for engineers who seek knowledge and skills necessary for the design of complex systems comprised of both hardware and software components. It has a heavy emphasis on the design of high speed and complex hardware and highly reliable and time critical software systems. It is designed to serve the needs of engineers who wish to continue their education. Courses are offered at a time and location convenient for the student who is employed on a full-time basis.

Facilities

The Erik Jonsson School of Engineering and Computer Science has developed a state-of-the-art computational facility consisting of a network of Sun servers and Sun Engineering Workstations. All systems are connected via an extensive fiber-optic Ethernet and, through the Texas Higher Education Network, have direct access to most major national and international networks. In addition, many personal computers are available for student use.

The Engineering and Computer Science Building provides extensive facilities for research in electrical engineering, telecommunications, and computer science and engineering.

The Center for Integrated Circuits and Systems (CICS) promotes education and research in the following areas: digital, analog and mixed-signal integrated circuit design and test; multimedia, DSP and telecom circuits and systems; rapid-prototyping; computer architecture and CAD algorithms. There are several laboratories affiliated with this center. These laboratories are equipped with a network of workstations, personal computers, FPGA development systems, prototyping equipment, and a wide spectrum of state-of-the-art commercial and academic design tools to support graduate research in circuits and systems.

The Center for Systems, Communications, and Signal Processing, with the purpose of promoting research and education in general communications, signal processing, control systems, medical and biological systems, circuits and systems and related software, is located in the Erik Jonsson School.

In the Digital Signal Processing Laboratory several multi-CPU workstations are available in a network configuration for simulation experiments. Hardware development facilities for real time experimental systems are available and include microphone arrays, active noise controllers, speech compressors and echo cancellers. The Distributed Computing Laboratory has a network of personal computers running Linux to support network simulation using discrete-event simulation packages. The Hardware/Software Co-design Laboratory has many workstations and PCs with DSP modules to support the experiments for various implementations in DSP and communications.

In addition to the facilities on campus, cooperative arrangements have been established with many local industries to make their facilities available to U.T. Dallas graduate engineering students.

Master of Science in Computer Engineering (M.S.C.E.) Admission Requirements

The University’s general admission requirements are discussed on page 13.

A student lacking undergraduate prerequisites for graduate courses in electrical engineering and computer science must complete these prerequisites or receive approval from the graduate advisor and the course instructor. A diagnostic exam may be required. Specific admission requirements follow.

The student entering the M.S.C.E. program should meet the following guidelines:

• An undergraduate preparation equivalent to a baccalaureate in computer science or electrical engineering from an accredited engineering program.

• A grade point average in upper-division quantitative course work of 3.0 or better on a 4-point scale.

• GRE examination scores of 500, 700 and 600 for the verbal, quantitative and analytical components respectively, or 1800 for the total score is advisable.

Applicants must submit three letters of recommendation from individuals able to judge the candidate’s probability of success in pursuing master’s study. Applicants must also submit an essay outlining the candidate’s background, education and professional goals.

Students from other engineering disciplines or from other science and math areas may be considered for admission to the program on a case-by-case basis; however, some additional course work may be necessary before starting the master’s program.
Degree Requirements

The University's general degree requirements are discussed on page 18.

The M.S.C.E. requires a minimum of 33 semester hours.

All students must have an academic advisor and an approved degree plan. Courses taken without advisor approval will not count toward the 33 semester-hour requirement. Successful completion of the approved course of studies leads to the M.S.C.E. degree.

The M.S.C.E. program has both a thesis and a non-thesis option. All part-time M.S.C.E. students will be assigned initially to the non-thesis option. Those wishing to elect the thesis option may do so by obtaining the approval of a faculty thesis supervisor.

All full-time, supported students are required to participate in the thesis option. The thesis option requires six semester hours of research, a written thesis submitted to the graduate school, and a formal public defense of the thesis. The supervising committee administers this defense and is chosen in consultation with the student's thesis advisor prior to enrolling for thesis credit. Each student must take 4 required courses:

- CE 6302 Microprocessor Systems
- CE 6304 Computer Architecture
- CE 6325 VLSI Design
- CE 6378 Advanced Operating Systems

Required courses must be passed with a grade of B or better.

Approved electives must be taken to make a total of 33 hours. These courses must be at 6000 level or higher from computer engineering, electrical engineering, computer science and telecommunications engineering curricula with the approval of the advisor. It is highly recommended that two of these electives be chosen from the following list:

- CE 6303 Testing and Testable Design
- CE 6305 Computer Arithmetic
- CE 6308 Real-Time Systems
- CE 6352 Performance of Computer Systems and Networks
- CS 6353 Compiler Construction
- CE 6370 Design and Analysis of Reconfigurable Systems
- CE 6375 Design Automation of VLSI Systems
- CE 6380 Distributed Computing
- CE 6397 Synthesis and Optimization of High Performance Systems
- CE 6398 DSP Architectures

Doctor of Philosophy in Computer Engineering

Objectives

Each doctoral degree program is tailored to the student. The student must arrange a course program with the guidance and approval of a faculty member chosen as his/her graduate advisor. Adjustments can be made as the student's interests develop and a specific dissertation topic is chosen.

The Ph.D. in Computer Engineering is awarded primarily to acknowledge the student's success in an original research project, the description of which is a significant contribution to the literature of the discipline. Applicants for the doctoral program are therefore selected by the Computer Engineering Program Graduate Committee on the basis of research aptitude, as well as academic record. Applications for the doctoral program are considered on an individual basis.

Admission Requirements

The University's general admission requirements are discussed on page 18.

The admission requirements will be basically the same as the existing ones for admission to the Ph.D. programs in Electrical Engineering and Computer Science. The entrance requirements are:

- A master's degree in Computer Engineering or a closely associated discipline such as Electrical Engineering or Computer Science.
- GPA in graduate level course work of 3.5 or better on a 4-point scale.
- GRE scores of at least 500, 700 and 600 for the verbal, quantitative and analytical components, respectively, or 1800 for the total score.
Applicants must submit three letters of recommendation from individuals able to judge the candidate’s probability of success in pursuing doctoral study. Applicants must also submit an essay outlining the candidate’s background, education and professional goals.

**Degree Requirements**

The University’s general degree requirements are discussed on page 18. The M.S.E.E. requires a minimum of 33 semester hours.

**Core requirements:**

The core requirements for the Ph.D. degree in Computer Engineering are the same as the ones for the M.S. in Computer Engineering. Candidates for the Ph.D. degree in Computer Engineering must also meet the following requirements, in addition to the dissertation:

- Pass a qualifying examination.
- Take and pass sufficient CE electives for a total of at least 90 hours beyond the baccalaureate degree.

The student is encouraged to consult with an advisor in choosing electives.

**Dissertation**

A dissertation is required and must be approved by the graduate program. A student must arrange for a dissertation advisor willing to guide this dissertation. The student must have a dissertation supervising committee that consists of no less than four members. The dissertation may be in computer engineering exclusively or it may involve considerable work in an area of application. The minimum number of semester credit hours required for the proposed doctoral degree will be the same as the number of credit hours required by the existing doctoral degrees offered by the School of Engineering and Computer Science, i.e., 90 semester credit hours beyond a bachelor’s degree in Computer Engineering or related field. These credits must include at least 30 semester hours of graduate level courses beyond the bachelor’s degree and a doctoral dissertation. However, a student’s supervising committee may impose course requirements that are necessary and appropriate for the student’s research program. It is expected that M.S degree students planning to enter the proposed doctoral program will take most of the courses as part of their M.S. degree requirements.

**Course Descriptions**

**Computer Engineering**

CS 5303 Computer Science I (3 semester hours) Computer science problem solving. The structure and nature of algorithms and their corresponding computer program implementation. Programming in a high-level block-structured language (e.g., PASCAL, Ada, C++, or JAVA). Elementary data structures: arrays, records, linked lists, trees, stacks, and queues. (3-0) S

CE 5325 (EE 5325) Hardware Modeling Using VHDL (3 semester hours) This course introduces students to VHDL beginning with simple examples and describing tools and methodologies. It covers the language, dwelling on fundamental stimulation concepts. Students are also exposed to the subset of VHDL that may be used for synthesis of custom logic. VHDL simulation and synthesis labs and projects are performed using commercial and/or academic VLSI CAD tools. Prerequisite: EE 3320 or equivalent. (3-0) T

CS 5330 Computer Science II (3 semester hours) Basic concepts of computer organization: Numbering systems, two’s complement notation, multi-level machine concepts, machine language, assembly programming and optimization, subroutine calls, addressing modes, code generation process, CPU datapath, pipelining, RISC vs. CISC, performance calculation. Co-requisite: CS 5303. (3-0) S

CS 5333 Discrete Structures (3 semester hours) Mathematical foundation of computer science. Logic, sets, relations, graphs and algebraic structures. Combinatorics and metrics for performance evaluation of algorithms. (3-0) S

CS 5343 Algorithm Analysis and Data Structures (3 semester hours) Formal specifications and representation of lists, arrays, trees, graphs, multi-linked structures, strings and recursive pattern structures. Analysis of associated algorithms. Sorting and searching, file structures. Relational data models. Prerequisites: CS 5303, CS 5333. (3-0) S

CS 5348 Operating Systems Concepts (3 semester hours) An introduction to fundamental concepts in operating systems, their design, implementation, and usage. Topics include: process management, main memory management, virtual memory, I/O and device drivers, file systems, secondary storage management, introduction
CE 5354 (CS 5354, SE 5354) **Software Engineering** (3 semester hours) Formal specification and program verification. Software life-cycle models and their stages. System and software requirements engineering; user-interface design. Software architecture, design, and analysis. Software testing, validation, and quality assurance. Corequisite: CS 5343 (CS 5343 can be taken before or at the same time as CS 5354) (3-0) S

CE 5381 **Curriculum Practical Training in Computer Engineering** (3 semester hours) This course is required of students who need additional training in engineering practice. Credit does not apply to the 33 hour M.S.C.E. requirement. Consent of Graduate Adviser required. (May be repeated to a maximum of 9 hours). (3-0) S

CE 6301 (EE 6301) **Advanced Digital Logic** (3 semester hours) Modern design techniques for digital logic. Logic synthesis and design methodology. Link between front-end and back-end design flows. Field programmable gate arrays and reconfigurable digital systems. Introduction to testing, simulation, fault diagnosis and design for testability. Prerequisites: EE 3320 or equivalent and background in VHDL/Verilog. (3-0) T

CE 6302 (EE 6302) **Microprocessor Systems** (3 semester hours) Design of microprocessor based systems including I/O and interface devices. Microprocessor architectures. Use of emulators and other sophisticated test equipment. Extensive laboratory work. Prerequisite: EE 4304 or equivalent. (2-3) Y

CE 6303 (EE 6303) **Testing and Testable Design** (3 semester hours) Techniques for detection of failures in digital circuits and systems. Fault modeling and detection. Functional testing and algorithms for automatic test pattern generation (ATPG). Design of easily testable digital systems. Techniques for introducing built-in self test (BIST) capability. Test of various digital modules, like PLA’s, memory circuits, datapath, etc. Prerequisites: EE 3320 or equivalent and background in VHDL/Verilog. (3-0) Y

CE 6304 (EE 6304, CS 6304) **Computer Architecture** (3 semester hours) Trends in processor, memory, I/O and system design. Techniques for quantitative analysis and evaluation of computer systems to understand and compare alternative design choices in system design. Components in high performance processors and computers: pipelining, instruction level parallelism, memory hierarchies, and input/output. Students will undertake a major computing system analysis and design project. Prerequisites: EE 4304 and C/C++. (3-0) Y

CE 6305 (EE 6305) **Computer Arithmetic** (3 semester hours) Carry look ahead systems and carry save adders. Multipliers, multi-bit recoding schemes, array multipliers, redundant binary schemes, residue numbers, slash numbers. High-speed division and square root circuits. Multi-precision algorithms. The IEEE floating point standard, rounding processes, guard bits, error accumulation in arithmetic processes. Cordic algorithms. Prerequisites: EE 3320 and C/C++. (3-0) Y

CE 6306 (EE 6306) **Application Specific Integrated Circuits Design** (3 semester hours) This course discusses the design of application specific integrated circuits (ASIC). Specific topics include: VLSI system design specification, ASIC circuit structures, synthesis, and implementation of an ASIC digital signal processing (DSP) chip. Prerequisite: EE 3320. (3-0) Y

CE 6307 (EE 6307) **Fault-Tolerant Digital Systems** (3 semester hours) Concepts in hardware and software fault tolerance. Topics include fault models, coding in computer systems, fault diagnosis and fault-tolerant routing, clock synchronization, system reconfiguration, etc. Survey of practical fault-tolerant systems. Prerequisites: EE 6301, EE 3341 or equivalent. (3-0) R

CE 6308 (EE 6308, CS 6396) **Real-Time Systems** (3 semester hours) Introduction to real-time applications and concepts. Real-time operating systems and resource management. Specification and design methods for real-time systems. System performance analysis and optimization techniques. Project to specify, analyze, design, implement and test small real-time system. Prerequisite: CS 5348. (3-0) R

CE 6324 (CS 6324) **Information Security** (3 semester hours) A comprehensive study of security vulnerabilities in information systems and the basic techniques for developing secure applications and practicing safe computing. Topics include common attacking techniques such as buffer overflow, Trojan, virus, etc. UNIX, Windows and Java security. Conventional encryption. Hashing functions and data integrity. Public-key encryption (RSA, Elliptic-Curve). Digital signature. Watermarking for multimedia. Security standards and applications. Building secure software and systems. Management and analysis of security. Legal and ethical issues in computer security. Prerequisite: CS 5348 and CS 5390 (3-0) Y

CE 6325 (EE 6325) **VLSI Design** (3 semester hours) Introduction to MOS transistors. Analysis of the CMOS inverter. Combinational and sequential design techniques in VLSI; issues in static, transmission gate and dynamic logic design. Design and layout of complex gates, latches and flip-flops, arithmetic circuits, memory structures. Low power digital design. The method of logical effort. CMOS technology, and rationale behind various design rules. Use of CAD tools to design, layout, check, extract and simulate a small project. Prerequisite: EE 3320 or equivalent. (3-0) Y
CE 6345 (EE 6345) Engineering of Packet-Switched Networks (3 semester hours) Detailed coverage, from the point of view of engineering design, of the physical, data-link, network and transport layers of IP (Internet Protocol) networks. This course is a Masters-level introduction to packet networks. Prior knowledge of digital communication systems is strongly recommended. (3-0) Y

CE 6352 (CS 6352) Performance of Computer Systems and Networks (3 semester hours) Overview of case studies. Quick review of principles of probability theory. Queuing models and physical origin of random variables used in queuing models. Various important cases of the M/M/m/N queuing system. Little’s law. The M/G/1 queuing system. Simulation of queuing systems. Product form solutions of open and closed queuing networks. Convolution algorithms and Mean Value Analysis for closed queuing networks. Discrete time queuing systems. Prerequisite: a first course on probability theory. (3-0) S

CE 6353 (CS 6353) Compiler Construction (3 semester hours) Lexical analyzers, context-free grammars. Top-down and bottom-up parsing; shift reduce and LR parsing. Operator-precedence, recursive-descent, predictive, and LL parsing. LR(k), LL(k) and precedence grammars will be covered. Prerequisites: CS 5343 and CS 5349. (3-0) Y

CE 6354 (CS 6354) Advanced Software Engineering (3 semester hours) This course covers advanced theoretical concepts in software engineering and provides an extensive hands-on experience in dealing with various issues of software development. It involves a semester-long group software development project spanning software project planning and management, analysis of requirements, construction of software architecture and design, implementation, and quality assessment. The course will introduce formal specification, component-based software engineering, and software maintenance and evolution. Prerequisite: CS 5354 (or equivalent) and knowledge of Java (3-0) S

CE 6367 (CS 6367) Software Testing, Validation, Verification (3 semester hours) Methods for evaluating software for correctness, performance and reliability including code inspections, program proofs and testing methodologies. Formal and informal proofs of correctness. Code walkthroughs, code inspections and their role in software verification. Unit and system testing techniques, testing tools and limitations of testing. Statistical testing, reliability models and performance measurement techniques. Prerequisite: CE 5354. (3-0) Y

CE 6370 (EE 6370) Design and Analysis of Reconfigurable Systems (3 semester hours) Introduction to reconfigurable computing, programmable logic: FPGAs, CPLDs, CAD issues with FPGA based design, reconfigurable systems: emulation, custom computing, and embedded application based computing, static and dynamic hardware, evolutionary design, software environments for reconfigurable systems. Prerequisite: EE 3320 or equivalent. (3-0) Y

CE 6375 (EE 6375) Design Automation of VLSI Systems (3 semester hours) This course deals with various topics related to the development of CAD tools for VLSI systems design. Algorithms, data structures, heuristics and design methodologies behind CAD tools. Design and analysis of algorithms for layout, circuit partitioning, placement, routing, chip floor planning, design rule checking (DRC). Introduction to CAD algorithms for RTL and behavior level synthesis, module generators, and silicon compilation. Prerequisite: CS 5343; Co-requisite: CE 6325. (3-0) Y

CE 6378 (CS 6378) Advanced Operating Systems (3 semester hours) Concurrent processing, inter-process communication, process synchronization, deadlocks, introduction to queuing theory and operational analysis, topics in distributed systems and algorithms, checkpointing, recovery, multiprocessor operating systems. Prerequisites: CS 5348, knowledge of C and Unix. (3-0) S

CE 6380 (CS 6380) Distributed Computing (3 semester hours) Topics include distributed algorithms, election algorithms, synchronizers, mutual exclusion, resource allocation, deadlocks, Byzantine agreement and clock synchronization, knowledge and common knowledge, reliability in distributed networks, proving distributed programs correct. Prerequisite: CS 5348. (3-0) S

CE 6390 (CS 6390) Advanced Computer Networks (3 semester hours) The design and analysis of computer networks. Topics include network architectures, the OSI reference model, theoretical basis for data-communications, network protocols, local area networks, ISDN. Prerequisites: CS 5341, CE 5390. (3-0) S

CE 6392 (CS 6392) Mobile Computing Systems (3 semester hours) Topics include coping with mobility of computing systems, data management, reliability issues, packet transmission, mobile IP, end-to-end reliable communication, channel and other resource allocation, slot assignment, routing protocols, and issues in mobile wireless networks (without base stations). Prerequisite: CE 6378 or CE 6390. (3-0) Y

CE 6397 (CS 6397) Synthesis and Optimization of High-Performance Systems (3 semester hours) A comprehensive study of the high-level synthesis and optimization algorithms for designing high performance systems with multiple CPUs or functional units for critical applications such as Multimedia, Signal processing, Telecommunications, Networks, and Graphics applications, etc. Topics including algorithms for architecture-level synthesis, scheduling, resource binding, real-time systems, parallel processor array design and mapping, code
generations for DSP processors, embedded systems and hardware/software codesigns. Prerequisite: CS 5348. (3-0) Y

CE 6398 (CS 6398/EE 6398) DSP Architectures (3 semester hours) Typical DSP algorithms, representation of DSP algorithms, data-graph, FIR filters, convolutions, Fast Fourier Transform, Discrete Cosine Transform, low power design, VLSI implementation of DSP algorithms, implementation of DSP algorithms on DSP processors, DSP applications including wireless communication and multimedia. Prerequisite: CS 5343. (3-0) Y

CE 6399 (CS 6399) Parallel Architectures and Systems (3 semester hours) A comprehensive study of the fundamentals of parallel systems and architecture. Topics including parallel programming environment, fine-grain parallelism such as VLIW and superscalar, parallel computing paradigm of shared-memory, distributed-memory, data-parallel and data-flow models, cache coherence, compiling techniques to improve parallelism, scheduling theory, loop transformations, loop parallelizations and run-time systems. Prerequisite: CS 5348. (3-0) Y

CE 7302 Hardware/Software Co-design (3 semester hours) Fundamental concepts in the design of complex digital systems consisting of hardware and software components. Topics include system description and modeling, efficient systems partitioning, hardware/software synthesis, compilation and behavioral optimization, embedded computing systems, telecommunications systems using general-purpose and special-purpose digital signal processors, and rapid prototyping and emulation using field programmable gate arrays. Prerequisites: CE 6301, CE 6302, and CE 6304. (3-0) Y

CE 7303 Hardware Verification (3 semester hours) This course deals with advanced issues related to the formal verification of complex digital systems. Topics include Binary Decision Diagrams (BDDs) and their application to representation and verification of digital systems, use of abstraction and rigorous analysis methods to solve complicated design problems, etc. Prerequisites: CE 6301, CE 6303, and CE 6325. (3-0) Y

CE 7304 (EE 7304) Advanced Computer Architecture (3 semester hours) Advanced research topics in, multi-processor, network and reconfigurable architectures. Focuses on current research in the area of computer system architecture to prepare students for a career in computer architecture research. Course will use articles from current technical literature to discuss relevant topics, such as digital signal processors and VLIW processors. Prerequisites: EE 6304, CS 5348, and EE 3341 and knowledge of C/C++. (3-0) R

CE 7325 (EE 7325) Advanced VLSI Design (3 semester hours) Advanced topics in VLSI design covering topics beyond the first course (EE/CE 6325). Topics include: use of high-level design, synthesis, and simulation tools, design for testability, clock distribution and routing problems, synchronous circuits, low-power design techniques, study of various VLSI-based computations, systolic arrays, etc. Discussions on current research topics in VLSI design. Prerequisite: CE 6325 or equivalent. (3-0) R

CE 7328 (EE 7328) Physical Design of High-Speed VLSI Circuits (3 semester hours) Techniques for the physical design of high-speed VLSI circuits. Topics related to interconnection circuit modeling, performance-driven routing, buffer and wire sizing, placement and floor planning, technology mapping and performance evaluation issues encountered in high-speed VLSI circuit designs. Discussion of the state-of-the-art practical industrial design examples. A project related to the development of a prototype CAD tool. Prerequisite: CE 6325 and knowledge of programming in C. (3-0) Y

CE 7V80 Special Topics in Computer Engineering (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ((1-6]-0) S

CE 8V40 Individual Instruction in Computer Engineering (1-6 semester hours) (May be repeated for credit.) For pass/fail credit only. ((1-6]-0) R

CE 8V70 Research In Computer Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ((3-9]-0) R

CE 8V98 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ((3-9]-0) S

CE 8V99 Dissertation (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ((3-9]-0) S

Doctor of Philosophy in Geospatial Information Sciences

http://www.utdallas.edu/dept/socsci/

This degree program is jointly offered by the School of Social Sciences, the School of Natural Sciences and Mathematics (specifically in the Department of Geosciences) and the Eric Jonsson School of Engineering and Computer Science, and is administered by the School of Social Sciences. Please refer to page 19 for program details and course descriptions.
Graduate Program in Materials Science and Engineering
http://www.mse.utdallas.edu/index.html

Faculty
Professors: Kenneth J. Balkus (Chemistry), Ray H. Baughman (Chemistry), Cyrus D. Cantrell (EE), Rockford K. Draper (Biology), John P. Ferraris (Chemistry), Robert Glosser (Physics), Bruce E. Gnade, Steven R. Goodman (Biomedical), Moon J. Kim, Gil S. Lee (EE), Alan G. MacDiarmid (Chemistry), Lawrence J. Overzet (EE), Robert M. Wallace, Anvar A. Zakhidov (Physics)

Associate Professors: Santosh R. D’Mello (Biology), Yuri Gartstein (Physics), Juan E. González (Biology), Jiyoung Kim, Jeong-Bong Lee (EE), Sanjeev K. Manohar (Chemistry), Inga Holl Musselman (Chemistry)

Assistant Professors:

Adjunct Professor: H. Edwards (TI), E.Forsythe (ARL), R. Irwin (TI), M. Quevedo-Lopez (TI)

Objectives
The program leading to the M.S. degree in materials science and engineering provides intensive preparation for professional practice in modern materials science by those engineers who wish to continue their education. Courses are offered at a time and location convenient for the student who is employed on a full-time basis.

The objective of the doctoral program in materials science and engineering is to prepare individuals to perform original, cutting edge research in the broad areas of materials science, including areas such as nanostructured materials, electronic, optical and magnetic materials, bio-mimetic materials, polymeric materials, MEMS materials and systems, organic electronics, and advanced processing of modern materials.

Facilities
The University of Texas at Dallas has recently undergone a substantial growth in materials characterization and synthesis capabilities. This capability will provide graduate students with tools uniquely suited to engage in research areas of modern materials science and engineering.

UHV Deposition and Characterization Cluster Tool
A new, unique multi-module cluster tool is now available at UTD for the fabrication and characterization of thin films. The system is capable of thin film deposition using PVD methods including electron beam evaporation, molecular beam deposition, sputter deposition and thermal evaporation methods. Additionally, in-situ characterization techniques include angle-resolved monochromatic x-ray and ultraviolet photoelectron spectroscopy, Auger electron spectroscopy, atomic force and scanning tunneling microscopy/spectroscopy. The system utilizes 100mm diameter wafers (for cleanroom process compatibility), and modified sample plates for the various deposition and characterization techniques. Wafers are transported throughout the system in a UHV transfer tube. Each deposition module has heating and rotational capability for the study of film uniformity and growth kinetics. The laboratory housing the tool is also equipped with wet chemical preparation facilities for wafer surface preparation.

Focused Ion Beam / Scanning Electron Microscopy
The focused ion beam system is a FEI Nova 200 NanoLab which is a dual column SEM/FIB. It combines ultra-high resolution field emission scanning electron microscopy (SEM) and focused ion beam (FIB) etch and deposition for nanoscale prototyping, machining, 2-D and 3-D characterization, and analysis. Five gas injection systems are available for deposition (e.g. Pt, C, SiO 2 ) and etching (e.g. iodine for metals, and a dielectric etch). Nanoscale chemical analysis is done with energy dispersive X-ray spectroscopy (EDS). A high resolution digital patterning system controlled from the User Interface is also available. Predefined device structures in Bitmap format can be directly imported to the patterning system for nanoscale fabrication. The FEI Nova 200 is also equipped with a Zyvex F100 nano-manipulation stage, which includes four manipulators with 10 nm positioning resolution. The four manipulators can be fitted with either sharp whisker probes for electrically probing samples or microgrippers for manipulating nanostructures as small as 10 nanometers. This is the first instrument of its kind in the world that combines a dual beam FIB with the F100 nanomanipulator, providing unparalleled nanofabrication and nanomanipulation.
High-Resolution Transmission Electron Microscopy

The facility operates and maintains two state-of-the-art transmission electron microscopes (TEM), and a host of sample preparation equipments. It also provides microscopy computing and visualization capabilities. Techniques and equipment available includes the following: (i) High Resolution Structural Analysis - The high-resolution imaging TEM is a JEOL 2100F which is a 200kV field emission TEM. Its capability includes atomic scale structural imaging with a resolution of better than 0.19 nm, and in-situ STM/TEM. (ii) High Resolution Chemical and Electronic Structure Analysis - High resolution analytical TEM is a second JEOL 2100F field emission TEM/STEM equipped with an energy dispersive x-ray spectrometer (EDS), an electron energy loss spectrometer (EELS), and a high angle Z-contrast imaging detector. This instrument performs chemical and electronic structure analysis with a spatial resolution of better than 0.5 nm in EELS mode and is also capable of spectrum imaging and mapping. The image resolution in the chemically sensitive Z-contrast scanning TEM (STEM) mode will be about 0.14 nm. Its capability also includes in-situ cryogenic cooling and heating, and a computer control system for remote microscopy operation.

X-ray Diffraction Suite

A Rigaku Ultima III X-ray Diffractometer system is available for thin film diffraction characterization. The system is equipped with a cross beam optics system to permit either High-resolution parallel beam with a motor controlled multilayer mirror, or a Bragg-Brentano Para-Focusing beam (without the multilayer mirror) which are permanently mounted, pre-aligned and user selectable with no need for any interchange between components. Curved graphite crystal or Ge monochromaters are also available. An integrated annealing attachment permits the in-situ examination of film structure up to 1500°C. The instrument enables a variety of applications including in-plane and normal geometry phase identification, quantitative analysis, lattice parameter refinement, crystallite size, structure refinement, residual stress, density, roughness (from reflectivity geometries), and depth-controlled phase identification. Detection consists of a computer controlled scintillation counter. Sample sizes up to 100 mm in diameter can be accommodated on this system. A new Rigaku Rapid Image Plate Diffractometer system is also available for small spot (30mm – 300mm) XRD work. The digital image plate system enables the acquisition of diffraction data over a 204° angle with a rapid laser scanning readout system. An integrated annealing attachment permits the in-situ examination of film structure up to 900°C on this system. A complete set of new control, database and analysis workstations and software is associated with these new systems.

Wafer Bonding Laboratory

An UHV wafer bonding unit, especially designed to use surface characterization and thin-film deposition techniques to measure and control substrate and interface chemistry within limits necessary to make heterojunction devices, is available to produce integrated heterostructures with well controlled chemistry that are tractable for quantitative nanostructural and properties measurements. This unit is capable of synthesizing interfaces by direct wafer bonding and/or in-situ thin film deposition method, and offers greater flexibility for producing advanced integrated artificial structures. It consists of five interconnected ultra high vacuum (UHV) chambers for in-situ surface preparation and analysis, addition of interface interlayers by e-beam or UHV sputter deposition, a bonding chamber, and a sample entry and preparation chamber. The base pressure is 2x10^{-10} Torr. Orientation of the bonded pairs can be controlled to ~0.1 degree prior to bonding. Ex-situ surface preparations using etching and low energy reactive plasma cleaning is done in a cleanroom to protect substrates prior to insertion in the bonding instrument. An atomic force microscopy (AFM) is also available to provide direct measurements of these effects, to supplement the indirect information of RHEED.

Cleanroom Research Laboratory

The existing cleanroom facility located in the Jonsson School of Electrical Engineering and Computer Science (http://www.utdallas.edu/eecs/cleanroom/) is utilized for initial unit process development. The total area of this facility is 10,000 sq. ft., with 5,000 sq. ft. of class 1,000 space. This facility contains semiconductor processing equipment including optical and e-beam lithography, chemical processing hoods, evaporation and sputter deposition systems, as well as a wide variety of material and processing diagnostics. The lithography component in the cleanroom facility consists of a Quintel contact printer, HTG contact printer, a Karl Suiss contact printer, and two e-beam lithography machines. One e-beam machine specializes in direct write applications while the other will specialize in photomask fabrication. These e-beam lithography stations were donated to UTD by Texas Instruments and have high-resolution columns, (0.12 micron minimum geometries), on a production speed base. Both positive and negative E-Beam resists are utilized to minimize write times. The Quintel aligner is a G-line contact printer with ~ 1 micron resolution and backside alignment capability (~1 micron). It will accept up 150
179 mm wafers. Exposed resist is developed in 3 versatile “APT” 914 and 915 developers using spray and spin wet processes. One APT can be used to etch the Chrome from photomasks. This technology is highly flexible for substrates and can contain up to 99 process programs. This tool produces developed substrates nearly free of particles. The thin-film deposition component of the lab includes a Uniaxis Plasma Enhanced CVD (up to 150 mm wafer), three E-beam evaporators (each fitting up to 150 mm wafers) and a four-head sputter deposition system (designed for 100 mm wafers). A “Tystar” Low Pressure Chemical Vapor Deposition reactor is currently being installed. The LPCVD is designed for either 100-150 mm wafers and has 4 tubes. It will allow deposition of low stress silicon nitride, polysilicon (doped and undoped) and silicon dioxide (doped and undoped). Films can be etched in any of 3 reactive ion etchers. These include: a “Technics” RIE setup for 100-105 mm wafers, a “Plasma Technologies” RIE accommodating up to 150 mm wafers and a “Drytech” Deep-RIE for 100 mm wafers. There are several anneal and oxidation furnaces available including 5 Minibrute tube furnaces (100mm) and a new Rapid Thermal Anneal (RTA) system (up to 200 mm wafers). The clean room diagnostics include a SEM, a spectroscopic ellipsometer, optical microscope, profilometer, ALESSI 4 point probe, a new Cascade Summit series electrical probe station (200 mm capability) with a chuck heating (to 150°C) and cooling stage (to -65°C) as well as associated electrical characterization instrumentation (parameter analyzers, CV meters, etc.), and a high resolution AFM. The SEM is a Phillips XL-30 tool with a 4 nm resolution and an EDAX material analysis system capable of handling a 100nm wafer with offset positioning. The AFM is a Park Scientific International model LS with two deflection stages, one with 10 micron travel and the other, 100 micron travel. The resolution on the AFM is below one nanometer. It can then fit the reflectance curve to accurately estimate film thicknesses and compositions for up to 6 layers.

In addition to the facilities on campus, cooperative arrangements have been established with many local industries to make their facilities available to U.T. Dallas graduate engineering students.

Master of Science in Materials Science and Engineering

Admission Requirements
The University’s general admission requirements are discussed on page 13.

A student lacking undergraduate prerequisites for graduate courses in Materials Science and Engineering must complete these prerequisites or receive approval from the graduate adviser and the course instructor. A diagnostic exam may be required. Specific admission requirements follow.

The student entering the MSEN program should meet the following guidelines:

- Student has met standards equivalent to those currently required for admission to the Ph.D. or Master's degree programs in Electrical Engineering, Chemistry, Physics, or Biology.
- a grade-point average in graduate-level course work of 3.5 or better on a 4-point scale
- GRE scores of at least 500, 700 and 600 for the verbal, quantitative and analytical components, respectively, or 1800 for the total score.

Students who fulfill some of the above requirements, if admitted conditionally, will be required to take graduate level courses as needed to make up any deficiencies.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The MSEN M.S. degree requires a minimum of 33 semester hours. All students must have an academic advisor and an approved degree plan. These are based upon the student’s choice of concentration. Courses taken without advisor approval will not count toward the 33 semester-hour requirement. Successful completion of the approved course of studies leads to the M.S. degree.

M. S. students undertaking the thesis option must carry out a research project under the direction of a member of the Materials Science and Engineering Affiliated Faculty and complete and defend a thesis on the research project. A Supervisory Committee will be appointed once the faculty member accepts the student for a research project. The rules for the thesis defense are specified by the Office of the Dean of Graduate Studies. For each of the proposed degree programs, students must pass the following core courses with a grade of B or better:

- MSEN 5310 Thermodynamics of Materials
- MSEN 5360 Materials Characterization
- MSEN 6324 (EE 6324) Electronic Materials

Note: the presence of a course number in parentheses indicates that this course will be cross-listed with an existing course.
180 Materials Science and Engineering

- MSEN 6319 Quantum Mechanics for Materials Scientists
  A student may petition for waiver of core courses, and if the Materials Science and Engineering Affiliated Faculty, or a designated committee, finds that the student has mastered the course material, the student may replace that core course with an elective course for a total of twelve semester credit hours.

A minimum of 9 semester credit hours will be required from the Advanced Course List
- MSEN 5340 Advanced Polymer Science and Engineering
- MSEN 5370 Ceramics and Metals
- MSEN 6310 Mechanical Properties of Materials
- MSEN 6330 Phase Transformations
- MSEN 6350 Imperfections in Solids
- MSEN 6377 (PHYS 6377) Physics of Nanostructures: Carbon Nanotubes, Fullerenes, Quantum Wells, Dots and Wires

The remaining credit hours are to be taken from the following list of Specialized Courses (or approved electives from Physics, Chemistry, or Biology):
- MSEN 5300 Introduction to Materials Science
- MSEN 5331 (CHEM 5331) Advanced Organic Chemistry I
- MSEN 5333 (CHEM 5333) Advanced Organic Chemistry II
- MSEN 5341 (CHEM 5341) Advanced Inorganic Chemistry
- MSEN 5344 Thermal Analysis
- MSEN 5353 Integrated Circuit Packaging
- MSEN 5355 (CHEM 5355) Analytical Techniques I
- MSEN 5356 (CHEM 5356) Analytical Techniques II
- MSEN 5361 Fundamentals of Surface and Thin Film Analysis
- MSEN 5371 (PHYS 5371) Solid State Physics
- MSEN 5375 (PHYS 5375) Electronic Devices Based On Organic Solids
- MSEN 5383 (PHYS 5383 and EE 5383) Plasma Technology
- MSEN 6313 (EE 6313) Semiconductor Opto-Electronic Devices
- MSEN 6320 (EE6320) Fundamentals of Semiconductor Devices
- MSEN 6321 (EE6321) Active Semiconductor Devices
- MSEN 6322 (EE6322) Semiconductor Processing Technology
- MSEN 6340 Advanced Electron Microscopy
- MSEN 6341 Advanced Electron Microscopy Laboratory
- MSEN 6361 Deformation Mechanisms in Solid Materials
- MSEN 6362 Diffraction Science
- MSEN 6371 (PHYS6371) Advanced Solid State Physics
- MSEN 6374 (PHYS6374) Optical Properties Of Solids
- MSEN 7320 (EE7320) Advanced Semiconductor Device Theory
- MSEN 7382 (EE7382) Introduction to MEMS
- MSEN 7V80 Special Topics in Materials Science and Engineering
- MSEN 8V40 Individual Instruction in Materials Science and Engineering
- MSEN 8V70 Research In Materials Science and Engineering
- MSEN 8V98 Thesis

Doctor of Philosophy in Materials Science and Engineering

Admission Requirements
The University’s general admission requirements are discussed on page 13.
A student lacking undergraduate prerequisites for graduate courses in Materials Science and Engineering must complete these prerequisites or receive approval from the graduate adviser and the course instructor. A diagnostic exam may be required. Specific admission requirements follow.
The student entering the MSEN program should meet the following guidelines:
- Student has met standards equivalent to those currently required for admission to the Ph.D. or Master’s degree programs in Electrical Engineering, Chemistry, Physics, or Biology.
- a grade-point average in graduate-level course work of 3.5 or better on a 4-point scale
• GRE scores of at least 500, 700 and 600 for the verbal, quantitative and analytical components, respectively, or 1800 for the total score.

Students who fulfill some of the above requirements, if admitted conditionally, will be required to take graduate level courses as needed to make up any deficiencies.

**Degree Requirements**

The University’s general degree requirements are discussed on page 18.

The MSEN Ph.D. requires a minimum of 60 semester hours.

All students must have an academic advisor and an approved degree plan. Courses taken without advisor approval will not count toward the 60 semester-hour requirement. Successful completion of the approved course of studies leads to the MSEN.

Each doctoral student must carry out original research in the area of Materials Science and Engineering, under the direction of a member of the Materials Science and Engineering Affiliated Faculty, and complete and defend a dissertation on the research project. A Supervisory Committee will be appointed once the faculty member accepts the student for a research project. Students must be admitted to doctoral candidacy by passing a Qualifying Exam, which will be administered at approximately the time that the students have completed their course work. The rules for the dissertation research and defense are specified by the Office of the Dean of Graduate Studies.

For each of the proposed degree programs, students must pass the following core courses with a grade of B or better:

Note: the presence of a course number in parentheses indicates that this course will be cross-listed with an existing course.

- MSEN 5310 Thermodynamics of Materials
- MSEN 5360 Materials Characterization
- MSEN 6319 Quantum Mechanics for Materials Scientists
- MSEN 6324 (EE 6324) Electronic Materials

A student may petition for waiver of core courses, and if the Materials Science and Engineering Affiliated Faculty, or a designated committee, finds that the student has mastered the course material, the student may replace that core course with an elective course for a total of twelve semester credit hours.

A minimum of 9 semester credit hours will be required from the Advanced Course List

- MSEN 5340 Advanced Polymer Science and Engineering
- MSEN 5370 Ceramics and Metals
- MSEN 6310 Mechanical Properties of Materials
- MSEN 6330 Phase Transformations
- MSEN 6350 Imperfections in Solids
- MSEN 6377 (PHYS 6377) Physics of Nanostructures: Carbon Nanotubes, Fullerenes, Quantum Wells, Dots and Wires

The remaining credit hours are to be taken from the following list of Specialized Courses (or approved electives from Physics, Chemistry, or Biology):

- MSEN 5300 Introduction to Materials Science
- MSEN 5331 (CHEM 5331) Advanced Organic Chemistry I
- MSEN 5333 (CHEM 5333) Advanced Organic Chemistry II
- MSEN 5341 (CHEM 5341) Advanced Inorganic Chemistry
- MSEN 5344 Thermal Analysis
- MSEN 5353 Integrated Circuit Packaging
- MSEN 5355 (CHEM 5355) Analytical Techniques I
- MSEN 5356 (CHEM 5356) Analytical Techniques II
- MSEN 5361 Fundamentals of Surface and Thin Film Analysis
- MSEN 5371 (PHYS 5371) Solid State Physics
- MSEN 5375 (PHYS 5375) Electronic Devices Based On Organic Solids
- MSEN 5383 (PHYS 5383 and EE 5383) Plasma Technology
- MSEN 6313 (EE 6313) Semiconductor Opto-Electronic Devices
- MSEN 6320 (EE6320) Fundamentals of Semiconductor Devices
- MSEN 6321 (EE6321) Active Semiconductor Devices
- MSEN 6322 (EE6322) Semiconductor Processing Technology
Materials Science and Engineering
CORE COURSES
MSEN 5310 Thermodynamics of Materials (3 semester hours) Work, energy and the first law of thermodynamics; the second law of thermodynamics, thermodynamic potentials, the third law of thermodynamics, thermodynamic identities and their uses, phase equilibria in one-component systems, behavior and reactions of gases. Solutions, binary and multicomponent systems: phase equilibria, materials separation and purification. Electrochemistry. Thermodynamics of modern materials. (3-0) R
MSEN 5360 Materials Characterization (3 semester hours) Survey of atomic and structural analysis techniques as applied to surface and bulk materials. Physical processes involved in the interaction of ions, electrons and photons with solids; characteristics of the emergent radiation in relation to the structure and composition. (3-0) R
MSEN 6319 Quantum Mechanics for Materials Scientists (3 semester hours) Quantum-mechanical foundation for study of nanometer-scale materials. Principles of quantum physics, stationary-states for one-dimensional potentials, symmetry considerations, interaction with the electromagnetic radiation, scattering, reaction rate theory, spectroscopy, chemical bonding and molecular orbital theory, solids, perturbation theory, nuclear magnetic resonance. (3-0) Y Cross-listed with EE 6319.
MSEN 6324 Electronic Materials (3 semester hours) Principles of selection, preparation, and characterization of electronic materials with emphasis on semiconductors. Fundamentals of crystallography and crystal growth. Defect and impurity control. Thermodynamics and phase equilibria as applied to semiconductor processing. Preparation and properties of epitaxial and heteroepitaxial structures. Advanced techniques for structural, chemical and electrical characterization of electronic materials. Prerequisite: EE 6320 or equivalent. (3-0) T Cross listed with EE 6324.

ADVANCED COURSES
MSEN 5340 Advanced Polymer Science and Engineering (3 semester hours) Polymer structure-property relations, Linear and nonlinear viscoelasticity. Dynamic mechanical analysis, time temperature superposition, creep and stress relaxation. Mechanical models for prediction of polymer deformation, rubber elasticity, environmental effects on polymer deformation, instrumentation for prediction of long term properties. (3-0) R
MSEN 5370 Ceramics and Metals (3 semester hours) Emphasis on structure-property relationships: chemical bonding, crystal structures, crystal chemistry, electrical properties, thermal behavior, defect chemistry. Chemical and physical properties of metals and alloys. Topics include: powder preparation, sol-gel synthesis, densification, toughening mechanisms, crystal structure, thermodynamics, phase diagrams, phase transformations, oxidation, mechanical, electrical and magnetic properties. (3-0) R
MSEN 6310 Mechanical Properties of Materials (3 semester hours) Stress, strain and the basics of concepts in deformation and fracture for metals, polymers and ceramics. Analysis of important mechanical properties such as plastic flow, creep, fatigue, fracture toughness and rupture. Application of these principles to the design of improved materials and engineering structures. (3-0) Y
MSEN 6330 Phase Transformations (3 semester hours) Thermodynamic, kinetic, and structural aspects of metallic and ceramic phase transformations: mechanisms and rate-determining factors in solid-phase reactions; diffusion processes, nucleation theory, precipitations from solid solution, order-disorder phenomena, and applications of binary and ternary phase diagrams. (3-0) R
MSEN 6350 Imperfections in Solids (3 semester hours) Point defects in semiconductors, metals, ceramics, and; nonideal defect structures; nonequilibrium conditions produced by irradiation or quenching; effects of defects on electrical and physical properties, effects of defects at interfaces between differing materials. (3-0) R


SPECIALIZED COURSES

BIOL 5410 Biochemistry of Proteins and Nucleic Acids (4 semester hours) Chemistry and metabolism of amino acids and nucleotides; biosynthesis of nucleic acids; analysis of the structure and function of proteins and nucleic acids and of their interactions including chromatin structure. Prerequisite: biochemistry or equivalent. (4-0) Y

BIOL 5440 Cell Biology (4 semester hours) Molecular architecture and function of cells and subcellular organelles; structure and function of membranes; hormone and neurotransmitter action; growth regulation and oncogenes; immune response; eukaryotic gene expression. Prerequisites: BIOL 5410 and BIOL 5420, or the equivalent, or permission of the instructor. (4-0) Y

BIOL 6358 Bionanotechnology * (3 semester hours) Protein, nucleic acid and lipid structures. Macromolecules as structural and functional units of the intact cell. Parallels between biology and nanotechnology. Applications of nanotechnology to biological systems. (Note: taught as a special topics course in Fall 2004 with 8 enrolled.)

MSEN 5300 Introduction to Materials Science (3 semester hours) This course provides an intensive overview of materials science and engineering and includes the foundations required for further graduate study in the field. Topics include atomic structure, crystalline solids, defects, failure mechanisms, phase diagrams and transformations, metal alloys, ceramics, polymers as well as their thermal, electrical, magnetic and optical properties. Prerequisites: None. (3-0) R.

MSEN 5331 Advanced Organic Chemistry I (3 semester hours) Modern concepts of bonding and structure in covalent compounds. Static and dynamic stereochemistry and methods for study. Relationships between structure and reactivity. (3-0) Y Cross Listed with CHEM 5331.

MSEN 5333 Advanced Organic Chemistry II (3 semester hours) Application of the principles introduced in CHEM 5331, emphasizing their use in correlating the large body of synthetic/preparative organic chemistry. Prerequisite: MSEN 5331/CHEM 5331. (3-0) R Cross Listed with CHEM 5333.

MSEN 5341 Advanced Inorganic Chemistry (3 semester hours) Physical inorganic chemistry addressing topics in structure and bonding, symmetry, acids and bases, coordination chemistry and spectroscopy. Prerequisite: CHEM 3341, or consent of instructor. (3-0) Y. Cross Listed with CHEM 5341.

MSEN 5344 Thermal Analysis (3 semester hours) Differential scanning calorimetry; thermogravimetric metric analysis; dynamic mechanical and thermomechanical analysis; glass transition; melting transitions, relaxations in the glassy state, liquid crystalline phase changes. (3-0) S

MSEN 5353 Integrated Circuit Packaging (3 semester hours) Basic packaging concepts, materials, fabrication, testing, and reliability, as well as the basics of electrical, thermal, and mechanical considerations as required for the design and manufacturing of microelectronics packaging. Current requirements and future trends will be presented. General review of analytical techniques used in the evaluation and failure analysis of microelectronic packages. (3-0) R

MSEN 5355 Analytical Techniques I (3 semester hours) Study of fundamental analytical techniques, including optical spectroscopic techniques and energetic particle and x-ray methods including SEM, EDS, STM, AFM, AES, XPS, XRF, and SIMS. (3-0) Y Cross Listed with CHEM 5355.

MSEN 5356 Analytical Techniques II (3 semester hours) Study of statistical methods (standard tests, statistical process control, ANOVA, experimental design, etc.) and problem solving techniques for dealing with ill-defined analytical problems. (3-0) Y Cross Listed with CHEM 5356.

MSEN 5361 Fundamentals of Surface and Thin Film Analysis (3 semester hours) Survey of materials characterization techniques; optical microscopy; Rutherford backscattering; secondary ion mass spectroscopy; ion channelling; scanning tunneling and transmission microscopy; x-ray spectroscopy; surface properties. (3-0) R

MSEN 5371 Solid State Physics (3 semester hours) Symmetry description of crystals, bonding, properties of metals, electronic band theory, thermal properties, lattice vibration, elementary properties of semiconductors. Prerequisites: PHYS 5400 and 5421 or equivalent. (3-0) Y Cross Listed with PHYS 5371.
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credit Hours</th>
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<td>PHYS 5375</td>
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<td>MSEN 8V40</td>
<td>Individual Instruction in Materials Science and Engineering</td>
<td>1-6</td>
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<td>MSEN 8V70</td>
<td>Research In Materials Science and Engineering</td>
<td>3-9</td>
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<td>Thesis</td>
<td>3-9</td>
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<tr>
<td>MSEN 8V99</td>
<td>Dissertation</td>
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**Graduate Program in Telecommunications Engineering**

http://www.utdallas.edu/dept/ee

**Faculty**

The M.S.T.E. is an interdisciplinary degree program administered by the Telecommunications Engineering Division on behalf of the Departments of Electrical Engineering and Computer Science in the Erik Jonsson School of Engineering and Computer Science (see Electrical Engineering and Computer Science sections for listing of faculty).

**Objectives**

The program leading to the M.S.T.E. degree provides intensive preparation for professional practice in the high technology aspects of telecommunications engineering. It is designed to serve the needs of engineers who wish to continue their education. Courses are offered at a time and location convenient for the student who is employed on a full-time basis.

**Facilities**

The Erik Jonsson School of Engineering and Computer Science has developed a state-of-the-art computational facility consisting of a network of Sun servers and Sun Engineering Workstations. All systems are connected via an extensive fiber-optic Ethernet and, through the Texas Higher Education Network, have direct access to most major national and international networks. In addition, many personal computers are available for student use.

The Engineering and Computer Science Building provides extensive facilities for research in microelectronics, telecommunications, and computer science. A Class 1000 microelectronics clean room facility, including optical lithography, sputter deposition and evaporation, is available for student projects and research. An electron beam lithography pattern generator capable of sub-micron resolution is also available for microelectronics research. The Plasma Applications Laboratory has state-of-the-art facilities for mass spectrometry, microwave interferometry, optical spectroscopy, and optical detection. In addition, a Gaseous Electronics Conference Reference Reactor has been installed for plasma processing and particulate generation studies. The Optical Measurements Laboratory has dual wavelength (visible and near infrared) Gaertner Ellipsometer for optical inspection of material systems, a variety of interferometric configurations, high precision positioning devices, and supporting optical and electrical components. The Optical Communications Laboratory includes attenuators, optical power meters, lasers, APD/p-i-n photodetectors, optical tables, and couplers and is available to support system level research in optical communications. The Electronic Materials Processing laboratory has extensive facilities for fabricating and characterizing semiconductor and optical devices. The Laser Electronics Laboratory houses graduate research projects centered around the characterization, development and application of ultrafast dye and diode lasers. Research in characterization and fabrication of nanoscale materials and devices is performed in the Nanoelectronics Laboratory.

The Digital Systems Laboratory includes a network of workstations, personal computers, FPGA development systems, and a wide spectrum of state-of-the-art commercial and academic design tools to support graduate research in VLSI design and computer architecture. In the Digital Signal Processing Laboratory several multi-CPU workstations are available in a network configuration for simulation experiments. Hardware development facilities for real time experimental systems are available and include microphone arrays, active noise controllers, speech compressors and echo cancellers. The Nonlinear Optics Laboratory has a dedicated network of Sun workstations for the development of simulation methods and software for optical transmission and communication systems, optical routers and all-optical networks. The Broadband Communication Laboratory has design and modeling tools for fiber and wireless transmission systems and networks, and all-optical packet routing and switching. The Advanced Communications Technologies (ACT) Laboratory provides a design and evaluation environment for the study of telecommunication systems and wireless and optical networks. ACT has facilities for designing network hardware, software, components, and applications.

The Center for Systems, Communications, and Signal Processing, with the purpose of promoting research and education in general communications, signal processing, control systems, medical and biological systems, circuits and systems and related software, is located in the Erik Jonsson School. The Center for Applied Optics, which has produced more than twenty Ph.D. graduates and whose faculty carry out research in enabling
technologies for microelectronics and telecommunications, is in the Erik Jonsson School. In addition to the facilities on campus, cooperative arrangements have been established with many local industries to make their facilities available to U.T. Dallas graduate engineering students.

**Master of Science in Telecommunications Engineering**

**Admission Requirements**

The University's general admission requirements are discussed on page 13.

A student lacking undergraduate prerequisites for graduate courses in electrical engineering must complete these prerequisites or receive approval from the graduate adviser and the course instructor. A diagnostic examination may be required. Specific admission requirements follow.

A student entering the M.S.T.E. program should meet the following guidelines:

- An undergraduate preparation equivalent to a baccalaureate in electrical engineering from an accredited engineering program,
- A grade point average in upper-division quantitative course work of 3.0 or better on a 4-point scale, and
- GRE examination scores of 500, 700 and 600 for the verbal, quantitative and analytical components respectively; a total score of at least 1800 is advisable based on our experience with student success in the program.

Applicants must submit three letters of recommendation from individuals who are able to judge the candidate’s probability of success in pursuing a program of study leading to the master's degree.

Applicants must also submit an essay outlining the candidate’s background, education and professional goals.

Students from other engineering disciplines or from other areas of science or mathematics may be considered for admission to the program; however, some additional course work may be necessary before starting the master’s program.

**Degree Requirements**

The University’s general degree requirements are discussed on page 18.

The M.S.T.E. degree requires a minimum of 33 semester hours.

All students must have an academic adviser and an approved degree plan. Courses taken without adviser approval will not count toward the 33 semester-hour requirement. Successful completion of the approved course of studies leads to the M.S.T.E. degree.

The M.S.T.E. program has both a thesis and a non-thesis option. All part-time M.S.T.E. students will be assigned initially to the non-thesis option. Those wishing to elect the thesis option may do so by obtaining the approval of a faculty thesis supervisor.

All full-time, supported students are required to participate in the thesis option. The thesis option requires six semester hours of research, a written thesis submitted to the graduate school, and a formal public defense of the thesis. Research and thesis hours cannot be counted in a M.S.T.E. degree plan unless a thesis is written and successfully defended. A supervising committee, which must be chosen in consultation with the student's thesis adviser prior to enrolling for thesis credit, administers the defense. Full-time students at UTD who receive financial assistance are required to enroll in 9 semester credit hours during the Fall, Spring and Summer semesters. Students enrolled in the thesis option should meet with individual faculty members to discuss research opportunities and to choose a research advisor during the first or second semester that the student is enrolled. After the second semester of study, course selection should be made in consultation with the research adviser. Part-time students are encouraged to enroll in only one course during their first semester and in no more than two courses during any semester they are also working full-time.

To receive a Master of Science degree in Telecommunications Engineering, a student must meet the following minimum set of requirements:

- Completion of a minimum of 33 semester hours of graduate level lecture courses including the required core courses. With adviser approval, these may include some 5000 level courses.
- Students must take the following five core courses and make a grade of B or better:

  CS/TE 6385 Algorithmic Aspects of Telecommunication Networks
  EE 6349 Random Processes
  EE 6352 Digital Communication Systems
  CS 6352 Performance of Computer Systems
CS 6390 Advanced Communication and Computer Networks
Students will take additional courses from those described in the following pages.
Recommended Elective Courses: Choose any 18 hours of 6000 level courses or higher with approval of the adviser.

RECOMMENDED ELECTRICAL ENGINEERING ELECTIVES:
EE 5305 Radio Frequency Engineering
EE 6310 Optical Communication Systems
EE 6316 Fields and Waves
EE 6341 Information Theory I
EE 6343 Detection and Estimation theory
EE 6344 Coding Theory
EE 6345 Engineering of Packet-Switched Networks
EE 6355 RF and Microwave Communications Circuits
EE 6360 Digital Signal Processing I
EE 6361 Digital Signal Processing II
EE 6362 Speech Signal Processing
EE 6365 Adaptive Signal Processing
EE 6390 Introduction to Wireless Communications Systems
EE 6391 Signal and Coding for Wireless Communication Systems
EE 6392 Propagation and Devices for Wireless Communication
EE 6394 Antenna Engineering for Wireless Communications
EE 6395 Advanced Radio Frequency Engineering
EE 7340 Optical Network Architectures and Protocols

RECOMMENDED COMPUTER SCIENCE ELECTIVES:
CS 6354 Software Engineering
CS 6360 Database Design
CS 6363 Design and Analysis of Computer Algorithms
CS 6368 Telecommunication Network Management
CS 6378 Advanced Operating Systems
CS 6381 Combinatorics and Graph Algorithms
CS 6386 Telecommunication Software Design
CS 6392 Mobile Computing Systems
CS 6394 Digital Telephony
CS 6396 Real Time Systems
Doctor of Philosophy in Telecommunications Engineering

Each doctoral degree program is tailored to the student. The student must arrange a course program with the guidance and approval of a faculty member chosen as his/her graduate adviser. Adjustments can be made as the student's interests develop and a specific dissertation topic is chosen.

Admission Requirements
The University's general admission requirements are discussed on page 13.

The Ph.D. degree in Telecommunications engineering is awarded primarily to acknowledge the student success in an original research project, the description of which is a significant contribution to the literature of the discipline. Applications for the doctoral program are therefore selected by the Telecommunications Engineering Graduate Committee on the basis of research aptitude, as well as academic record. Applications for the doctoral program are considered on the individual basis.

The following are guidelines for admission to the Ph.D. program in Telecommunications Engineering.

- A master’s degree in Telecommunications Engineering, or Electrical Engineering or Computer Science or a closely associated discipline from an accredited U.S institution or from an acceptable foreign university. Consideration will be given to highly qualified students wishing to pursue the doctorate without satisfying all of the requirements for a master’s degree.
- A grade point average in graduate course work of 3.5 or better or a better on a 4-point scale
- Scores on the GRE examination of 500, and 700 for the verbal, and quantitative respectively or 1200 for the total score.
- Applicants must submit three letters of recommendation on official school or business letterhead or the UTD Letter of Recommendation form from individuals who are familiar with the student record and able to judge the candidate’s probability of success in purchasing doctoral study in electrical engineering.
- Applicants must also submit a narrative describing their motivation for doctoral study in telecommunications engineering.
- Applicants must also submit a narrative describing their motivation for doctoral study and how it relates to their professional goals.

For students who are interested in a Ph.D., but are unable to attend school full-time, there is a part-time option. The guidelines for admission to the program and the degree requirements are the same as for full-time Ph.D., students. All students must have an academic adviser and an approved plan of study.

Degree Requirements
The University's general degree requirements are discussed on page 18.

The M.S.E.E. requires a minimum of 33 semester hours.

Each program for doctoral study is individually tailored to the student's background and research objectives by the student's supervisory committee. The program will require a minimum of 90 semester credit hours beyond the bachelor's degree. These credits must include:

1. Course Work

At least 30 semester hours of graduate level courses beyond the bachelor's level in the major concentration. Students choose 30 hours from the following courses with the approval of the TE Graduate Committee.

Core Courses (choose any 5 of the following)
- CS/TE 6385 Algorithmic Aspects of Telecommunication Networks
- EE 6349 Random Processes
- EE 6352 Digital Communication Systems
- CS 6352 Performance of Computer Systems
- CS 6390 Advanced Communication and Computer Networks
- CS 6354 Software Engineering
- EE 6390 Wireless Communication Systems
- EE/CE 6304 Computer Architecture
- EE/TE 7V81 Network Security
Recommended Electrical Engineering Electives
- EE 5305 RF Engineering
- EE 6310 Optical Communication Systems
- EE 6316 Fields and Waves
- EE 6341 Information Theory
- EE 6343 Detection and Estimation theory
- EE 6344 Coding Theory
- EE 6345 Engineering of Packet Switched Networks
- EE 6355 RF and microwave communication circuits
- EE 6360 Digital Signal Processing I
- EE 6361 Digital Signal Processing II
- EE 6365 Adaptive Signal Processing
- EE 6390 Introduction to Wireless Communication Systems
- EE 6391 Signal and Coding for Wireless Communication Systems
- EE 6392 Propagation and Devices for Wireless Communication
- EE 6394 Antenna Engineering for Wireless Communication
- EE 6395 Advanced Radio Frequency Engineering
- EE 7340 Optical Network Architecture and Protocols
- TE/EE 7V81 Network Security

Recommended Computer Science Electives
- CS 6354 Software Engineering
- CS 6360 Database Design
- CS 6363 Design and Analysis of Algorithms
- CS 6368 Telecommunication Network Management
- CS 6378 Advanced Operating Systems
- CS 6381 Combinatorics and Graph Algorithms
- CS 6386 Telecommunications Software Design
- CS 6392 Mobile Computing Systems
- CS 6394 Digital Telephony
- CS 6396 Real time Systems
- CS 6390 Advance Computer Networks
- CS 8302 Personal Communication Systems

2. Supervising Committee
   At least 4, at least 3 from the Erik Jonsson school faculty.

3. Qualifying Examination
   The student must pass a qualifying exam approved by the TE graduate committee.

4. Dissertation
   Completion of a major research project culminating in a dissertation demonstrating an original contribution
to a scientific knowledge and engineering practice. The dissertation will be defended publicly. The rules for this
defense are specified by the Office of the Dean of Graduate Studies.
   Neither a foreign language nor a minor is required for Ph.D. However, the student’s supervisory committee
may impose these or other requirements that it feels are necessary and appropriate to the student’s degree
program.
Areas of Research
The principal concentration areas for the graduate program are:

- Communications and signal processing
- Optical and wireless networks
- Network design and protocols
- Embedded and reconfigurable systems
- Optical and photonic devices, materials and systems
- Fault-tolerant systems

Doctoral level research opportunities include: VLSI design, reconfigurable systems, system architecture, fault-tolerant computing, digital signal processing, digital communications, modulation and coding, electromagnetic-wave propagation, fiber and integrated optics, lasers and optoelectronic devices, optical transmission systems, optical networks, wireless communications, mobile IP, wireless multimedia, DWDM networks, QoS assurance protocols, network design and optimization, ad-hoc and PCS wireless networks, network security and high speed protocols.

Interdisciplinary Opportunities
In keeping with the established tradition of research at UT-Dallas, the Telecommunications Engineering Program encourages students to interact with researchers in the strong programs in basic computer science, electrical engineering and business management.

Telecommunications Engineering Course Descriptions

Electrical Engineering Courses

EE 5305 Radio Frequency Engineering (3 semester hours) Introduction to generation, transmission, and radiation of electromagnetic waves. Microwave-frequency measurement techniques. Characteristics of guided-wave structures. Impedance matching. Fundamentals of antennas and propagation. Prerequisite: EE 4301 or equivalent. (3-1) Y

EE 6310 Optical Communications Systems (3 semester hours) Operating principles of optical communications systems and fiber optic communication technology. Characteristics of optical fibers, laser diodes, laser modulation, laser and fiber amplifiers, detection, demodulation, dispersion compensation, and network topologies. System topology, star network, bus networks, layered architectures, all-optical networks. Prerequisite: EE 3350 or equivalent. (3-0) T

EE 6316 Fields and Waves (3 semester hours) Study of electromagnetic wave propagation beginning with Maxwell’s equations; reflection and refraction at plane boundaries; guided wave propagation; radiation from dipole antennas and arrays; reciprocity theory; basics of transmission line theory and waveguides. Prerequisite: EE 3350 or equivalent. (3-0) Y

EE 6341 Information Theory I (3 semester hours) Self information, mutual information, discrete memoryless sources, entropy, source coding for discrete memoryless channels, homogeneous Markov sources, discrete memoryless channels, channel capacity, converse to the coding theorem, noisy channel coding theorem, random coding exponent, Shannon limit. Prerequisite: EE 6352. (3-0) R


EE 6344 Coding Theory (3 semester hours) Groups, fields, construction and properties of Galois fields, error detection and correction, Hamming distance, linear block codes, syndrome decoding of linear block codes, cyclic codes, BCH codes, error trapping decoding and majority logic decoding of cyclic codes, non-binary codes, Reed Solomon codes, burst error correcting codes, convolutional codes, Viterbi decoding of convolutional codes. Prerequisite: EE 6352. (3-0) R

EE 6345 Engineering of Packet-Switched Networks (3 semester hours) Detailed coverage, from an engineering point of view, of the physical, data-link, network and transport layers of IP (Internet Protocol) networks. This course is a Masters-level introduction to packet networks. Prior knowledge of digital communication systems is strongly recommended. Prerequisite: EE 3350 or equivalent. (3-0) Y

EE 6349 Random Processes (3 semester hours) Random processes concept. Stationary and independence. Autocorrelation and cross-correlation functions, spectral characteristics. Linear systems with random inputs. Special topics and applications. Prerequisites: EE 3302 and EE 3341 or equivalents. (3-0) Y
EE 6352 Digital Communication Systems (3 semester hours) Digital communication systems are discussed. Source coding and channel coding techniques are introduced. Signaling schemes and performance of binary and M-ary modulated digital communication systems. The overall design considerations and performance evaluations of various digital communication systems are emphasized. Prerequisites: EE 6349 or equivalent. (3-0) Y

EE 6355 RF and Microwave Communication Circuits (3 semester hours) Design of high frequency communication circuits. Prerequisite: EE 4368 or equivalent. (3-0) R

EE 6360 Digital Signal Processing I (3 semester hours) Analysis of discrete time signals and systems, Z-transform, discrete Fourier transform, fast Fourier transform, analysis and design of digital filters. Prerequisite: EE 3302 or EE 4361 or equivalent. (3-0) Y

EE 6361 Digital Signal Processing II (3 semester hours) Continuation of EE 6360. Includes advanced topics in signal processing such as: Digital filter structures and finite-word-length effects, digital filter design and implementation methods, multirate digital signal processing, linear prediction and optimal filtering, spectral analysis and estimation methods. Prerequisite: EE 6360. Co-requisite: EE 6350. (3-0) T

EE 6362 Speech Signal Processing (3 semester hours) Introduction to the fundamentals of speech signal processing and speech applications. Speech analysis and synthesis techniques. Speech recognition using hidden Markov models, speech enhancement and speech coding techniques including ADPCM and linear-predictive methods such as CELP. Prerequisites: EE 6350, EE 6360 and EE 6349. (3-0) T

EE 6365 Adaptive Signal Processing (3 semester hours) Adaptive signal processing algorithms learn the properties of their environments. Transversal and lattice versions of the Least Mean Squares (LMS) and Recursive Least Squares (RLS) adaptive filter algorithms and other modern algorithms will be studied. These algorithms will be applied to network and acoustic echo cancellation, speech enhancement, channel equalization, interference rejection, beam forming, direction finding, active noise control, wireless systems, and others. Prerequisite: EE 6349, EE 6350, EE 6360 and knowledge of matrix algebra (3-0) T

EE 6390 Introduction to Wireless Communications Systems (3 semester hours) Principles, practice, and system overview of mobile systems. Modulation, demodulation, coding, encoding, and multiple-access techniques. Performance characterization of mobile systems. MMIC and low-power mobile devices. Prerequisite: EE 4350 or equivalent. (3-0) Y

EE 6391 Signaling and Coding for Wireless Communications Systems (3 semester hours) Study of signaling and coding for mobile communication systems. Topics which will be covered include digital modulation schemes, digital multiple access technologies, their performance under wireless channel impairments, equalization, channel coding, interleaving, and diversity schemes. Prerequisites: EE 6352 and EE 6390. (3-0) T

EE 6392 Propagation and Devices for Wireless Communications (3 semester hours) Mobile communication fundamentals, models of wave propagation, simulation of electromagnetic waves in the cellular environment, multipath propagation, compensation for fading, mobile and cell antenna designs, problems of interference and incompatibility, design of active and passive cellular components, comparison of analog and digital cellular designs. Prerequisites: EE 4301 or equivalent, EE 6390. (3-0) T

EE 6394 Antenna Engineering for Wireless Communications (3 semester hours) Operating principles for microwave antennas used in modern wireless communications systems. Prerequisite: EE 6316 or equivalent. (3-0) T

EE 6395 Advanced Radio Frequency Engineering (3 semester hours) Sources, components, antennas, and detectors used in wireless communication systems. Microwave-frequency component technology. Propagation paths and their effects on communications. Prerequisite: EE 5305 or equivalent. (2-3) R


Computer Science Courses

CS 6352 Performance of Computer Systems and Networks (3 semester hours) Overview of case studies. Quick review of principles of probability theory. Queuing models and physical origin of random variables used in queuing models. Various important cases of the M/M/m/N queuing system. Little’s law. The M/G/1 queuing system. Simulation of queuing systems. Product form solutions of open and closed queuing networks. Convolution algorithms and Mean Value Analysis for closed queuing networks. Stochastic Petri Nets. Discrete time queuing systems. Prerequisite: a first course on probability theory. (3-0) S

CS 6354 Advanced Software Engineering (3 semester hours) Introduction to software life cycle models and overview of their stages. System and software requirements engineering, software architecture and design, software testing, validation, and verification, software quality assurance and metrics, software generation,
maintenance, and evolution, project planning, control, and management. Software processes, CASE tools, software reuse, reverse engineering, and re-engineering. Prerequisites: CS 5303, CS 5333; corequisite: CS 5343 (CS 5343 can be taken before or at the same time as CS 6354) (3-0) S

CS 6360 Database Design (3 semester hours) Methods, principles and concepts that are relevant to the practice of database software design. Topics such as file-system organization, database structure, schemata, database implementation, information retrieval and protection. Prerequisite: CS 5343. (3-0) S

CS 6363 Design and Analysis of Computer Algorithms (3 semester hours) The study of efficient algorithms for various computational problems. Algorithm design techniques. Sorting, manipulation of data structures, graphs, matrix multiplication, and pattern matching. Complexity of algorithms, lower bounds, NP completeness. Prerequisite: CS 5343. (3-0) S

CS 6368 Telecommunication Network Management (3 semester hours) In-depth study of network management issues and standards in telecommunication networks. OSI management protocols including CMIP, CMISE, SNMP, and MIB. ITU’s TMN (Telecommunication Management Network) standards, TMN functional architecture and information architecture. NMF (Network Management Forum) and service management, service modeling and network management API. Issues of telecommunication network management in distributed processing environment. Prerequisite: One of CS 5390, CS 6390, or CS 6385. (3-0) Y

CS 6378 Advanced Operating Systems (3 semester hours) Concurrent processing, inter-process communication, process synchronization, deadlocks, introduction to queuing theory and operational analysis, topics in distributed systems and algorithms, checkpointing, recovery, multiprocessor operating systems. Prerequisites: CS 5348 or equivalent; knowledge of C and UNIX. (3-0) S

CS 6381 Combinatorics and Graph Algorithms (3 semester hours) Fundamentals of combinatorics and graph theory. Combinatorial optimization, optimization algorithms for graphs (max flow, shortest routes, Euler tour, Hamiltonian tour). Prerequisites: CS 5343, CS 6363. (3-0) T.

CS 6385 (TE 6385) Algorithmic Aspects of Telecommunication Networks (3 semester hours) This is an advanced course on topics related to the design, analysis, and development of telecommunications systems and networks. The focus is on the efficient algorithmic solutions for key problems in modern telecommunications networks, in centralized and distributed models. Topics include: main concepts in the design of distributed algorithms in synchronous and asynchronous models, analysis techniques for distributed algorithms, centralized and distributed solutions for handling design and optimization problems concerning network topology, architecture, routing, survivability, reliability, congestion, dimensioning and traffic management in modern telecommunication networks. Prerequisites: CS 5343, CS 5348 and TE 3341 or equivalents. (3-0) Y

CS 6386 Telecommunication Software Design (3 semester hours) Programming with sockets and remote procedure calls, real-time programming concepts and strategies. Operating system design for real-time systems. Encryption, file compression, and implementation of firewalls. An in-depth study of TCP/IP implementation. Introduction to discrete event simulation of networks. Prerequisite: CS 5390. (3-0) Y

CS 6390 Advanced Computer Networks (3 semester hours) Overview of the ISDN network and the SS7 protocol. High-speed networks including B-ISDN, Frame Relay and ATM. Congestion control algorithms, quality of service guarantees for throughput and delay. Prerequisite: CS 5390. (3-0) S

CS 6392 Mobile Computing Systems (3 semester hours) Topics include coping with mobility of computing systems, data management, reliability issues, packet transmission, mobile IP, end-to-end reliable communication, channel and other resource allocation, slot assignment, routing protocols, and issues in mobile wireless networks (without base stations). Prerequisite: 6378 or CS 6390 or equivalent. (3-0) Y


CS 6396 Real-Time Systems (3 semester hours) Introduction to real-time applications and concepts. Real-time operating systems and resource management. Specification and design methods for real-time systems. System performance analysis and optimization techniques, task assignment and scheduling, real-time communication, case studies of real-time operating systems. Prerequisite: CS 5348 or equivalent. (3-0) Y

Telecommunications Engineering Courses

TE 5341 Probability, Statistics, and Random Processes in Engineering (3 semester hours) Introduction to probability modeling and the statistical analysis in engineering and computer science. Introduction to Markov chains models for discrete and continuous time queuing systems in Telecommunications. Computer simulations. Prerequisite: Undergraduate degree in engineering and computer science. (3-0)
Combination of Engineering and Management Graduate Degrees

Today’s graduates aspiring to assume managerial and leadership positions in high tech firms and research institutions must be knowledgeable in both the engineering and managerial dimensions of the position. In recognition of this growing reality, UT-Dallas offers a blend of courses allowing students to earn a combination of master's level degrees in both engineering and management. Specifically, graduates of this program will qualify to earn an M.S.E.E. degree in combination with an MBA, an M.S. or an M.A. degree in Management.

Faculty

The combination of master’s level degrees in both engineering and management are jointly administered by the faculty members in the Department of Electrical Engineering in the Erik Jonsson School of Engineering and Computer Science and the School of Management.

Objectives

The program of studies leading to the award of an M.S.E.E. degree by the Erik Jonsson School of Engineering and Computer Science in combination with one of the following master’s degrees, MBA, M.S. or M.A., offered by the School of Management, provides intensive preparation for engineers who seek knowledge and skills necessary to manage a technology firm. This program emphasizes both Electrical Engineering and Engineering Management, preparing students for a career in management and for holding leadership positions in engineering companies and research institutions. The program of studies is ideal for students interested in managing new technologies, from conceptualization and development to introduction and production.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

Student pursuing the M.S.E.E. degree in combination with and a master’s degree in management must meet the admission requirements for both graduate programs. For this program of studies, the School of Management will accept a competitive GRE performance in lieu of the GMAT.

Degree Requirements

The University’s general degree requirements are discussed on page 18.

Combination of M.S.E.E. and MBA graduate degrees

The combination of M.S.E.E. and MBA degrees can be earned by completing a minimum of 68 graduate hours beyond prerequisite courses. This includes a minimum of 24 hours of approved electrical engineering courses in combination with a minimum of 44 hours of approved management courses.
Students enrolled in this combination of M.S.E.E. and MBA degree programs are permitted to
• utilize a maximum of 9 credit hours from the approved list of management courses together with 12 hours of
approved elective EE courses to satisfy the required 21 hours of elective courses listed in the M.S.E.E. degree
requirements specified on page 160 and
• utilize a maximum of 9 credit hours from the approved list of EE courses together with 15 hours of approved elective
MBA courses to satisfy the 24 hours of elective courses listed in the MBA degree requirements
specifie

Students are required to meet all other core and elective requirements for the M.S.E.E. and MBA degrees
to obtain the combination of the M.S.E.E. with MBA graduate degrees.

Combination of M.S.E.E. with M.S. or M.A. graduate degrees

The combination of M.S.E.E. and M.S. or M.A. degrees can be earned by completing a minimum of 51
credit hours beyond prerequisites. This includes a minimum of 24 hours of approved electrical engineering courses
in combination with a minimum of 27 hours of approved management courses for each of these management
degrees.

Students enrolled in a combination of the M.S.E.E. and M.S. or M.A. degree programs are permitted to
• utilize a maximum of 9 credit hours from the approved list of management courses together with 12 hours of
approved elective EE courses to satisfy the required 21 hours of elective courses listed in the M.S.E.E. degree
requirements specified on page 160, and
• utilize a maximum of 9 credit hours from the approved list of EE courses in satisfying elective courses
requirements for the M.S. or M.A. degree requirements specified on page 212.

Students are required to meet all other core and elective requirements for the M.S.E.E. and M.S. or M.A.
degrees to obtain the combination of M.S.E.E. with M.S. or M.A. graduate degrees.

All students must have a graduate advisor in the electrical engineering department and a graduate advisor
in the management school who will advise on respective programs and approve a degree plan. The advising office
in each school will provide a detailed listing of approved courses. Courses taken without advisor approval may not
count toward the required credit hours. No degree will be awarded until the completion of all requirements, including
the requirement for the 68 or 51 credit hours for the M.S.E.E./MBA or M.S.E.E./M.S. or M.A. combinations
respectively. If a student chooses at a later time to pursue only one of the two degree programs, the student MUST
again seek admission into the degree program of the student’s choice and satisfy the requirements of that degree
program. Prior coursework relevant to the specific degree program will be transferred, provided the course
requirements have not changed.
Industrial Practice Programs

The Industrial Practice Programs (IP Programs or IPP) of the Erik Jonsson School of Engineering and Computer Science include the School’s Cooperative Education, Internship, and Curricular Practical Training programs. These programs combine classroom learning with paid work experience. Qualified students are referred to participating employers seeking candidates for career-related, pre-professional, work assignments. The programs enhance a student’s education and career preparation by integrating classroom theory with on-the-job performance; providing an understanding of work environments and professional requirements; testing career and professional goals; developing confidence, maturity, and skills in human relations; and establishing professional contacts and interests.

Students enroll in Engineering Computer Science Co-op (ECSC) courses during semesters when working on an IPP assignment. Students are expected to follow the rules of the IP Programs when working in a position titled by the employer as an Internship or a Cooperative Education assignment.

For more information about the IP Programs, call (972) 883-4363. The IP Programs are located in EC 3.706.

Engineering And Computer Science Co-Op Courses

Graduate
ECSC 5177 CS IPP ASSIGNMENT (1 semester hours) Work in an approved, supervised, computer science position. Students will complete an IPP Work Report including a written Narrative focusing on the accomplishments and learning gained through the IPP experience. May be repeated. Y

ECSC 5179 ENG IPP ASSIGNMENT (1 semester hours) Work in an approved, supervised, engineering position. Students will complete an IPP Work Report including a written Narrative focusing on the accomplishments and learning gained through the IPP experience. May be repeated. Y
SCHOOL OF GENERAL STUDIES

The Graduate Program in Interdisciplinary Studies, leading to the degree of Master of Arts in Interdisciplinary Studies, is designed for students who wish to continue their intellectual development within an interdisciplinary framework and for those with specialized training who wish to broaden their education. The objective of the program is to provide students the opportunity to develop an approach to topics and problems from the perspectives of more than one discipline and to develop a better understanding of many of the social, cultural, and scientific forces which affect the individual and society.

Teacher Development Center

The University offers opportunities in selected fields for teachers and other school personnel to earn advanced degrees, additional certification, and certificate endorsements.

Students wishing to pursue an advanced degree should consider programs leading to the Master of Arts in Teaching (M.A.T.) degree in Humanities, Science Education, or Mathematics Education. Students enrolling for one of these degrees should consult the appropriate subject area in this catalog. Students pursuing coursework leading to additional certificate endorsement or initial certification should seek counsel in the Teacher Development Center early in their programs of study. Tel: (972) 883-2730.

DEGREES OFFERED

Master of Arts in Interdisciplinary Studies
Graduate Instruction in Education
Faculty

All faculty in the university are eligible to participate.

Professors: George W. Fair, Karen J. Prager, Lawrence J. Redlinger
Associate Professor: Scherry F. Johnson, Erin A. Smith
Senior Lecturers: Susan P. Chizeck, Dachang Cong, Elizabeth M. Salter, Penny G. Sanders

Objectives

The Graduate Program in Interdisciplinary Studies, leading to the degree of Master of Arts in Interdisciplinary Studies, is designed for students who wish to continue their intellectual development within an interdisciplinary framework and for those with specialized training who wish to broaden their education. The objective of the program is to provide students the opportunity to develop an approach to topics and problems from the perspectives of more than one discipline and to develop a better understanding of many of the social, cultural, and scientific forces which affect the individual and society.

Admission Requirements

The University's general admission requirements are discussed on page 13.

For admission to the program, the student must have a bachelor's degree from an accredited institution, with a grade average of B or better. A verbal plus quantitative GRE score of 1000 (or equivalent examination) is advisable based on our experience with student success in the program. All students not meeting the above criteria are considered on an individual basis. A student who has a deficit in either GRE score or grade point average may be conditionally admitted to the program.

Degree Requirements

The University's general degree requirements are discussed on page 18.

For the degree of Master of Arts in Interdisciplinary Studies, 36 hours of course work must be completed. These hours are distributed as follows:

Interdisciplinary Seminars (3 hours)

In the first year the student must complete an interdisciplinary seminar (MAIS 5300, 5301 or 5305). The seminars are designed to introduce students to graduate work and to give them experience in interdisciplinary approaches to subjects and problems.

Core Requirements (9 hours)

From the graduate courses offered in this catalog, the student selects, in consultation with the adviser, at least three hours each from at least two of the following areas: Behavioral Sciences, which includes courses in Communication Disorders, Human Development, and selected courses in Education; Humanities, which includes Aesthetic Studies, History of Ideas, and Studies in Literature; Natural Sciences and Mathematics, which includes courses in Biology, Chemistry, Geosciences, Mathematical Sciences, Physics, and selected courses in Science Education; Social Sciences, which includes courses in Public Affairs; Management, which includes Management and International Management Studies; and Engineering and Computer Science.

Concentration (12 hours)

From the graduate courses offered in this catalog, the student selects, in consultation with the adviser, at least 12 additional hours of course work in one or two of the general areas listed above.

Electives (6 hours)

From the graduate courses offered in this catalog, the student selects, in consultation with the adviser, at least six semester hours of courses.
Capstone Seminar and Research Project (6 hours)

The seminar and project are the culmination of the student's program. The seminar includes readings in, and discussion of, interdisciplinary theory and preparation for the research project. Each student will develop a research topic which lends itself to an interdisciplinary approach. The topic should be sufficiently broad to draw upon knowledge and techniques gained throughout the program. To complete the project, students should synthesize and integrate information from various sources, utilizing different methodologies, and thus draw conclusions which present a new perspective on the topic as a result of this interdisciplinary approach.

Graduate Program in Interdisciplinary Studies

At the beginning of the degree program each student participates in a specially designed interdisciplinary seminar on topics related to the development of human beings and their world. At the end of the program, each student participates in a capstone seminar and completes an interdisciplinary research project. The remainder of the program is individually designed by the student, in consultation with the adviser, to meet particular personal interests and professional needs.

Course Descriptions

MAIS 5300 Interdisciplinary Seminar (3 semester hours) Topics will vary each semester. (May be repeated for credit.) (3-0) S

MAIS 5301 Seminar on Close Relationships (3 semester hours) An examination of the psychological, sociological, economic, and philosophical approaches to the study of close relationships. Specific issues that will be discussed include male-female differences, intimacy and self-disclosure, loneliness, conflict. (3-0) Y

MAIS 5302 Capstone Seminar (3 semester hours) Topics will vary. The seminar includes discussion of interdisciplinary theory and preparation for a research project. Must be taken in the student's next-to-last semester. (3-0) S

MAIS 5303 Research Project (3 semester hours) Completion of an interdisciplinary research project. Prerequisite: MAIS 5302. (Students on academic probation may not enroll for MAIS 5303.) (3-0) S

MAIS 5V04 Independent Study (1-6 semester hours) Available only to meet particular curricular needs of an individual degree plan. Prerequisite: consent of instructor and approval of MAIS adviser. (May be repeated for credit.) ([1-6]-0) S

MAIS 5310 Negotiation and Conflict Resolution (3 semester hours) An exploration of the dynamics of conflict resolution from the smallest of interpersonal disputes to those of global dimensions. Focus is on the evolution and employment of peaceful techniques for settling disputes and their substitution for the more violent forums of conflict resolution through force. (3-0) Y

MAIS 5311 Business and Competitive Intelligence (3 semester hours) Explores the acquisition of regular and sensitive information and the ethics of the means used to obtain and exploit it. As in many other spheres of human activity, while most of the information necessary to the making of useful informed business decisions lies within the public domain, what is required is a thorough understanding of the sources and the methods to exploit them since over the past two decades, the acquisition, storage and retrieval of all kinds of business intelligence have changed substantially. (3-0) Y

MAIS 5313 Doing Business in Greater China (3 semester hours). A study of Mainland China, Taiwan, and Hong Kong with the focus on economic development and current participation in the global economy. The course reviews the experience of multinational corporations and examines strategies of doing business in Greater China. The course also explores how the digital revolution reshapes the three economies. (3-0) R

MAIS 5320 Special Topics in Interdisciplinary Studies (3 semester hours) Topics will vary each semester. May be repeated for credit. (3-0) S

MAIS 5307 Ethics and Law (3 semester Hours) An exploration of the ethical foundations of the law and the institutions through which it is created and administered. It will examine the principles upon which our notions of justice rest and inquire how and why these fundamentals may have changed in our own times.

MAIS 5308 Law and Psychiatry (3 semester hours) Covers a wide-ranging field of subject matter in both law and medicine. The primary focus will be upon issues of public concern such as the death penalty; the causes of social and interpersonal violence; drug and alcohol abuse; aberrant sexual behavior; and the direction law and society might take on these and other issues.

MAIS 5316 Managing The Digital Economy (3 semester hours) Examines how the digital economy (chip-making, computing, IT services, and telecommunications) has transformed American business. Knowledge workers need to cultivate skills in leadership, communication, entrepreneurship, finance, and project/workplace management.
MAIS 5330 Human Relations and Motivation in the Corporate Arena I (3 semester hours) Addresses equal rights/opportunities of the individual, by law, in the workplace, via providing information, regarding compliance with all of the major laws that prohibit discrimination in employment. Laws to be covered: Sex Discrimination, Age Discrimination, National Origin Discrimination, Race Discrimination, Disability Discrimination, and the Civil Rights act of 1964 as amended.

MAIS 5331 Human Relations and Motivation in the Corporate Arena II (3 semester hours) Second course in two-part session. Addresses equal rights/opportunities of the individual, by law, in the workplace, via providing information, regarding compliance with all of the major laws that prohibit discrimination in employment.

Graduate Instruction in Education

http://www.utdallas.edu/teach

Associate Dean of School of General Studies and Director for Teacher Development: Scherry F. Johnson

Faculty

Professors: George W. Fair, Dean of School of General Studies

Associate Professors: Scherry F. Johnson, Associate Dean and Director

Senior Lecturers: Patricia Leek, Angela McNulty, Nancy Van, Rebekah K. Nix, Candice Chandler, Penny Sanders

Post-Baccalaureate Program for Teacher Certification

Persons who already have baccalaureate degrees may seek teacher certification. They should consult with an advisor in the Teacher Development Center to develop a certification plan after they have been admitted to the university through the Office of Admissions. Post-baccalaureate students may complete the required 18 semester hours of professional education course work at the graduate level and apply most of these hours toward a Master of Arts in Interdisciplinary Studies degree, or they have the option of taking many of these courses at the undergraduate level if they do not wish to pursue a master’s degree. See the U.T. Dallas Graduate Catalog for details.

Post-Baccalaureate students must meet the 24 semester hours requirement in the appropriate teaching field. A certification plan will be developed based on an evaluation of the student's transcript. When appropriate, students may take the required courses in their teaching field(s) at the graduate or undergraduate level. Post Baccalaureate students must demonstrate computer literacy, effective public speaking, and complete 12 semester hours of English. All students must fulfill the U.T. Dallas requirements for student teaching or supervised internship.

See the website – www.utdallas.edu/teach for the most current information and course requirements.

Graduate Degrees

Individuals pursuing an advanced degree should consider programs leading to a Master of Arts in Interdisciplinary Studies degree in the School of General Studies or the Master of Arts in Teaching degree in Humanities, Mathematics Education, or Science Education. The M.A.T. is aimed at developing a master teacher whose competence in the discipline is enhanced by the ability to create an effective teaching environment. Certification requirements may also be used to fulfill some graduate degree requirements. Requirements for the M.A.T. degree may require additional professional education course work. Interested students should contact an advisor in the School of Arts and Humanities or Science/Mathematics Education or School of General Studies.
### Course Descriptions

**ED 5300 Teaching English Language Arts and Reading in Grades 8 – 12** (3 semester hours) Developing appropriate teaching strategies and curriculum units in English and Language Arts for grades 8-12. Curriculum tracks Texas Essential Knowledge and Skills. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) S

**ED 5305 Teaching of Science** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Science for Grades 4-12. Curriculum tracks Texas Essential Knowledge and Skills. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) Y

**ED 5306 Teaching Mathematics in Secondary Schools** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Mathematics for grades 8-12. Curriculum tracks Texas Essential Knowledge and Skills. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) Y

**ED 5307 Teaching of History and Social Studies** (3 semester hours) Developing appropriate teaching strategies and curriculum units in History and Social Studies for grades 8-12. Curriculum tracks Texas Essential Knowledge and Skills. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) Y

**ED 5310 (MATH 5310) Seminar: The Teaching of Mathematics** (3 semester hours) Selection and analysis of concepts appropriate to various topics in mathematics taught in schools and community colleges. Prerequisite: One year of teaching experience in Mathematics or consent of instructor. (3-0) Y

**ED 5314 Science Methods for the Middle School Grades 4-8** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Science for grades 4-8. Curriculum tracks Texas Essential Knowledge and Skills for these grades. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) R

**ED 5315 Math Methods for the Middle School Grades 4-8** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Math for grades 4-8. Curriculum tracks Texas Essential Knowledge and Skills for these grades. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) Y

**ED 5316 Language Arts Methods for Middle School Grades 4-8** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Language Arts for grades 4-8. Curriculum tracks Texas Essential Knowledge and Skills for these grades. A minimum of 20 clock hours of field experience is required and prerequisite for a grade. (3-0) Y

**ED 5311 Science Methods – EC– 4** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Science for grades EC - 4. Curriculum tracks Texas Essential Knowledge and Skills for these grades. (3-0) R

**ED 5312 Math Methods – EC– 4** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Math for grades EC - 4. Curriculum tracks Texas Essential Knowledge and Skills for these grades. (3-0) R

**ED 5313 Language Art/Social Studies Methods – EC-4** (3 semester hours) Developing appropriate teaching strategies and curriculum units in Language Art/Social Studies for grades EC – 4. Curriculum tracks Texas Essential Knowledge and Skills for these grades. (3-0) R

**ED 53XX Supervised Teaching Internship** (3 semester hours) Students are hired by a partner school district as a teacher of record with university supervision, workshops, and mentoring during the two semesters they are enrolled in this course. Prerequisite: Admission to internship program. Student will also enroll in ED 53XX the second semester of the Internship. Prerequisite – passing scores on both state required TExES examinations. (3-0) Y

**ED 53XX Supervised Teaching Internship II** (3 semester hours) The second semester of supervised teaching internship. Prerequisite: successful completion of ED 53XX (3-0) Y

**ED 5630 Supervised Teaching Internship** (6 semester hours) Students are hired by a partner school district as a teacher of record with university supervision, workshops, and mentoring during the semester they are enrolled in this course. Prerequisite: Admission to internship program. (6-0) S

**ED 5320 (Online Only) Issues in Educational Technology** (3 semester hours) This course addresses two key technological issues that directly impact education: information overload and nonlinear processing. These same challenges offer the key to effective design and integration of web-based media into the classroom learning environment. Teachers, administrators, researchers and curriculum developers will learn how to select/apply appropriate tools to enhance classroom teaching and school management. (3-0) Y

**ED 5343 Issues-Educating Gifted Persons** (3 semester hours) This course addresses educators’ need to identify giftedness in students, explore techniques for helping students deal with their “gifts” and limitations, and understand and develop differentiated instruction in schools. (3-0) Y
ED 5344 (Online Only) Chess I: Introduction (3 semester hours) A consideration of methods for using chess to teach critical thinking, math, and reading skills in the elementary classroom, based upon the curricular model developed by McNeil. This course is also appropriate for chess instructors who wish to incorporate additional academic and humanistic goals into their programs. No previous knowledge of chess is required. This course is offered exclusively through distant learning delivery via the UT TeleCampus. www.telecampus.utsystem.edu (3-0) R

ED 5345 (Online Only) Chess II: Institutional and Cultural Contexts of Chess (3 semester hours) A consideration of the cultural role of chess as a combination of game, art, sport, and science using the interdisciplinary methods of arts and humanities. This course will also explore practical resources for teachers from local and national chess organizations, foundations, and associations. No previous knowledge of chess is required. The course is offered exclusively through distance learning delivery via the UT TeleCampus. www.telecampus.utsystem.edu (3-0) R

ED 5370 Classroom Management (3 semester hours) Designed to expand the skills of teachers and prospective school leaders with conceptual and human-interaction skills necessary for classroom and school improvement. Emphasis on innovative school reform and classroom management. (3-0) R

ED 5V01 Independent Study (1-6 semester hours) (May be repeated for credit.) ([1-6]-0) R

ED 5V02 Special Topics in Education (1-3 semester hours) (May be repeated for credit to a maximum of 9 hours.) ([1-3]-0) R

ED 5317 History and Philosophy of American Public Schools (3 semester hours) Survey of the history and philosophies that serve as the foundation for the contemporary American public school; general laws and governance structures that manage this system and the role of the teacher in the system. Mandatory 20 hours of field experience associated with this class and prerequisite for a grade. (3-0) Y

ED 6307 Planning Administration (3 semester hours) Foundational course for school leadership. Study ways that planning and governance are informed by data collection, analysis, and information-use strategies in order to improve schools and school systems. (3-0) R

ED 6323 School Law (3 semester hours) Legal basis for organizing and administering public school systems; statutes and court decisions affecting educational functions. (3-0) R

ED 6326 Public School Finance (3 semester hours) Study of the financial basis for public education and the policy and political environments in which financial support is developed and administered. (3-0) R

ED 6V01 Special Topics in Education (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S
English as a Second Language

English as a Second Language Supplemental Certificate can be added to existing elementary, secondary, or all-level certificates, to Grade EC-4 Generalist or the Grades 4-8 Generalist Certificates, or to Grades 4-8 or Grades 8-12 Content Area Certificates.

ED 5353 (HUED 5353) Teaching English as a Second Language (3 semester hours) The investigation of modern techniques of teaching English to speakers of other languages. Students will develop materials relating to language learning, language testing, and analyzing differences among languages. (3-0) Y

(Choose One)
HUSL 7384 The Nature of Language or COMD 6317 Language & Linguistics Y
HUSL 7385 Applied Linguistics Y

(Choose One)
HCS 6368 Language Development or COMD 6307 Language Acquisition Y
The School of Management was established in 1975 as the academic unit responsible for (1) the Master of Science (M.S.) degree in Management and Administrative Sciences; (2) the Master of Arts (M.A.) degree in International Management Studies; (3) the Doctor of Philosophy (Ph.D.) degrees in Management Science and in International Management Studies; and (4) an upper-division program leading to a Bachelor of Science (B.S.) degree in Business Administration.

The School added a Master of Business Administration (MBA) degree in 1983, and in 1992, in conjunction with U.T. Dallas’s expansion to include a full undergraduate program, lower-division instruction was initiated. The Master of Science in Accounting started in 1994 and the name changed to Master of Science in Accounting and Information Management in 2001. In 1996, the School added the Cohort MBA, a full-time MBA program in which students take all of their courses together in a fixed sequence. In 1997, the School formed a strategic alliance with The University of Texas Southwestern Medical Center at Dallas to offer a Master of Science in Medical Management. The program is open to physicians and senior healthcare administrators.

Since its inception, the School of Management has offered a range of degree options and program formats designed to serve the diverse needs of a student population primarily composed of working adults, but also including traditional full-time graduate students and, more recently, residential undergraduate students.

The graduate programs in the School of Management stress the theory and use of applied sciences for successful management and administration of private and public institutions. Courses provide an opportunity to gain integrated and detailed knowledge of the functional areas of management as well as analytical tools for effective appraisal and decision making. Seminars and research on specific projects are designed to develop creativity and to stimulate the student toward an integrated application of the acquired knowledge.

With over 25 years of operating history and with the rapid development in the “Telecom Corridor” area surrounding the campus, U.T. Dallas’s School of Management has become a major provider of management education to many global corporations.

The School of Management’s mission is to meet the challenges of a rapidly changing, technology-driven, global society by partnering with the business community to:

- deliver high quality management education to a diverse group of undergraduate and graduate students and practicing executives;
- develop and continuously improve programs advancing management education and practice;
- and conduct research enhancing management knowledge.

The School creates enduring knowledge for a changing world. Grounded in research and experience, our educational programs provide the managerial and technical skills to address evolving business challenges.

DEGREES OFFERED
Master of Arts in International Management Studies (M.A.)
Master of Business Administration (MBA)
Master of Science in Accounting and Information Management (M.S.)
Master of Science in Information Technology and Management (M.S.)
Master of Science in Management and Administrative Sciences (M.S.)
Master of Science in Medical Management (M.S.)

Doctor of Philosophy in International Management Studies (Ph.D.)
Doctor of Philosophy in Management Science (Ph.D.)

Medical Management (Certificate)
Project Management (Certificate)
Faculty


Assistant Professors: Jayatirtha Asundi, Nina Baranchuk, Indranil Bardhan, Norris Bruce, Metin Cakanyildirim, Octavian Carare, Zhonglan Dai, Kutsal Dogan, Laurel Franzen, Umit Gurun, Nanda Kumar, Mark Laplante, Seung-Hyun Lee, Xu Li, Xiaohui Liu, Holly Lutze, Nirup Menon, Syam Menon, Volkmar Muslu, Hyeun-Suk Rhee, Andrei Strijnev, Rafal Szwejkowski, Mark Vargus, Davina Vora, Wei Yue, Alejandro Zentner, Qin Zhang

Senior Lecturers: Art Algunek, Jasper Arnold, George Barnes, Abhijit Biswas, Ron Blair, Tiffany Bortz, Mary Chaffin, Anne Ferrante, Richard Fisher, Mary Beth Goodrich, David Heroy, Robert Hicks, Jonathon Hochberg, Marilyn Kaplan, Peter Lewin, Diane McNulty, Radha Mookerjee, Kumar Nair, Joseph Picken, Carolyn Reichert, Robert Robb, Mark Salamisick, Michael Savoie, Charles Solcher, Lou Thompson, Amy Troutman, Habte Woldu, Laurie Ziegler

Clinical Faculty: Joachim Adler, Alain Bensoussan, Tevfik Dalgic, John McCracken, Steve Perkins, Michael Oliff, Divakar Rajamani

Visiting Faculty: Celal Aksu, Usman Ghani, Fang Wu, Yuanping Ying

Objectives

The Master of Business Administration degree provides students with a broad managerial education drawing from all business disciplines. It is obtained by completing the program course requirements of 53 hours beyond the prerequisites. U.T. Dallas offers several distinct approaches to obtaining an MBA. These include (1) the Cohort MBA Program, a full-time program in which students are admitted as a group each Fall and take their required classes together in a fixed sequence, (2) the Professional MBA Program for students attending school part-time, with classes largely meeting in the evening, and (3) the Global MBA Online with all core and elective courses available by distance learning, online.

Each of these MBA programs consists of 29 hours of required core courses and 24 hours of elective course work, which may include an optional concentration in a selected area of business study. Courses in the Global MBA Online use audio streaming lectures supported by downloadable presentations, online text-based conferences, bulletin board and e-mail exchanges, and teleconferences.

The M.A. in International Management Studies degree provides knowledge of and training in international management, which includes trade across national boundaries, management practices within foreign nations, and management on a global basis. The program provides students the opportunity to learn in-depth the fundamentals of (1) functional areas of management, (2) international management, and (3) cultural, sociopolitical, and geographical constraints affecting international business decisions. In the past, the School has organized study abroad opportunities in Russia, China, Hong Kong, Singapore, Vietnam, Thailand, Indonesia, and India. Foreign study courses, usually offered between semesters, vary in length from two to three weeks and are generally taken as part of an Area Studies course. Many classes for this degree must be taken via distance learning.

The M.S. in Accounting and Information Management provides a tailored educational experience that encourages (1) a globally-oriented, interdisciplinary focus, (2) a balanced conceptual and pragmatic approach, (3) development of written and oral communication skills, (4) a refinement of research and analytical skills that results in enhanced decision-making abilities, and (5) a commitment to life-long learning. The Accounting and Information Management Program is a leader in developing the professional skills that are needed for the core services identified by the Institute of Certified Public Accountants as being fundamental to the future of the profession. Students are offered a choice among seven concentrations that relate to these core services including financial planning and analysis, assurance services, taxation services, international services, management consulting, software management and information management. Upon completion of the M.S. in Accounting and Information
Management, students may sit for the Uniform CPA Examination, provided they meet the educational requirements. Students can pursue a curriculum designed for careers in auditing and tax services, or a curriculum designed for contemporary information and software management careers.

The M.S. in Information Technology and Management bridges the gap between the pure information technologist and the business professional. By providing a technology intensive program with a business focus, the program prepares graduates to apply information technology to business problems and create efficient and effective solutions. The 36 hour degree consists of 9 hours of business core courses, 12 hours of information technology foundation courses, 9 hours of concentration courses, and 6 hours of approved electives. Three concentrations are available (1) Information Technology Management and Consulting (2) E-Business Technology and (3) Telecommunications Management. In this program, students will acquire not only fundamental knowledge of business management and decision-making, but also highly specialized professional knowledge in information systems development, IT-based business models, managerial issues in IT design, and IT adoption and diffusion.

The M.S. in Management and Administrative Sciences degree provides students the opportunity for specialized education in a specific management discipline built upon a core of business courses. It is obtained by completing the program course requirements of 36 hours beyond all prerequisites. The program consists of 10 hours of business core courses, 12 to 18 hours of specified concentration courses and the remaining hours as elective courses. The concentration areas include (1) Finance (2) Electronic Commerce, (3) Organizations and Strategy, (4) Supply Chain Management, (5) Innovation and Entrepreneurship and (6) Healthcare Administration. The classes for this degree are largely offered in the evenings.

The evening programs, MBA, M.A., and M.S., serve primarily employees of the companies in the Dallas/Fort Worth Metroplex. The daytime, full-time, Cohort MBA program enrolls students selected from local, national, and international applicants. The Global MBA Online serves students seeking a flexible schedule or who live too far from campus as well as students emphasizing international management and information technology. The School of Management also offers Executive Education degree programs. Executive Education MBA programs are offered for students with several years of experience. These include (1) the Executive MBA Program with classes meeting for two days (Friday and Saturday) every other week, (2) the Project Management Executive MBA that emphasizes managing complex projects, (3) the Medical Management Executive MBA for physicians and healthcare administrators interested in learning how to improve the management of their organizations, and (4) Global Leadership Executive MBA primarily delivered by distance learning with a focus on international management. Students in Executive Education programs are assessed program related fees beyond those charged to other graduate students to cover the additional costs of unique scheduling, events, and services associated with these programs. Each of these programs requires 53 credit hours to graduate.

In addition, the Executive Education M.S. in Medical Management prepares physicians and senior healthcare administrators with the critical business skills they need to improve the leadership and management of their healthcare organizations. The program is jointly taught by faculty from The University of Texas at Dallas School of Management and The University of Texas Southwestern Medical Center at Dallas. The 36 credit hour program consists of eight residential classes plus a self-directed field study. Classes are taught in focused, 4 ½ day sessions, with a different class offered every two months. The program in Medical Management is supported entirely by participant fees. For information about fees, contact the program office (972-883-4635).

Leaders in high tech firms often need expertise in both engineering and management. Through a unique combined master’s level degree program, graduate students may earn an M.S.E.E. degree from the Jonsson School of Engineering and Computer Science in combination with an MBA, an M.S. or an M.A. degree from the School of Management. This combined degree program is ideal for students interested in managing new technologies, from conceptualization and development to introduction and production. Students must meet the admission requirements in both schools and have an advisor in both schools. The combination of M.S.E.E. and MBA degrees can be earned by completing a minimum of 68 graduate hours, compared to 86 hours if completing the two degrees separately. The combination of M.S.E.E. and M.S. or M.A. degrees can be earned by completing a minimum of 51 credit hours beyond prerequisites, compared to 69 hours if completing the two degrees separately. See the Electrical Engineering section for details.

The Ph.D. in International Management Studies provides the opportunity to conduct research in the analysis of international business, emphasizing a strong foundation in theory and research in organizations and strategy. International Management Studies focuses on the analysis of organizations, industries, and markets as interdependent systems, stressing structural, strategic, environmental, and international considerations and their implications for management. Topics such as organizational design and change, corporate strategy, multinational management, technological and industrial development, and managerial decision making are examined using theories and empirical methods drawn from sociology, economics, political science, anthropology, psychology,
demography, statistics, and computer science.

The Ph.D. in Management Science provides the opportunity to conduct research in a functional business area to contribute to the knowledge in that field with respect to its intellectual content or professional practice. The School of Management defines Management Science as the use of economics, behavioral science, mathematics, and statistics, to conduct rigorous scientific research. It encompasses both theory and empirical analysis. Management Science embraces areas of specialization like marketing, finance, accounting, organizational behavior, management strategy and public policy, and decision sciences. It has no clear boundaries among the various areas, and places emphasis on science and is not constrained by the culture of individual disciplines. It is this underlying orientation of science and integration that distinguishes Management Science from other philosophies and approaches to the study of management.

Both doctoral programs offer preparation for academic and/or research positions in universities, with organizations such as the World Bank, and in industry, both in the United States and in other countries.

Facilities
The School of Management is located in a new facility at the corner of University Parkway and Drive A. This 200,000 square foot building opened in the Fall of 2003. The three wings, arranged around a courtyard, provide classrooms, meeting rooms, and office space. State-of-the-art wireless access to the internet will be available throughout the facility.

Admission Requirements to Master’s Programs
The University’s general admission requirements are discussed on page 13.

Evening and Online programs (MBA, Global MBA Online, M.A., M.S.)
Admissions to the evening programs are based on a holistic consideration of the applicants’ record. The following factors are considered in arriving at an admission decision:
• a bachelor’s degree from an accredited institution in the United States, or its equivalent, as determined by the Dean of Graduate Studies,
• international applicants must submit a TOEFL score of at least 550 on the paper test (or 215 on the computerized test) that is less than two years old,
• undergraduate GPA, calculated on the last 60 hours of academic course work,
• honors and achievements,
• personal essay outlining academic interests and goals
• letters of recommendations (3),
• work experience,
• competitive GMAT/GRE performance based on a score that is less than seven years old
• personal characteristics that add to the diversity of the class, such as country of citizenship, gender, multilingual skills, involvement in extracurricular and community activities and socioeconomic history.

Applications are due in the Admissions Office 90 days prior to registration for international students and 45 days prior to registration for all other students. Students are admitted 3 times per year and can start their studies during any one of the three semesters.

Students may apply for the Dean’s Excellence Award which provides financial support in the form of scholarships. A limited number of teaching assistantships are also available.

The Global MBA Online has the same admission requirements and tuition as the traditional MBA. And the Online program follows the same academic calendar as the rest of the University. These students receive priority registration for online courses.

Cohort MBA program: In addition to the factors required for admission to the evening programs, admission to the full-time, Cohort MBA program requires the capability to perform well in a fast-paced, team-oriented curriculum. Applicants are admitted based on a composite evaluation of the submitted measures of performance which include the GMAT, GPA, recommendation letters, and work experience, as well as initiative and interest suggested through essays. The Admission Committee seeks academic and professional excellence. Applications completed by May 1 will be considered for financial support. International applications are due June 1 and domestic applications by July 1. Students are admitted each fall.

Executive MBA program: Admissions are based on academic transcripts, a personal essay, letters of recommendation, and knowledge of elementary calculus and basic financial accounting. Also, approximately 10 years of business experience with relevant managerial experience, the ability to use a DOS-based personal
computer, with Windows, for word processing and spreadsheets (possession of a laptop computer with modem and Internet access is required), and corporate endorsement and support in the case of employed participants. The GMAT is encouraged, but not required. Applications are due by June 30, and students are admitted each fall.

**Master of Science in Medical Management:** For Physicians - MD or DO degree from an accredited school of medicine or school of osteopathy and a copy of a state medical license. Admission to the Master of Science program requires medical school and undergraduate transcripts. For Senior Healthcare Administrators – To be considered for admission, an administrator is required to have seven years of professional work experience in a U.S. healthcare organization. Additional requirements are: a baccalaureate degree with an undergraduate GPA of 3.0 or higher; evidence of the ability to successfully perform graduate level work, by holding either a Master’s degree or higher from a U.S. accredited college or university or by providing a GMAT score; two confidential letters of reference from professional colleagues; a written statement of professional objectives; and a personal or telephone interview at the option of the program director.

Students may be admitted as non-degree seeking students. To be admitted as a non-degree seeking student, students will have to meet all the admission requirements specified for degree seeking students including relevant test scores (GMAT/GRE, TOEFL). Students who want to switch to degree-seeking status, will have to apply to the degree program. If they are admitted, at most six credits taken as a non-degree seeking student can be transferred to the degree program.

Conditional acceptance to the School may be granted with the recommendation of the Admissions Committee and the concurrence of the Dean of Graduate Studies. At the time of their acceptance, the students will be informed of the conditions they need to satisfy to become regular students. The students can be in conditional status for only one semester and need to fulfill the stipulated conditions by the end of the semester. Conditionally accepted students will be restricted to:
- taking at most six credits during the semester,
- enrolling in courses from a pre-specified list.

**Substitutions and Transfers of Credit**

Substitutions of program requirements may be granted in recognition of previous coursework taken in a specific business program area. Substitutions are approved by the appropriate Program Director through a process which allows a student to skip a core course and take the next higher level course in that area with no reduction in the overall program hour requirements.

Transfers of credit may be granted for equivalent graduate coursework taken at other universities with a grade of B or better within the past six years. The appropriate Program Director initiates such transfers which must be approved by the Dean of Graduate Studies. The total number of transfers of credit toward the completion of a master’s degree cannot exceed twelve hours toward the M.A. and M.S. degree, and fifteen hours toward the MBA degree.

Applications for approval of substitutions and transfers of credit may be obtained in and submitted to the School of Management Advising Office.

**Prerequisites for Graduate Programs**

Knowledge of calculus and competence in personal computing are requirements for the programs. Students who have not completed an undergraduate calculus course at the level of MATH 1325 or higher may satisfy the prerequisite by completing MATH 5304 Applied Mathematical Analysis for Non-majors. Competence in personal computing may be demonstrated in one of three ways: having completed BA 3351 with a grade of B or better, having completed an equivalent course at another university with a grade of B or better, or verifying to the Advising Office that the skills and knowledge equivalent to BA 3351 have been obtained by experience. Degree credit is not earned for program prerequisites; however, the grade achieved in MATH 5304 will count toward the student’s grade point average. For the M.A. in International Management Studies, FIN 6301 has a prerequisite of OPRE 6301, its equivalent, or consent of instructor. Prerequisites must be satisfied within the first twelve hours of graduate study as a degree-seeking student.
Master of Science in Accounting and Information Management

Degree Requirements
The University’s general degree requirements are discussed on page 18. At least 36 hours of the management course work beyond prerequisite courses is required, including 12 hours of basic business core courses and 24 hours of graduate accounting and information management courses. The M.S. in Accounting and Information Management degree is designed for students both with or without previous educational background in accounting and business. Within the M.S. in Accounting and Information Management degree program, the candidate may select one of seven concentrations based on their previous experience and future aspirations. Concentrations include (I) Financial Analysis, (II) Audit and Professional, (III) Taxation, (IV) Managerial, (V) Information Management, (VI) International, and (VII) Internal Audit. Students must maintain a 3.0 grade point average in both core courses and in aggregate to qualify for the M.S. in Accounting and Information Management degree.

Basic Business Core (12 credit hours)
Each candidate must satisfactorily complete the following three courses.
AIM 6344 Financial Statement Analysis
MECO 6303 Business Economics
OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business

And complete one of the following two courses
AIM 6343 Accounting Information Systems
OPRE 6302 Operations Management

Accounting Foundation* (9 hours)
Each candidate must satisfactorily complete the following three accounting foundation courses:
AIM 6330 Intermediate Financial Accounting I
AIM 6332 Intermediate Financial Accounting II
AIM 6341 Planning, Control, and Performance Evaluation
* students that have already taken foundation courses (or their undergraduate equivalents) may replace them with AIM electives

(I) Financial Analysis Concentration (15 hours)
AIM 6333 Advanced Financial Reporting
AIM 6334 Auditing
AIM 6345 Business Valuation
AIM 6346 Financial Dimensions of Mergers and Acquisitions
AIM 6351 Individual Taxation

(II) Audit and Professional Concentration (15 hours)
AIM 6333 Advanced Financial Reporting
AIM 6334 Auditing
AIM 6351 Individual Taxation
AIM 6352 Corporate Taxation
AIM 6377 Corporate Governance and Accounting

(III) Taxation Concentration (15 hours)
AIM 6334 Auditing
AIM 6351 Individual Taxation
AIM 6352 Corporate Taxation
AIM 6354 Partnership Taxation
AIM 6356 Tax Research
(IV) Managerial Concentration (15 hours)
AIM 6333 Advanced Financial Reporting
AIM 6334 Auditing
AIM 6342 Strategic Cost Management
AIM 6347 Current Topics in Advanced Cost Management
AIM 6351 Individual Taxation

(V) Information Management Concentration* (15 hours)
AIM 6336 Information Technology Audit and Risk Management or AIM 6338 Integrated Accounting Information Systems Analysis and Design**
AIM 6347 Current Topics in Advanced Cost Management
AIM 6349 Corporate Information Technology Strategy and Management
AIM elective
AIM elective
* the IT security and Enterprise System course-sets can be followed in this concentration
** course not chosen may be used as elective

(VI) International Services Concentration (15 hours)
AIM 6342 Strategic Cost Management
AIM 6362 International Accounting
AIM 6377 Corporate Governance and Accounting
AIM elective
AIM elective

(VII) Internal Audit Concentration (15 hours)
AIM 6336 Information Technology Audit and Risk Management
AIM 6380 Internal Audit
AIM 6383 Forensic Accounting Investigations or AIM 6384 Analytical Reviews Using Audit Software
AIM guided elective**
AIM guided elective**
* course not chosen may be used as elective
** to be approved by Director of Endorsed Internal Audit Program

Additional information about courses within each concentration may be obtained in the SOM advising office as well as information about the requirements for the CPA exam.
Master of Business Administration

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The MBA degree is obtained by completing a 53-hour program beyond prerequisite courses (see section above) consisting of 29 hours of core courses and 24 hours of elective courses. At the option of the student, a concentration may be developed by taking a set of electives related to an area of interest. Students may obtain further information about these concentrations from the School of Management Advising Office.

Students must maintain a 3.0 grade point average in both core courses and in aggregate courses to qualify for the MBA degree.

Core Courses (29 hours)
Each candidate must satisfactorily complete the following core of 11 courses.
AIM 6201 Financial Accounting
AIM 6202 Managerial Accounting
BPS 6310 Strategic Management
FIN 6301 Financial Management
IMS 5200 Global Business
MIS 6204 Information Technology and MIS Fundamentals
MECO 6303 Business Economics
MKT 6301 Introduction to Marketing Management
OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business
OPRE 6302 Operations Management
OB 6301 Organizational Behavior

Elective Courses (24 hours)
Each candidate must also complete an additional 24 hours of elective graduate course work. Students may develop a concentration within the 24 hours of electives, but are not required to do so. Students cannot include more than 15 hours in any single functional area (demarcated by the area prefix) beyond the required core courses. A student may elect to submit a Master’s thesis, which counts as three elective credit hours.

Concentrations are informal collections of electives that address a student’s educational goals. A concentration may be aligned with functional area specialties, or may cut across functional areas. Students are encouraged to develop their concentration with the help of a faculty member, area coordinator, or the Advising Office. Typical concentrations include:

Accounting and Information Management: In today’s global and technology-driven environment, managers need skills to effectively analyze accounting information and make value-enhancing decisions. Students may select accounting and information management (AIM) courses to concentrate in financial analysis, consulting, corporate governance and tax management.

Finance: Prepares students for careers in corporate finance, investment management, or the management of financial institutions. The curriculum emphasizes creative solutions to business financing problems, the development of value maximizing investment and financing strategies, and the analysis and management of fixed income and equity investments. Students may choose to concentrate in either corporate financial planning or the analysis of financial securities and investment portfolios.

Information Systems: Information Technology permeates all aspects of modern business and our courses will enable you to make the most of information technology to solve business problems and gain strategic advantage. We also provide advanced courses for students who wish to be on the “supply” side of information technology in the areas of IT consulting, software management, and e-business.

Operations Management: Learning how to use operations effectively to create and sustain competitive advantages. Students gain a deeper and analytical understanding of how challenges posed by a fast and continuously developing business environment can be morphed into profit-making opportunities. Effective integration of various parties (suppliers, factories, stores) and various functional areas (marketing, finance, procurement) is an important theme. In particular, incentives, contracts and information technologies fostering collaboration among financially independent parties are emphasized.
Marketing: Learning to satisfy the needs of a firm’s customers while making a profit. In order to do that, one must not only understand customers’ needs and purchase behaviors but also understand the competition. This knowledge helps a manager develop an effective marketing strategy. Then one needs to learn to develop new products successfully, and manage the different brands, and product categories. In managing products, students can acquire expertise in pricing, in advertising and promotions, in market research, and in retailing strategies. In addition, students can learn about recent developments on the Internet and its effect on marketing and business.

Strategic Management: This concentration focuses on corporate level strategic management, including implementation of strategic designs; top management team leadership; the strategic implications of the social, governmental, technological, and international environments; organization structuring; and strategic alliances. Students will learn how to integrate accounting, finance, economics, and organization theory to create sustainable competitive advantage.

Leadership in Organizations: The leadership concentration is designed to prepare students for upper management positions through the study of the psychological, sociological, and organizational behavior disciplines. The program provides a foundation of leadership theory, building and problem solving in interpersonal work relationships, group dynamics, organizational decision making and change, and ethics.

International Management: In this concentration, students will take a multi-disciplinary approach to the study of international management, with courses in finance, marketing, strategic management, and the legal and cross-cultural differences that effect business. This course of study will prepare students for careers in international industries.

Innovation and Entrepreneurship: Focused on the processes of technological innovation in both large and small organizations, this multidisciplinary sequence of courses seeks to prepare students for successful careers either as principals or key functional managers in emerging growth firms, or as leaders of technological innovation in established firms. These concentrations include three required and two elective courses in the field.

Healthcare Administration: The primary goal of this concentration is to prepare students for leadership positions in healthcare organizations. The healthcare concentration is cross-functional and industry focused. Courses will contain cases, projects, and assignments that are centered around applying management skills to healthcare issues and organizations. Classes are taught by School of Management faculty and healthcare executives who bring special expertise and experience to the program.

Master of Arts in International Management Studies

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The M.A. degree is obtained by completing satisfactorily a 36-hour program beyond prerequisite courses for School of Management graduate programs. The program provides students the opportunity to learn in-depth the fundamentals of (1) functional areas of management, (2) international management, and (3) cultural, sociopolitical and geographical constraints affecting international business decisions. It also provides educational opportunities for the student with non-business undergraduate training to prepare for a career in the management of international trade and industry.

The School of Management encourages all students studying for the M.A. degree to master one foreign language. However, equally important is direct experience of business practices in a foreign country. In the past, U.T. Dallas has organized study abroad opportunities in Russia, China, Hong Kong, Singapore, Vietnam, Thailand, Indonesia, and India. Foreign study courses, usually offered between semesters, vary in length from two to three weeks and are generally taken as part of an Area Studies course.

Students must maintain a 3.0 grade point average in both core courses and in aggregate courses to qualify for the M.A. degree.

Business Core Courses (8 hours)
AIM 6201 Financial Accounting
MKT 6301 Introduction to Marketing Management
FIN 6301 Financial Management
International Management Core Courses (17 hours)
The following 4 courses:
IMS 5200 Global Business
IMS 6310 International Marketing Management
IMS 6360 International Strategic Management
IMS 6365 Cross Cultural Communications and Management

Plus 6 hours from the following:
IMS 6202 International Business Transactions
IMS 6220 International Corporate Finance or FIN 6366 International Financial Management
BPS 6332 Strategic Leadership
IMS 6312 International Advertising
IMS 6314 Global E-Business Marketing

Electives (11 hours)
An additional eleven semester hours of elective courses in the School of Management are required. Four
hours from Area Studies (IMS 7250-55) are recommended. International courses from other Schools may be taken
with permission of the appropriate Program Director.

Students seeking the M.A. degree are encouraged to complete the Business Core courses by the end
of the fall semester before beginning the International Management Core courses. Students are strongly advised
to start with the first course in the sequence, Global Economy, and to continue through to the last course,
International Business Management, which serves as a capstone for the International Management curriculum.

Master of Science in Information Technology and Management

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The M.S. degree in ITM requires a minimum of 36 credit hours, consisting of basic business courses, IT
foundation courses, area concentration courses, and electives. The business core courses are designed to provide
incoming students with the context to better appreciate and understand the complex issues that occur at the
interface between IT and business. The IT foundation courses cover the essentials of IT knowledge that any student
must possess before branching out into one of the three concentrations. The concentrations provide in-depth
knowledge of the technology and technology management issues in each area. In addition, students may choose
approved electives that maximize their individual educational and professional goals.

Students must maintain a 3.0 grade point average in both core courses and in aggregate courses to qualify
for the M.S. degree.

Basic Business Core Courses (minimum of 9 credit hours from the following courses)
AIM 6201 Financial Accounting
AIM 6202 Managerial Accounting
FIN 6301 Financial Management
MECO 6303 Business Economics
MKT 6301 Marketing Management
OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business
OPRE 6302 Operations Management
OB 6301 Organizational Behavior

IT Foundation Courses (12 credit hours)
MIS 6316 Telecommunications
MIS 6323 Object Oriented Systems
MIS 6326 Database Management Systems
MIS 6308 Systems Analysis and Project Management
(I) Information Technology Management and Consulting Concentration (9 credit hours)
MIS 6360 Software Engineering Economics
MIS 6319 Enterprise Resource Computing
MIS 6358 Distributed Computing Architectures and Middleware Technologies

(II) E-Business Information Technology Concentration (9 credit hours)
MIS 6355 Information Technologies for E-Business
MIS 6330 Information Technology Security and Audit
MIS 6302 Strategic Impact of Information Technology

(III) Telecommunications Management Concentration (9 credit hours)
MIS 6325 Advanced Telecommunications
MIS 6327 Analysis and Design of Telecommunication Networks
MIS 6329 Contemporary Issues in Telecommunications

Approved Electives (6 credit hours)
A list of approved electives is available from Advising. Any course from another concentration area in the ITM degree may be used as an approved elective. Also any course from the set of business background courses may be used as an approved elective.

Master of Science in Management and Administrative Sciences

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The M.S. degree is obtained by completing a 36-hour program, beyond prerequisite courses, consisting of (1) 10 hours of basic core courses, (2) courses in a selected area of concentration, and (3) electives. Areas of concentration are (1) Finance, (2) Electronic Commerce, and (3) Organizations and Strategy, (4) Supply Chain Management, (5) Innovation and Entrepreneurship, and (6) Healthcare Administration.

The student may elect to submit a Master’s thesis, which counts as three credit hours toward the total course requirements.

Students must maintain a 3.0 grade point average in both core courses and in aggregate courses to qualify for the M.S. degree.

Basic Core Courses (10 hours)
Each candidate must satisfactorily complete the following 10 hour basic core.
AIM 6201 Financial Accounting
MECO 6303 Business Economics
MIS 6204 Information Technology and MIS Fundamentals
OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business

Concentration Area Courses
Each candidate must complete a minimum number of required credit hours specified for a concentration. The required courses in each concentration area are:

Finance: In the Finance concentration, students may choose either the Investment Analysis and Management track or the Corporate Financial Strategy track. The former track is designed for students who intend to pursue careers in investment analysis and portfolio management, which in some cases require completion of the Chartered Financial Analyst (CFA®) examination. The latter track is designed for students who plan to pursue careers in corporate financial analysis, including financial planning, management of financial institutions, and entrepreneurial finance.

(I) Finance – Investment Analysis and Management concentration (17 hours)
FIN 6301 Financial Management
FIN 6310 Investment Management
Electronic Commerce – This concentration focuses on business models and processes in electronic commerce. Every organization will increasingly use the Internet as an integral component of their overall strategy in coming years. This program gives students a solid understanding of issues pertaining to the use of Internet as a marketing tool – focusing on both strategic and technology aspects. This includes topics such as database management systems, web design and development, and Internet business models. The curriculum covers issues relevant to pure Internet based firms as well as traditional firms moving to Internet based delivery of products and services.

Electronic Commerce (16 hours)
MIS 6326 Database Management Systems
MKT 6301 Introduction to Marketing Management
MKT 6322 Internet Business Models
MIS 6352 Web Systems Design and Development
MKT 6323 Database Marketing
MIS 6150 Electronic Commerce Lab

Organizations and Strategy – This concentration emphasizes organizational behavior and theory, human resources management, and strategic management. Students will learn how to effectively integrate and leverage human resources as well as other forms of capital to create sustainable advantages in the competitive marketplace. The courses draw upon and integrate a wide variety of disciplines, including economics, organization theory, finance, psychology, and sociology.

Organizations and Strategy (15 hours)
The following 3 courses:
BPS 6310 Strategic Management
BPS 6311 Strategy Implementation
BPS 6360 Management Consulting

Plus 6 Hours from the following:
BPS 6385 Entrepreneurial Business Strategies (also cross-listed as ENT 6385)
OB 6231 Power & Politics in Organizations
OB 6301 Introduction to Organizational Behavior
OB 6303 Managing Organizations
OB 6305 Managing People in Organizations

Supply Chain Management – The SCM concentration explores key issues related to the design and management of industrial supply chains. Students will learn how to improve supply chain operations to obtain lower costs, faster delivery, higher quality and mass customization. The ultimate objective is to mold traditional business operations into competitive weapons for today's global economy.

Supply Chain Management (12)
The following 3 courses
OPRE 6302 Operations Management
OPRE 6363 Inventory Control
OPRE 6366 Supply Chain Management
Plus at least one more from the following
OPRE 6335 Risk and Decision Analysis
OPRE 6340 Flexible Manufacturing Strategies
OPRE 6368 Industrial Applications in Supply Chains
OPRE 6370 Logistics and Distribution
OPRE 6385 Scheduling

Innovation and Entrepreneurship - Focused on the processes of technological innovation in both large and small organizations, this multidisciplinary sequence of courses seeks to prepare students for successful careers either as principals or key functional managers in emerging growth firms, or as leaders of technological innovation in established firms. These concentrations include three required and two elective courses in the field.

Innovation and Entrepreneurship (15 hours)
The required courses include:
ENTP 6370 Entrepreneurship
ENTP 6378 Managing the Emerging Enterprise
ENTP 6385 Entrepreneurial Business Strategies
In addition, students may select a minimum of two additional courses chosen from among the following:
ENTP 6315 Entrepreneurial Finance
ENTP 6375 Strategic and Organizational Issues in the Management of Technology
ENTP 6380 Entrepreneurial Marketing
ENTP 6390 Business Plan Development
ENTP 6395 Seminar – Topics in Innovation & Entrepreneurship

Healthcare Administration: The cost and complexity of healthcare continues to grow in America and the rest of the developed world. Students taking this concentration will learn how to manage and lead healthcare organizations. The first course in the concentration provides the political and economic background for the healthcare industry. Additional courses cover strategy, accounting, information systems, and management.

Healthcare Administration (12 hours from the following courses)
HMGT 6320 The American Healthcare System
HMGT 6321 Strategic Management of Healthcare Organizations
HMGT 6322 Healthcare Cost Management and Control
HMGT 6323 Healthcare Informatics
HMGT 6324 Healthcare Negotiation and Dispute Resolution
HMGT 6329 Special Topics in Healthcare

Elective Courses
Students are required to complete a sufficient number of elective hours to earn a minimum of 36 hours toward the M.S. Specific course requirements for these concentration areas are available in the School of Management Advising Office. Students wishing to develop an individual program of studies which does not follow one of the concentrations must have the program approved in advance by the appropriate Program Director.

Master of Science in Medical Management

Degree Requirements
The 36-credit hour Master of Science in Medical Management consists of eight, four credit hour modules and a four credit hour non-residential field study project. Modules are comprised of 4 ½ day residential classes. Seven modules are eligible for up to 36 hours each of Category 1 CME credit toward the AMA Physician’s Recognition Award and CEU credit for healthcare administrators.
Successful completion of any five modules is recognized by the award of a Certificate in Medical Management. Completion of all eight modules plus the self-directed field study is recognized by the award of a Master of Science in Medical Management.
Courses (36 credit hours, 180 Category 1 CME hours)
MED 6401 Negotiation and Conflict Management in Healthcare
MED 6402 Financial Management of Healthcare Organizations
MED 6403 Medical Cost and Performance Management
MED 6404 Service Quality Improvement and Patient Satisfaction
MED 6405 Healthcare Data Management and Information Technology
MED 6406 Strategic Leadership of Healthcare Organizations
MED 6407 Healthcare Policy and Regulation
MED 6408 Leading Organizational Change in Healthcare
MED 6409 Self-Directed Field Study

Combination of Engineering and Management Graduate Degrees
http://www.utdallas.edu/dept/ee

Leaders in high tech firms often need expertise in both engineering and management. Through a unique combined master's level degree program, graduate students may earn an M.S.E.E. degree from the Jonsson School of Engineering and Computer Science in combination with an MBA, an M.S. or an M.A. degree from the School of Management. This combined degree program is ideal for students interested in managing new technologies, from conceptualization and development to introduction and production. Students must meet the admission requirements in both schools and have an advisor in both schools. The combination of M.S.E.E. and MBA degrees can be earned by completing a minimum of 68 graduate hours, compared to 86 hours if completing the two degrees separately. The combination of M.S.E.E. and M.S. or M.A. degrees can be earned by completing a minimum of 51 credit hours beyond prerequisites, compared to 69 hours if completing the two degrees separately.

See the Electrical Engineering section for details.

Doctor of Philosophy

Admission Requirements
The University's general admission requirements are discussed on page 13.

Application for admission to the Ph.D. program should normally include (1) a GMAT test score of 600 is advisable based on our experience with student success in the program, (2) an undergraduate degree with a good academic record from an accredited institution of higher learning, (3) letters of recommendation, and (4) a personal statement of goals in relation to seeking the degree. In the case of international students, TOEFL scores or other evidence of English proficiency are required. No student will be admitted without the approval of the concentration area to which the student applies. For additional information, contact the Office of the Director of Ph.D. programs in the School of Management. Financial support is often available to PhD students in the form of teaching assistantships and / or scholarships.

Degree Requirements
The University's general degree requirements are discussed on page 18.

Each doctoral candidate is required to complete a minimum of 90 semester credit hours of applicable graduate work in specific program areas beyond the baccalaureate and prerequisites. Throughout their programs of study at the university, Ph.D. students are encouraged to participate in ongoing research activities and to develop their own lines of research. Research activities include research seminars, directed reading courses and research assistantships. Research supervision is available in the areas of Accounting, Finance and Economics, Information Systems, Marketing, Operations Management, Operations Research, and OSIM (Organizations, Strategy and International Management).

Ph.D. in International Management Studies

Students may enter the IMS doctoral program after previous graduate training or directly from undergraduate programs. Desirable educational backgrounds include graduate training in any area of business and graduate or undergraduate degrees in areas such as economics, sociology, political science, mathematics, and engineering, although students from all areas are considered.
The IMS Ph.D. curriculum includes a business foundation, core courses, advanced seminars, a methodology requirement, directed readings and independent research courses, and the dissertation. All students must take the Ph.D. courses that are offered in each of the first two years in the program.

Students must pass the comprehensive qualifying examination, which is administered at the end of the second year of study when all the relevant course requirements (* below) have been satisfied. It is intended to assess the student’s mastery of the basic theories and methodologies central to the program and to evaluate the student’s potential to do original research in an area of specialization. After passing the comprehensive exam, each student writes a dissertation proposal. This must be completed within six months of the comprehensive exam. The proposal is defended before a faculty committee appointed in consultation with the student, dissertation chair, and Ph.D. advisor. This committee also serves as the supervising committee for the dissertation after the proposal is approved.

**Foundation Courses (minimum of 12 hours)**
These courses provide a foundation in basic business topics such as economics, marketing, finance, and accounting. These courses may be waived for students with master’s degrees in management or other academic backgrounds that provide an equivalent foundation.

**Core Courses (18 hours)**
- OB 7300 Organization Theory
- MAS 8v42 Organizational Behavior
- IMS 7300 International Management
- IMS 8v40 International Business
- BPS 7300 Strategic Management
- MAS 8v51 Advanced Strategic Management

**Advanced Seminars (9 hours)**
Advanced seminars are offered on topics in organization theory, organizational behavior, strategic management, and international management. These courses are an opportunity for students to explore areas of study in greater depth, to develop short-term research projects, and to develop working relationships with faculty members with a view towards research publications and the dissertation.

**Research Methods (15 hours)**
- OB 7303 Research Design
- OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business
- or POEC 5313 Policy Data Analysis I or STAT 5311 Applied Statistics for Management Science I
- or STAT 5312 Regression Analysis or POEC 5316 Policy Data Analysis II
- or POEC 5331 Econometrics
- or OB 7306 Macro-Organizational Empirical Investigation

Students are encouraged to take additional methods courses consistent with their research interests.

**Directed readings and independent research courses (21 hours)**
Students can take further courses with selected faculty members to develop more specialized knowledge in areas of research interest before and after the comprehensive exam.

**Dissertation (minimum of 15 hours)**
The Ph.D. degree is conferred when the dissertation is successfully defended.
Ph.D. in Management Science

The Ph.D. program in Management Science is characterized by a high ratio of research faculty to students, which fosters close working relationships. Core and elective courses provide the students with a thorough understanding of management principles. Course work incorporates a broad business outlook into the study of theory and practice. A sequence of Ph.D. seminars exposes students to traditional and emerging research issues. Students have the opportunity to be involved in ongoing research projects under the mentorship of experienced faculty. We emphasize involving students in research early in their graduate careers. The close interaction with faculty members enables students to quickly learn to identify and develop research ideas and create their own research agenda. Students also develop their teaching competence under faculty mentorship by teaching organized classes.

The course of study for the Ph.D. in Management Science consists of three phases. First is attaining a background in business concepts. Second are the requirements for doctoral proficiency. Third is the dissertation. Each area of study – Accounting, Finance, Information Systems, Marketing, and Operations Management — determines the specific requirements for the three phases. Details can be obtained from the Director of the Ph.D. programs in the School of Management.

Students admitted into the program typically devote two years to the doctoral proficiency course work and research projects. They then take a comprehensive qualifying exam, based on the course work. Following passing the qualifying exam, each student develops his or her dissertation research area, which is usually completed over the next two years.

Doctoral proficiency encompasses courses in research methods, electives or a specialization, doctoral seminars, and a written and oral qualifying examination.

Required core courses:
OPRE 6330 Probability and Stochastic Processes
MECO 6315 Approaches to Statistical Inference
MAS6v00 Data Analysis and Software
MECO 6320 Introduction to Econometrics
MECO 6345 Advanced Managerial Economics
OPRE 7320 Optimal Control Theory and Applications
MAS 8V00 Teaching Practicum

Secondary Core Courses (6-12 hours):
Students must take at least two of the following courses:
OPRE 6311 Game Theory
MECO 7320 Advanced Econometrics
OPRE 6331 Stochastic Models in Operations Research
OPRE 7330 Deterministic Models in Operations Research

Remaining requirements beyond the core consist of research courses, electives, independent study, and seminars as approved by the program committee appointed to guide and evaluate each student. After completion of the coursework to achieve doctoral proficiency, the student will sit for a written qualifying exam which must be passed before formal admission to candidacy for the doctorate. The student must also orally defend the dissertation proposal before starting the dissertation. Written examination in the area of specialization may also be required.

The focal point of the Ph.D. program is the dissertation. The dissertation is written under the direction of the candidate’s committee. Twelve to twenty-four semester hours may be granted for the dissertation toward the minimum ninety hour requirement for the degree. At a time mutually agreeable with the candidate and the members of the committee, the student will orally defend his or her dissertation to the satisfaction of the committee. A student must pass in order to have the Ph.D. degree conferred.

Accounting Concentration
This program is for individuals seeking training in the most advanced issues, both theoretical and applied, in the field of Accounting. It is designed to prepare them primarily for teaching positions in research-oriented universities. Some students may be placed in senior positions in industry, government or consulting organizations. The program requires a hands-on training in accounting research, supported by work in the disciplines of economics, mathematics, psychology and statistics, culminating in a doctoral dissertation.
Finance Concentration  
This program is for individuals seeking the most advanced academic degree with an emphasis in Finance. It is designed to prepare them for (1) teaching positions in research-oriented universities, (2) senior staff positions in industry or government, or (3) senior positions in consulting organizations; however, the emphasis is on (1). The program consists of coursework in financial management, investments, and money and capital markets, together with work in the supporting areas of economics, mathematics, and statistics; it culminates in a doctoral dissertation. The program is designed to be completed in three years of full-time study by a student entering with an appropriate master’s degree.

Information Systems Concentration  
This program is designed for individuals who seek training in advanced theoretical and applied issues in the field of information systems. The training prepares students for conducting leading edge research in topics ranging from the design of optimized systems to the effective use of such systems in organizations. Students undergo rigorous training in research methodologies as well as in the design of information systems. The research conducted is often interdisciplinary in nature, and is characterized by strong analytical modeling of new and emerging issues in information technology creation and management. The program prepares students mainly for academic positions in research universities; some students may be placed in research positions in industry, government, or consulting organizations.

Marketing Concentration  
The purpose of the PhD Program in Management Science with a marketing major is to train researchers capable of dealing with the most advanced issues, both theoretical and applied, in the field of marketing. Universities as well as major companies with marketing orientation aggressively recruit PhD's with strong theoretical and research training in marketing. Graduates will have rigorous training in disciplinary areas and research methodology. They will have knowledge of the various research streams in marketing, will have developed a research specialization and a clear perspective on management issues.

Operations Management Concentration  
Operations Management emphasizes the development of models, methods, applications, and algorithms as they apply to problems in manufacturing and services. All students will be exposed to deterministic and stochastic modeling and will have the option of applying and/or developing these and new methods to solve problems in their selected topics. There will also be an option of combining a major in Finance, Information Systems or Marketing with one in Operations Management. The goal of the doctoral program in Operations Management is to educate future practitioners and researchers in the concepts and analytical techniques needed to understand and advance scientific solutions to the problems currently faced by operations managers.

Research  
The faculty of the School makes intellectual contributions in two areas: fundamental scholarship that advances theory and practice and applied scholarship focusing on practical issues. The fundamental work includes traditional basic research as well as applied research that defines new areas of practice and provides general frameworks that address a wide range of application problems. The applied scholarship provides “how to” frameworks for skilled practitioners, uses demonstration cases to show how theories can be applied, and defines new areas of application for existing tools and techniques.
Certificate in Executive and Professional Coaching

The School of Management offers a Graduate Certificate in Executive and Professional Coaching for working professionals. Graduates of the Certificate Program will be qualified to apply for professional accreditation by the International Coach Federation. This graduate level certificate requires the successful completion of the following executive coaching classes:

- MAS 6V02 Intro to Executive Coaching
  (Introduction to Executive and Professional Coaching)
- MAS 6V02 Business & Org Coaching
  (Coaching in the Business or Organizational Setting)
- MAS 6V02 Advanced Models & Methods
  (Advanced Coaching Models and Methods)
- MAS 6V02 Supervised Coaching
- MAS 6V02 Coaching Practicum & Exam

Classes are delivered via a series of online learning modules that are taught by outstanding master coaches with real-world coaching experience within business settings. These learning modules are conducted utilizing the very best in interactive distance learning methodologies, making the program convenient, efficient, and geographically independent for busy professionals. Participants will be eligible to receive twelve graduate credit hours upon completion of the program. More information is available at http://som.utdallas.edu/coaching.

Certificate in Medical Management

The School of Management offers a Certificate in Medical Management for physicians and healthcare administrators. This graduate level certificate requires the successful completion of any five of the following medical management classes:

- MED 6401 Negotiation and Conflict Management in Healthcare
- MED 6402 Financial Management of Healthcare Organizations
- MED 6403 Medical Cost and Performance Management
- MED 6404 Service Quality Improvement and Patient Satisfaction
- MED 6405 Healthcare Data Management and Information Technology
- MED 6406 Strategic Leadership of Healthcare Organizations
- MED 6407 Healthcare Policy and Regulation
- MED 6408 Leading Organizational Change in Healthcare

Each course represents four semester hours of graduate business credit and up to 36 hours of Category 1 CME credit for physicians and CEU credit for administrators. Students may apply these 20 graduate credit hours toward a Master of Science in Medical Management or a Master of Business Administration. Both degrees are offered through Executive Education in the School of Management.

Certificate in Project Management

The School of Management offers a Certificate in Project Management for both degree and non-degree seeking students. Both Technical and Interpersonal/Organizational issues are studied, both from a theoretical and an application point of view. This graduate level certificate is available to students with undergraduate degrees and requires the completion of 18 credits of graduate work in the following courses:

- OPRE 6271 Project Overview, Strategic and Process Management
- OPRE 6372 Project Initiation
- OPRE 6373 Project Planning
- OPRE 6374 Project Planning and Execution
- OPRE 6375 Project Execution and Closeout
- OPRE 6376 Advanced Project Management and Simulation
- MAS 6101 Legal Considerations in Project Management

Students who meet SOM entry requirements may petition to apply these credits toward the Master of Science in Management and Administrative Sciences or the Master of Business Administration through the Executive Education area in the School of Management.
Course Descriptions

Accounting and Information Management

AIM 5300 Accounting and Information Management Internship (3 semester hours) This course provides students with an opportunity to expand and apply their skills in accounting and information management in a professional setting. The accounting and information student will be required to apply knowledge obtained at the University in an actual job situation. This course is designed for students who are engaged in a supervised internship that meets all of the necessary requirements set forth by Texas State Board of Public Accounting (3-0) S

AIM 6201 Financial Accounting (2 semester hours) This course explores the role of financial accounting information in the economy and explains how accounting information found in financial statements and annual reports is used in decision-making by investors, analysts, creditors and managers. (2-0) S

AIM 6202 Managerial Accounting (2 semester hours) This course presents a detailed study of how managerial accounting information supports the operational and strategic needs of the enterprise and how managers use accounting information for decision-making, learning, planning and controlling activities within organizations. (2-0) S

AIM 6305 Accounting for Managers (3 semester hours) Fundamental concepts in financial and managerial accounting are presented from the perspective of business managers. In the financial accounting part, students develop skills in reading and using information provided in financial statements. In the managerial accounting part, students learn accounting techniques used by managers in planning, directing, controlling, and other decision-making activities. This course is available only to students in the UT Telecampus MBA Program. May not be substituted for AIM 6201 or AIM 6202 (3-0) S

AIM 6330 Intermediate Financial Accounting I (3 semester hours) A study of external financial reporting, including measurement and reporting of cash, receivables, inventories, property, plant, and equipment, and intangibles. Financial statement presentation issues are analyzed to gain an appreciation for the impact of generally accepted accounting principles on business decisions. Students who have taken AIM 3331 or its equivalent may not take AIM 6330 for credit. Prerequisite: AIM 6201 or equivalent (3-0) S

AIM 6332 Intermediate Financial Accounting II (3 semester hours) A continuation of topics in external financial reporting including accounting for debt, leases, deferred taxes, pensions, stock-based compensation plans, equity, earnings per share, accounting changes and cash flows. Currently generally accepted accounting principles for financial reporting are analyzed as is their effect on the financial results of companies. Students who have taken AIM 3332 or its equivalent may not take AIM 6332 for credit. Prerequisite: AIM 6330 or equivalent. (3-0) S

AIM 6333 Advanced Financial Reporting (3 semester hours) The application of generally accepted accounting principles in complex settings is studied. Topics include accounting for business combinations, consolidated entities, companies in financial difficulty, state and local governments, not-for-profit organizations, and global operations including foreign currency conversion and translation of financial statements reported in foreign currency. Prerequisite: AIM 6332 or instructor consent. (3-0) Y

AIM 6334 Auditing (3 semester hours) Basic concepts, philosophy, standards, procedures, and practices of auditing are presented. Topics include generally accepted auditing standards, the changing role of the independent auditor in society, professional conduct and ethics, the auditor's reporting responsibilities, risk assessment, internal control, evidential matter, and management fraud. Prerequisites: AIM 6330 or equivalent. (3-0) S

AIM 6335 Ethics for Professional Accountants (3 semester hours) Ethical reasoning, integrity, objectivity, independence and other core values as defined by the American Institute of Certified Public Accountants are presented. (3-0) Y

AIM 6336 Information Technology Audit and Risk Management (3 semester hours) Management's role in designing and controlling information technology used to process accounting data is studied. Topics include the role of internal and external auditors in systems development, information security, business continuity, information technology, operations, and the assurance of information related to on-line systems, web-based, internet, and other advanced computer systems. (3-0) Y

AIM 6337 Data Management (3 semester hours) Database theory and tools used to manage accounting data and other information are introduced. Topics include relational database theories, Structured Query Language (SQL), database design and conceptual/semantic data modeling. A client/server database environment is developed with a selected SQL server and a database application development tool. May not receive credit for both AIM 6337 and MIS 6326. (3-0) Y

AIM 6338 Integrated Accounting Information Systems Analysis and Design (3 semester hours) Using SAP or similar software, this course focuses on accounting information systems as part of integrated enterprise systems and modern systems analysis and design of integrated accounting systems. Emphasis will be on integrated business processes and related financial transaction flows, system analysis and design methods in SAP with focus on configuration methods. (3-0) Y
AIM 6339 Financial Reporting using XBRL and XML (3 semester hours) Using case studies reflecting different ways of collecting and analyzing financial and managerial information, students are introduced to enterprise software, financial reporting using XBRL, XML, and the importance of multiple views of accounting data for decision-making. Relevant e-business aspects will be covered. (3-0) R

AIM 6340 Information Technology Project Management (3 semester hours) This course addresses project management issues related to information technology projects. Topics include software life cycle models, project planning and control, software development and maintenance, risk management, cost estimation models, software productivity and quality metrics, outsourcing and conventional and emerging software technologies. (3-0) R

AIM 6341 Planning, Control and Performance Evaluation (3 semester hours) The application of management accounting for planning, control and performance evaluation is studied for business and not-for-profit organizations. Topics include planning, budgeting, performance evaluation, centers of responsibility, modern control methods, management compensation, and transfer pricing. Extensive use cases are adhered to. Prerequisite: AIM 6202 or instructor consent. (3-0) Y

AIM 6342 Strategic Cost Management (3 semester hours) Cost analysis is integrated with strategic analysis to understand the role of financial and non-financial information in operational and strategic decision-making. Topics include strategic value chain analysis, strategic positioning analysis, activity based management, line of business evaluation, life cycle costing, technology costing, target costing, quality cost management and balanced scorecard. Prerequisite: AIM 6202 or equivalent. (3-0) Y

AIM 6343 Accounting Information Systems (3 semester hours) Managing the design, control and operation of accounting information systems in a computerized organizational environment is studied. The emphasis is on identifying the information needs of decision makers and developing appropriate business process control in the design of accounting information systems. (3-0) R

AIM 6344 Financial Statement Analysis (3 semester hours) Analysis of financial statements for evaluating firm performance and risk. Topics include interpretation of financial statements and footnotes, managers’ incentives for earnings manipulation, comparative analysis of firms, and ethics in financial reporting. Prerequisite: AIM 6201 or equivalent. (3-0) S

AIM 6345 Business Valuation (3 semester hours) Financial statement based valuation models are studied. Topics include earnings management, income measurement and profitability assessment, discounted cash flow, and accounting-based valuation models. Prerequisite: AIM 6201 and AIM 6202 or instructor consent. (3-0) Y

AIM 6346 Financial Dimensions of Mergers and Acquisitions (3 semester hours) The application of financial statement based information is examined for merger and acquisition activities. Topics include financial measures for identifying acquisition targets and/or leveraged buy-out targets, the impact of acquisition on performance measures, valuing the targets and structuring deals. Prerequisite: AIM 6201 and AIM 6202 or instructor consent. (3-0) Y

AIM 6347 Current Topics in Advanced Cost Management (3 semester hours) Analysis of costs, benefits and risks to facilitate evaluation of information systems and technology. Topics include evaluation of technology investments, recall decisions, accounting for software development costs, quantifying benefits related to enterprise resource planning systems and supply chain management systems and high quality cost management systems, valuation of entrepreneurial firms, and real options analysis. Prerequisite AIM 6202 (3-0) Y

AIM 6349 Corporate Information Technology Strategy and Management (3 semester hours) Issues of strategic planning and control related to information technology and e-commerce are discussed based on contemporary case studies. Topics include strategic scenario planning for e-commerce infrastructure, developing business cases for information technology investment and valuation, and implementing the balanced scorecard for IT project management. May not receive credit for both AIM 6349 and MIS 6302. (3-0) Y

AIM 6351 Individual Taxation (3 semester hours) Taxation principles and concepts for individual income are studied. (3-0) S

AIM 6352 Corporate Taxation (3 semester hours) Income taxes on corporations and associations, reorganizations, and corporate distributions are examined. The role of taxes in business decisions and business strategy is emphasized. Prerequisite: AIM 6351 or equivalent. (3-0) S

AIM 6354 Partnership Taxation (3 semester hours) The tax law is studied as it relates to the formation of a partnership, the determination of the taxable income of the partnership and the distributive shares of the partners, the tax consequences of distributions by a partnership and of transfers of interests in a partnership. Prerequisite: AIM 6351 or equivalent, and AIM 6356 (3-0) S

AIM 6356 Tax Research (3 semester hours) Identification and evaluation of legal authorities applicable to tax issues for individual and business taxpayers are studied. Application of research in tax planning and administrative procedures in a tax practice, emphasizing the structure of the Internal Revenue Service and its impact on a tax practitioner. Prerequisite: AIM 6351 or equivalent. (3-0) S
AIM 6357 Federal Gift and Estate Taxation (3 semester hours) Federal tax laws applicable to the taxes imposed on property transfers by lifetime giving and bequests upon death are surveyed. Topics include the valuation of property for transfer tax purposes, properties included in a deceased person’s estate, deductions allowable on the estate tax return, and exclusions from taxation. Prerequisite: AIM 6351 or equivalent, and AIM 6356 (3-0) R

AIM 6362 International Accounting (3 semester hours) Measurement and reporting problems and accounting functions and activities in various international environments are evaluated using country and case studies. Accounting concepts, standards, methods and practices in foreign countries and their relationship to US accounting are examined. Topics include foreign currency translation, taxation, performance measurement of international entities, accounting for international operations, comparative accounting systems, transfer pricing and financial reporting of foreign and multinational corporations. Prerequisite: AIM 6201 or equivalent or instructor consent. (3-0) Y

AIM 6365 Governmental and Not-For-Profit Accounting (3 semester hours) Accounting practices for governmental and not-for-profit organizations are studied, including accounting requirements for institutions, municipalities, and state and federal government. Topics include performance budgeting, systems analysis, and accounting implications of economic decisions. Prerequisite: AIM 6201 and AIM 6202 or instructor consent. (3-0) R

AIM 6370 Business Law (3 semester hours) Laws affecting business organizations and laws influencing managerial decision-making are examined. Topics include contract law, law of agency, law of commercial transactions, and the uniform commercial code and the laws relating to the formation and operation of corporations (3-0) Y

AIM 6377 Corporate Governance and Accounting (3 semester hours) This course views Corporate Governance as a structured system of policies and processes established and maintained by a board of directors to oversee an organization’s strategic activities and resulting performance. The system is in place to ensure proper accountability, probity and openness in the conduct of an organization’s business for the long-term benefit of its shareholders. As such, Corporate Governance focuses on and effectuates the relationships among a company’s board of directors, top management, investors (particularly institutional investors), and other stakeholders. To enhance understanding, this course has two themes: first, issues are addressed academically; second, issues are addressed through the presentations by 12 prominent and knowledgeable speakers involved in various aspects of Corporate Governance. Prerequisite: AIM 6201 and AIM 6202 or equivalent (3-0) S.

AIM 6378 Enterprise Systems and CRM (3 semester hours) The objective of the course is to increase practical skills and conceptual knowledge related to Customer Relationship Management (CRM) utilizing the mySAP.com CRM application as the primary learning tool. Students will garner knowledge of operational, analytical, and collaborative CRM. (3-0) R

AIM 6379 ABAP Programming (3 semester hours) This course provides a thorough understanding of the role of ABAP programming, SAP’s programming language, in the implementation and use of enterprise systems. Focus of the course will include complex report development, SAP query, dialog programming, ASAP Objects, transaction development, EDI/ALE and BAPI development, Business Add-ins (BADIs) and output processing. (3-0) R

AIM 6380 Internal Audit (3 semester hours) The course covers internal audit from a broad perspective that includes information technology, business processes, and accounting systems. Topics include internal auditing standards, risk assessment, governance, ethics, audit techniques, and emerging issues. This is the first course leading to Endorsed Internal Audit Certificate and will prepare students to sit for the Certified Internal Auditor Exam. (3-0) Y

AIM 6382 Advanced Auditing (3 semester hours) This course examines how the role of internal and external audit can best be coordinated. Numerous case studies of audit integrated activities will be covered. Current topics and issues related to audit will be discussed as part of the class. Prerequisite: AIM 6334 and AIM 6380 or equivalents. (3-0) R

AIM 6383 Forensic Accounting Investigations (3 semester hours) This course will include a review of techniques used in solving financial crimes including: interviewing techniques, rules of evidence, sources of information, forensic accounting procedures and current issues in financial investigations. The course will include the criminal statutes related to financial crimes. Case studies will be used to discuss interviewing techniques and other indirect methods of proof in resolving financial crimes. Various financial documents and instruments will be discussed and reviewed as part of the documentary evidence to support financial investigations. (3-0) Y

AIM 6384 Analytical Reviews using Audit Software (3 semester hours) This course will introduce students to the theory and tools used to leverage automated auditing software, such as ACL and IDEA. It will include an analytical review of accounting and operational data for Internal Auditors. The course includes hands-on use of audit software and the development of an audit dashboard. The course will also explore ways to leverage the enterprise technology and use available technology to monitor controls and detect fraud. (3-0) R

AIM 6390 Professional Accounting (3 semester hours) This course is designed to help students prepare for careers in professional accounting and professional examinations. (3-0) R
AIM 7313 Contemporary Research in Accounting and Economics (3 semester hours) Presents current areas of research in accounting economics. Emphasis is ongoing and recently completed research studies, including understanding of their antecedents and research methodologies. Format includes presentations by doctoral students, faculty and visiting speakers. Prerequisite: Consent of the instructor. (3-0) T

AIM 7314 Contemporary Research in Information Management (3 semester hours) Presents current areas of research in information management. Emphasis is ongoing and recently completed research studies, including understanding of their antecedents and research methodologies. Format includes presentations by doctoral students, faculty and visiting speakers. Prerequisite: Consent of the instructor. (3-0) T

AIM 7323 Empirical Research in Accounting and Economics (3 semester hours) Presents a detailed study of past and current empirical research in accounting. Emphasis is on a clear understanding of hypothesis formulation, research design, sample selection and statistical techniques used in these studies. Topics include the role of information for valuation, contracting, and performance evaluation, and analysis of financial and non-financial performance measurement. (3-0) T

AIM 7324 Empirical Research in Information Management (3 semester hours) Presents a detailed study of past and current empirical research in information management. Emphasis is on a clear understanding of hypothesis formulation, research design, sample selection and statistical techniques used in these studies. Topics include the role of information for contracting and performance evaluation; analysis of cost, productivity and other performance measures, market structure in e-commerce and software management. (3-0) T

AIM 7333 Analytical Research in Accounting and Economics (3 semester hours) Presents a detailed study of economics based analytical research in accounting. Emphasis is on a clear understanding of theoretical paradigms, modeling issues, interpretation of the results, and empirical applications of analytical models. Topics will include the role of information for valuation, contracting, and performance evaluation, and analysis of financial and non-financial performance measurement. (3-0) T

AIM 7334 Analytical Research in Information Management (3 semester hours) Presents a detailed study of economics based research in information intensive organizations. Emphasis is on providing an understanding of the economic theory underlying the role of information in e-commerce settings, market structure evolution and decision-making, together with related empirical applications. Topics will include pricing and revenue models, supply chain economics, time-based financial models and quality of service. (3-0) T

AIM 7343 Analytical Research in Finance and Accounting (3 semester hours) Presents a detailed study of analytical research of capital markets. Emphasis is on providing an understanding of the theory underlying valuation and corporate governance, together with applications in accounting and finance. Topics will include valuation, signaling, disclosure and rational expectation equilibrium. (3-0) T

AIM 7344 Empirical Research in Finance and Accounting (3 semester hours) Presents a detailed study of empirical research of capital markets. Emphasis is on providing an understanding of the theory underlying valuation and corporate governance, together with applications in accounting and finance. Topics will include valuation, signaling, disclosure and rational expectation equilibrium. (3-0) T

Business Policy and Strategy
BPS 6201 The Environment of Business (2 semester hours) An examination of the relationship between the management of micro-organizational units (corporations, non-business entities, and government agencies) and the larger social environment of which they are a part. (2-0) S

BPS 6305 Ethical Issues in International Business (3 semester hours) Examines ethical concepts such as justice, equality, freedom, and responsibility as they relate to the functioning of an economic system. Specific problems facing the global business organization will be discussed from an ethical perspective. Articulation of management philosophy incorporating the ethical dimension. (3-0) S

BPS 6260 Readings in Management (2 semester hours) Examination of the development of management thought and practice as business developed into a major institution in our society. Readings in management thought assignments to accomplish this purpose. Each student is expected to develop his/her own written philosophy of management as a major objective of the course. Prerequisite: BPS 6210 or BPS 6310. (2-0) T

BPS 6310 Strategic Management (3 semester hours) Strategic management consists of the analysis, decisions, and actions that organizations take to create sustainable competitive advantages. The course examines a variety of issues including environmental, competitor, and stakeholder analysis, strategy formulation, and strategy implementation and control. The central role of ethics and corporate governance as well as global issues will be addressed. Prerequisites: OB 6301, MKT 6301, AIM 6201, AIM 6202, FIN 6301 or consent of the instructor. (3-0) S
BPS 6311 Strategy Implementation (3 semester hours) Implementation issues of strategic planning. Topics include: planning system design, organizing for planning, situation analysis, and corporate/divisional relationships. Cases and selected readings illustrate the key planning concepts. Prerequisite: BPS 6210 or BPS 6310 or consent of instructor. (3-0) Y

BPS 6312 Advanced Multinational Business Seminar (3 semester hours) This seminar aims at the broadening of business strategy horizons to include the international dimension applied to topical business problems. It also responds to the recent findings of the US Management schools that precepts of corporate strategy for national markets are subject to many exceptions and require much supplementation when applied to multinational markets. This course also aims at providing support for the Dallas Metroplex area business organizations for designing and implementing their strategies in general, multinational strategies in particular. This course will investigate topical and sector-based implementation problems derived from the participants’ own companies or current business media. (3-0) T

BPS 6320 Government Regulation of Business (3 semester hours) Impact of U.S. federal and state agencies on business as well as international legal issues. Emphasis is on a strategic approach to the principle regulatory issues facing business today. (3-0) Y

BPS 6332 Strategic Leadership (3 semester hours) Addresses the challenge of leading organizations in dynamic and challenging environments. Overall goal is to not only question one’s assumptions about leadership, but also enhance skills and acquire new content knowledge. Topics include visionary and transformational leadership; post-heroic leadership; empowerment; leveraging and combining resources; designing organizations; and ethics. (3-0) Y

BPS 6340 Accountability and Ethics in Corporate Governance (3 semester hours) This course addresses the issues faced by top management teams and boards of directors, including compensation, investor relations, social responsibility, and accountability in the context of ethical strategic policy making. (3-0) S

BPS 6350 Enterprise Transformation Management (3 semester hours) This course is designed to provide an overview of the key concepts that comprise enterprise transformation, specifically corporate-wide resource allocation and reallocation—relating and combining corporate strategy, business structure, and management systems within a general change-management framework. The roles of leadership, communication, team-building, and performance measurement are highlighted as they accelerate and sustain large-scale, complex transformation programs in global industries. (3-0) T

BPS 6360 Management and Organizational Consulting: theory and practice (3 semester hours) Management Consulting now accounts for more than $120 billion in global annual revenues. In addition to these full-time consultants, more and more employees are also in roles of a consultative nature, as the knowledge-intensive nature of work increases. This course will begin with a review of the theoretical foundations of the client-consultant relationship, drawing from counseling psychology and other disciplines, then, broaden to cover theories of Organizational Behavior, Organizational Learning and Strategy. Through various workshops and hands-on exercises, participants will apply these theories in a number of scenarios relevant for consulting. Special attention will be given to prepare students to become confident practitioners, by bridging the theory-practice gap in the practice of management and organizational consulting.

Prerequisite: OB 6301 (3 - 0) T

BPS 6385 Entrepreneurial Business Strategies (3 semester hours) Focuses on successful business strategies for entrepreneurial firms attempting entry into established or emerging industries. Topics include the formulation and evaluation of strategy in emerging industries, including an introduction to models of technological evolution, new firm strategy development, and organizational dynamics and innovation. The course also addresses the innovation process, appropriation of economic value from innovation, competition between technologies, strategies for competing against established incumbents, management of innovation and theories of diffusion and adoption. The course will make extensive use of case studies and visiting lectures by entrepreneurs. This course is equivalent to ENTP 6385 and only one of these may count toward a degree. Prerequisites: BPS 6370 and BPS 6310 or permission of the instructor. (3-0) Y

BPS 7300 Strategic Management (3 semester hours) Major theories and current research addressing strategy formulation and implementation. Prerequisite: OB 7300. (3-0) T

Innovation and Entrepreneurship

ENTP 6360 Entrepreneurial Ventures (3 semester hours) This course is designed to provide an introduction to entrepreneurship for non-management students. The course emphasizes the development of technology-based ventures, addressing opportunity identification and evaluation, market assessment, startup strategies, business valuation, business plan development, venture financing, and startup management. Guest lectures by practicing entrepreneurs and investors provide a real-world perspective. The major deliverable of this course is an early stage feasibility analysis of a venture of the student’s choosing. This course is not available to students enrolled in degree programs in the School of Management. (3-0) S
ENTP 6370 Entrepreneurship (3 semester hours) This course provides an introduction to entrepreneurship, with an emphasis on identifying, evaluating and developing new venture opportunities. Topics include opportunity identification and evaluation, startup strategies, business valuation, business plan development, attracting stakeholders, financing the venture, managing the growing business and exit strategies. Case studies and guest lectures by entrepreneurs and venture capital partners provide a real-world perspective. The major deliverable of this course is an early stage feasibility analysis of a venture of the student’s choosing. Prerequisites: AIM 6201 or consent of the instructor. (3-0) T

ENTP 6375 Strategic and Organizational Issues in Technology Management (3 semester hours) This course addresses the strategic and organizational issues confronted by firms in technology-intensive environments. The course reflects five broad themes: (1) managing firms in technology-intensive industries; (2) linking technology and business strategies; (3) using technology as a source of competitive advantage; (4) organizing firms to achieve these goals; and (5) implementing new technologies in organizations. Students will analyze actual situations in organizations and summarize their findings and recommendations in an in-depth term paper. Case studies and class participation are stressed. Prerequisites: (a) AIM 6201 and OB 6301 or consent of the instructor, or (b) ENTP 6360 for students not enrolled in the School of Management. (3-0) T

ENTP 6378 Managing the Emerging Enterprise (3 semester hours) The course focuses on the challenges of growing a small company from early startup to a professionally managed business, as the entrepreneur struggles to maintain the entrepreneurial spirit of the firm while introducing the professional management disciplines essential to sustained and profitable growth. Topics include shaping and communicating the entrepreneur’s vision, developing a viable business model, positioning products and services in a broader market, implementing business strategies, building an organization and infrastructure, molding the culture, developing and managing critical relationships with banks, suppliers and customers, and managing growth with limited resources. The course makes extensive use of case studies and visiting lectures by entrepreneurs. Prerequisite: (a) ENTP 6370 or consent of the instructor, or (b) ENTP 6360 for students not enrolled in the School of Management. (3-0) Y

ENTP 6315 Entrepreneurial Finance (3 semester hours) The objective of this course is to build skills and knowledge in the financing of entrepreneurial ventures. Entrepreneurial Finance concerns not only the processes of financing and investing in start-up companies, but also the changes to the initial financing mix that may be required as start-up companies mature and grow. Topics include the market for venture capital and private equity, the decision to go public or remain private, alternative financing arrangements, and the differential marketability and liquidity of the securities used to finance non-public firms. The course is equivalent to FIN 6315 and only one of these may be counted toward a degree. Prerequisite: FIN 6301 or consent of the instructor. (3-0) Y

ENTP 6380 Entrepreneurial Marketing (3 semester hours) This course addresses the marketing challenges facing the entrepreneurial firm, including the introduction and marketing of new products and services without the benefit of an established reputation, channel infrastructure or customer base. Topics include the development of marketing strategies, channel selection and design, product positioning, competitive pricing strategies, advertising and promotion, etc., all within the framework of the resource limitations inherent in an entrepreneurial startup. This course is equivalent to MKT 6380 and only one of these may be counted toward a degree. Prerequisites: (a) MKT 6301 and ENTP 6370 or consent of the instructor, or (b) ENTP 6360 for students not enrolled in the School of Management. (3-0) Y

ENTP 6385 Entrepreneurial Business Strategies (3 semester hours) This course is an advanced course in strategic management, with an emphasis on business strategies for entrepreneurial firms. Within this framework, the course addresses the most recent approaches and perspectives on strategic management in rapidly changing environments. Topics include the formulation and evaluation of strategy in emerging industries, strategies for market entry and competition against established incumbents, the role of technology standards, the technology adoption life cycle model, theories of disruptive innovation, and the use of creative imitation, speed and agility to prevail over established competitors. This course is equivalent to BPS 6385 and only one of these may be counted toward a degree. Prerequisites: (a) ENTP 6370 and BPS 6310 or consent of the instructor, or (b) ENTP 6360 for students not enrolled in the School of Management. (3-0) Y

ENTP 6388 Creating and Managing Ventures within the Corporation (3 semester hours) Intrapreneurs are the entrepreneurs within established corporations who combine innovation, creativity and leadership to develop and launch new products, new product lines and new business units that grow revenues and profits from within. The course seeks to equip students with the skills and perspectives required to initiate new ventures and create viable businesses in dynamic and uncertain environments in the face of organizational inertia and other sources of resistance to innovation. Course topics include the elements of strategic analysis and positioning for competitive advantage in dynamic markets, and the structuring, utilization and mobilization of the internal resources of existing firms in the pursuit of growth and new market opportunities. Prerequisites: (a) AIM 6201 and OB 6301 or consent of the instructor, or (b) ENTP 6360 for students not enrolled in the School of Management. (3-0) T
ENTP 6390 Business Plan Development (3 semester hours) This course is designed for students who desire to pursue the development of a comprehensive business plan for an entrepreneurial new business concept. The course will be structured in a workshop format consisting of lectures, developmental exercises and group presentations of the new business idea, researching, developing and refining the new business concept under the guidance of a faculty mentor. Enrollment will be limited to groups of students with a pre-approved new business idea. Prerequisite: (a) ENTP 6370 and consent of the instructor, or (b) ENTP 6360 for students not enrolled in the School of Management and consent of the instructor. (3-0) R

ENTP 6395 Seminar – Topics in Innovation and Entrepreneurship (3 semester hours) This course will explore special topics of interest to students of Innovation and Entrepreneurship. The content will vary, exploring such topics as opportunities for innovation in Biotechnology, Information Technology, Nanotechnology and other fields. Extensive use of outside speakers, special readings, and field and library research will be involved. Prerequisites: (a) ENTP 6370 and consent of instructor, or (b) ENTP 6360 for students not enrolled in the School of Management and consent of the instructor. (3-0) Y

ENTP 6398 The Entrepreneurial Experience (3 semester hours) This course will provide individuals or teams of students the opportunity to earn course credit while gaining actual work experience in entrepreneurial firms. Marketing, strategy or operations research projects will be developed jointly by faculty and the entrepreneurial firm, and made available to students as an opportunity to gain practical experience in an entrepreneurial organization. Evaluation will be based on a term paper or other major deliverable negotiated on a case by case basis. Prerequisites: (a) ENTP 6370 and consent of instructor, or (b) ENTP 6360 for students not enrolled in the School of Management and consent of instructor. (3-0, R.

Finance
FIN 6301 Financial Management (3 semester hours) Theoretical and procedural considerations in the administration of the finance function in the individual business firm; planning, fundraising, controlling of firm finances; working capital management, capital budgeting and cost of capital. Corequisites: STAT 5311 or OPRE 6301 and AIM 6201, or consent of instructor. (3-0) S

FIN 6305 Corporate Finance and Policy (3 semester hours) Cases involving financial situations encountered in general management and financial management. Special emphasis is placed on strategy. Prerequisites: FIN 6301 and MECO 6201 or MECO 6303. (3-0) Y

FIN 6310 Investment Management (3 semester hours) The course examines a range of issues concerning the management of investment portfolios. The course objective is to provide an understanding of the role of modern financial theory in portfolio management and to present a framework for addressing current issues in the management of financial assets. The concepts and techniques examined are also useful in financial planning and personal investment decisions. Topics to be covered during the semester include trading, valuation, active portfolio management, asset allocation, global diversification, performance measurement, financial derivatives, and fixed income securities. Theoretical and practical approaches to investment management. Topics include: the theory of the consumption-investment decision; the sources and uses of financial information in investment decisions; the role and function of the security analyst; and the theoretical and applied approaches to efficient portfolio management. Prerequisites: FIN 6301, MECO 6201 or MECO 6303, and STAT 5311 or OPRE 6301. (3-0) Y

FIN 6312 Portfolio Management (3 semester hours) This course builds on the basic ideas underlying portfolio optimization covered in FIN 6301 and FIN 6310. It emphasizes the application of modern portfolio theory using quantitative methods. Spreadsheet analysis and statistical concepts play a key role in the practical examples used to illustrate theoretical models and methods. At the completion of this course, students will be able to analyze market data using the latest investment management tools, to formulate theoretical models, and to implement appropriate investment strategies. Students who are interested in obtaining a qualification such as the CFA or CFP will find this course useful in achieving this goal. Prerequisite: FIN 6310. (3-0) T

FIN 6315 Entrepreneurial Finance (3 semester hours) The objective of this course is to build skills and knowledge in the financing of entrepreneurial ventures. Entrepreneurial Finance concerns not only the process of financing and investing in start-up companies, but also the changes to the initial financing mix that may be required as start-up companies mature and grow. Topics include the markets for venture capital and private equity, the decision to go public or remain private, alternative financing arrangements, and the differential marketability and liquidity of the securities used to finance non-public firms. This course is equivalent to ENTP 6315 and only one of these may be counted toward a degree. Prerequisite: FIN 6301. (3-0) T

FIN 6320 Money and Capital Markets (3 semester hours) Financial behavior in relation to production and consumption decisions. Banking, financial intermediation, flows of funds, regulation and structure of financial markets. Selected topics of current interest. Prerequisites: FIN 6301, MECO 6201 or MECO 6303 and STAT 5311 or OPRE 6301. (3-0) Y
FIN 6350 Advanced Financial Management (3 semester hours) Advanced analysis of topics in financial management. Capital structure, dividend policy, incentives, and risk management. Prerequisites: FIN 6301, MECO 6201 or MECO 6303 and FIN 6310, or consent of instructor. (3-0) T

FIN 6360 Options and Futures Markets (3 semester hours) Examines the valuation of derivative securities such as options and futures contracts, as well as the use of these instruments in managing business and financial risks. The topics to be covered include pricing of futures contracts, swaps, and options, the use of derivative instruments in hedging, portfolio insurance, exotic options, and the valuation of options on debt instruments. Prerequisites: FIN 6310 and MECO 6201 or MECO 6303. (3-0) T

FIN 6366 International Financial Management (3 semester hours) Study of world financial markets and institutions, foreign exchange exposure and management, foreign direct investment, and a variety of issues involved in the financial management of multinational firms. May not also receive credit for IMS 6220. Prerequisite: FIN 6301. (3-0) T

FIN 6370 The Theory of Finance and Its Applications (3 semester hours) A survey of financial theories and their application to various financial decisions and issues. Topics will include the theory of portfolio choices, asset pricing, derivative pricing, asymmetric information theories, and firm financing issues. Prerequisite: FIN 6301, FIN 6310 or FIN 6350, or permission of instructor. (3 - 0) T

FIN 6375 Finance Workshop (3 semester hours) Forum for faculty and students to present recent developments in the finance literature. Presentation and discussion of published and unpublished papers of researchers with various affiliations. Prerequisite: Consent of instructor. (May be repeated for credit.) (3-0) T

FIN 7310 Seminar in Contemporary Finance (3 semester hours) Issues in current financial research. Prerequisite: consent of instructor. (May be repeated for credit.) (3-0) T

FIN 7330 Asset Pricing Theory (3 semester hours) Advanced studies in the theory of asset pricing. Provides a foundation for advanced research in financial theory and empirical tests of asset pricing models. The prerequisites are advanced calculus and MECO 6345, or an equivalent doctoral level course in microeconomics. Topics include utility theory, mean-variance portfolio analysis, state preference models, continuous time portfolio selection, and the term structure of interest rates. (3-0) T

FIN 7340 Theory of Corporate Finance (3 semester hours) Advanced empirical and theoretical analysis of corporate financial decision making. The prerequisites are advanced calculus and MECO 6345, or an equivalent doctoral level course in microeconomics. Topics include the theory of the firm, initial public offerings, ownership and control, managerial incentives, risk management, and financing and investment decisions. (3-0) T

Healthcare Administration

HMGT 6320 The American Healthcare System (3 semester hours) Explores the structure and political economy of the US health system. Topics include the economics of cost, quality and access to healthcare, the impact of regulation on health care delivery and analysis of recent proposals for health care reform. This course could serve as an introduction for healthcare majors. (3 - 0) T

HMGT 6321 Strategic Management of Healthcare Organizations (3 semester hours) Explores how healthcare organizations can create sustainable competitive advantage in a volatile, reimbursement driven industry. Topics include external and internal environmental analysis, strategy formulation, organizational design and control and the impact of mergers and alliances on industry performance. Healthcare case studies are used to illustrate key concepts. Prerequisite: HMGT 6320. (3 - 0) T

HMGT 6322 Healthcare Cost Management and Control (3 semester hours) Examines how healthcare organizations allocate and report costs and use that information for managerial decision-making. Additional topics include how activity based costing can be used to more accurately determine the true cost of medical services and the use of the balanced scorecard to manage the conflicting imperatives of controlling costs and improving care. Prerequisite: HMGT 6320 and either AIM 6201 or AIM 6202. (3 - 0) T

HMGT 6323 Healthcare Informatics (3 semester hours) Examines the unique challenges of clinical and service process improvement in the healthcare industry, including the role of data management and information technology in improving healthcare delivery. Prerequisite: HMGT 6320 and MIS 6204 or equivalent. (3 - 0) T

HMGT 6324 Healthcare Negotiation and Dispute Resolution (3 semester hours) Examines and analyzes the significant issues related to negotiation and conflict management in the healthcare industry. Students critique and discuss these issues from the perspectives of major healthcare stakeholders. Exercises and simulations reinforce theories about the role of negotiations and dispute resolution in effective management. Prerequisite: HMGT 6320. (3 - 0) T
HMGT 6329 Special Topics in Healthcare Management (3 semester hours) This course examines several important structural, political and regulatory issues in healthcare. Facilitated by outside industry experts, topics might include: healthcare reform, consumer directed healthcare, the future of Medicare and Medicaid, medical ethics, health plan economics, the impact of hospital and MCO consolidation, HIPPA regulation, and measuring quality in healthcare. Prerequisite: HMGT 6320. (3 - 0) R

International Management Studies

IMS 5200 Global Business (2 semester hours) Provides an introduction to the fundamental concepts of international business, covering macro-level environmental factors that affect international businesses today. Topics include globalization, country environments, culture, international trade and investment, regional economic integration, and the global monetary system. (2-0) S

IMS 6202 International Business Transactions (2 semester hours) The legal environment and framework of international business, legal aspects and implications of international trade and the establishment and operation of business abroad, moving goods across national borders, immigration, joint ventures, licensing, setting up and financing operations abroad, negotiating an international deal, resolving disputes, international corruption, bribery and crime. Prerequisite: IMS 5200. (2-0) T

IMS 6220 International Corporate Finance (2 semester hours) Financial policies and practices of companies involved in multinational operations. The course considers management of working capital and permanent assets. Investment practices and capital budgeting for the global firm. May not also receive credit for FIN 6366. Prerequisites: IMS 5200 and FIN 6301, or consent of instructor. (2-0) Y

IMS 6300 The Multinational Firm (3 semester hours) Examines how multinational firms adapt to the international environment. Topics include the management of human resources, finance and the supply chain within the multinational firm. Special attention is given to the strategy and structure of multinational operations. Prerequisite: IMS 5200. (2-0) Y

IMS 6310 International Marketing (3 semester hours) This course aims at preparing students to appreciate the international marketing by understanding both theoretical and practical issues involved. This course covers the fundamentals and evolution of international marketing, the environment of international marketing, foreign entry methods, evaluation of market potential, management of international marketing mix, consumer behavior and international strategic marketing planning. Students will also learn the reasons why international marketing is important for success in international business and for finding personal career opportunities. Prerequisite: MKT 6301 or consent of instructor. (3-0) Y

IMS 6312 International Advertising (3 semester hours) This course will aim at preparing the students to understand theoretical and practical aspects of international advertising within the context of global marketing communications. The basic principles of the course will include global versus local creative strategies and executions, international media opportunities, and global research methods. It will aim to equip the students with an understanding of the basic principles of advertising, including the various and differing cultural, economic and political factors that impact international marketing communications with a view to get employment in international advertising. Prerequisite: MKT 6301 or consent of instructor. (3 - 0) T

IMS 6314 Global E-business Marketing (3 semester hours) This course aims at preparing the students for managing global e-business activities within the framework of accelerated trends for globalization. International aspects of E-business have become more important due to the variables in legal and regulatory regimes, the state of the communications infrastructure and differences in culture; including language and perception of the benefits of the Internet. Students will be prepared to understand the worldwide unevenness in the adoption and use of E-business globally and develop ability to customize and personalize the Internet experience to use at their employment in the field. Prerequisites: MKT 6301 or consent of instructor. (3 - 0) T

IMS 6360 International Strategic Management (3 semester hours) This course examines the strategic challenges that multinational firms face. Issues such as managing across national boundaries, responding to environmental challenges, managing international joint ventures and strategic alliances, managing headquarters-subsidiary relationships, and developing global capabilities will be discussed. Prerequisite: IMS 5200 (3-0) Y

IMS 6365 Cross-Cultural Communication and Management (3 semester hours) This course focuses on understanding national culture and cultural issues in international business. It emphasizes the importance of managing cultural differences to enhance communication, negotiation, leadership, and group dynamics in an international work environment. Further, the course describes methods to develop effective selection and training programs for international assignments. (3-0) Y

IMS 7300 International Management (3 semester hours) Current theory and research on international management, multinational corporations, and government policies affecting international business. Prerequisite: admission to OSIM Ph.D. program or consent of instructor. (3-0) Y
Area Studies

Area studies courses focus on the history and role of specific geographic regions in the global economy. These courses may be repeated for credit as the course topics change.

IMS 7V50 Area Studies-Far East (2 or 3 semester hours) History of economic development and overview of current participation in the world economy. Prerequisite: IMS 5200 or consent of instructor. ([2 or 3]-0) T

IMS 7V52 Area Studies-Russia (2 or 3 semester hours) History of economic development and overview of current participation in the world economy. Prerequisite: IMS 5200 or consent of instructor. ([2 or 3]-0) T

IMS 7V53 Area Studies-Eastern Europe (2 or 3 semester hours) History of economic development and overview of current participation in the world economy. Prerequisite: IMS 5200 or consent of instructor. ([2 or 3]-0) T

IMS 7V54 Area Studies-Western Europe (2 or 3 semester hours) History of economic development and overview of current participation in the world economy. Prerequisite: IMS 5200 or consent of instructor. ([2 or 3]-0) T

IMS 7V55 Area Studies-Latin America (2 or 3 semester hours) History of economic development and overview of current participation in the world economy. Prerequisite: IMS 5200 or consent of instructor. ([2 or 3]-0) T

IMS 7V59 Area Studies-Special Topics (2 or 3 semester hours) History of economic development and overview of current participation in the global economy of regions of the world of timely interest to international management but outside the scope of other Area Studies courses. Prerequisite: IMS 5200 or consent of instructor. ([2 or 3]-0) T

Directed Readings, Seminars and Research

IMS 8V40 Seminar in International Business (2, 3 or 6 semester hours) Discussion of selected concepts and theories in international business. (May be repeated for credit.) ([2, 3, or 6]-0) T

IMS 8V60 Readings in International Business (2, 3, or 6 semester hours) Investigation into the literature of topical areas in international business. ([2, 3, or 6]-0) T

IMS 8V80 Research Series in International Business (2, 3, or 6 semester hours) (May be repeated for credit.) ([2, 3, or 6]-0) T

IMS 8399 Dissertation (3 semester hours) (May be repeated for credit.) (3-0) S

Management Information Systems

MIS 5321 Computer Programming (3 semester hours) Introductory and advanced programming techniques using C/C++ with emphasis on business applications. Concepts in JAVA will also be introduced. (3-0) T

MIS 6150 Electronic Commerce Lab (1 semester hour) Lab-based practice of electronic business concepts. (1-0) Y

MIS 6204 Information Technology and MIS Fundamentals (2 semester hours) Necessary background to understand the role of information technology and Management Information Systems in today’s business environment. Topics include: strategic role of information, organization of information, information decision making requirements, telecommunications and networking, managing information resources, distributed processing, and current information systems/technology issues. (2-0) S

MIS 6302 Strategic Impact of Information Technology (3 semester hours) The strategic implications of telecommunications technology and information systems will be explored in this course. Competitive advantage accruing from adoption of information technology solutions will be addressed. Economic issues, benefits and risks associated with technology adoption will also be addressed in this course. Related to the acquisition, deployment and benefits accruing from the implementation. (Prereq MIS 6204 or MIS 6350) (3-0) Y

MIS 6308 Systems Analysis and Project Management (3 semester hours) This course will introduce students to various methodologies for systems analysis. A critical component of the course is project management as it relates to systems development. Students will also be introduced to project management software. Prerequisite: MIS 6326. (3-0) Y

MIS 6312 Automated System Development Methodologies (3 semester hours) Emphasis on the development of information systems with automated tools. Topics include procedure definition, dialogue design, screen/report design, procedure logic design, and technical design. Students use CASE software tools to demonstrate methodologies. Prerequisite: MIS 6308 or consent of instructor. (3-0) Y

MIS 6314 System Re-Engineering Project (3 semester hours) This course utilizes Information Engineering Methodology to plan, analyze, design, and construct a working system. Students are members of a project team which will complete an advanced application execution of a “real world” development problem. Prerequisite: MIS 6308. (3-0) Y

MIS 6316 Telecommunications (3 semester hours) This course covers the fundamentals of telecommunications, including: transmission, switching, throughput and capacity, error rates and checking, and security and policy issues. State of the art technologies and their applications to business are covered in depth. (3-0) Y
MIS 6318 Introduction to Electronic Commerce (3 semester hours) Technical, economic, and managerial issues leading to prudent decision making for the implementation of electronic commerce applications and data communications networks including: overview of current technologies for enterprise-wide connectivity; the Internet and the Information Superhighway; current trends in Internet-based open systems; digital convergence of voice, video, and data; and World Wide Web programming techniques for interactive web document creation. Prerequisite: MIS 6204 or MIS 6350 or consent of instructor. (3-0) Y

MIS 6319 Enterprise Resource Computing (3 semester hours) This course is intended to cover the evolution of computing from "standalone technology islands" to networked computing systems and from standalone applications to integrated enterprise wide applications. It includes a discussion of the idea behind client server computing, application development for a client server architecture, and selection and implementation of ERP systems. A part of the course will be set aside for demonstrations and "hands on" exercises with one of the available ERP software. Prerequisite: MIS 6326. (3-0) Y

MIS 6321 Systems Simulation (3 semester hours) Multiple forms of simulation, in particular discrete simulation models. Technical aspects: generation of random numbers and variates, design of simulation experiments for optimization, analysis of data generated by simulation experiments, and validation of simulation models and results. Prerequisite: STAT 5311 or OPRE 6301 or consent of instructor. (3-0) Y

MIS 6322 Developing Business Applications with Visual Basic (3 semester hours) Students will be introduced to developing business applications using Visual Basic. Topics include fundamental Basic programming, Windows user interface design, Windows and Visual Basic controls, ActiveX controls, data controls, and integration with other applications. (3-0) Y

MIS 6323 Object Oriented Systems (3 semester hours) This course includes the fundamentals of Java programming, writing applets for web-based systems, and business application programming using Java. Prerequisite: MIS 5321 or equivalent. (3-0) Y

MIS 6324 Business Intelligence Software and Techniques (3 semester hours) This course will focus on the design and development of Decision Support Systems (DSS). Topics covered in the course will include the design and development of data warehouses to support decisions, data mining techniques, artificial intelligence techniques including design of expert systems and various types of DSS such as group and negotiation support systems. The role of theses systems in acquiring business intelligence will also be addressed in this course. Prerequisite: MIS 6326. (3-0) Y

MIS 6325 Advanced Telecommunications (3 semester hours) This course will focus on advanced technologies in wireless and wireline telecommunication systems. Topics to be covered will include: wireless voice networks, wide area wireless data networks, wireless local area networks, third generation wireless systems and broadband local access technologies and systems with a focus towards delivery of services via traditional as well as IP. Prerequisite: MIS 6316. (3-0) Y

MIS 6326 Database Management Systems (3 semester hours) Study of relational database theories, industry standard SQL, and database design. Conceptual/semantic data modeling with the entity-relationship diagramming technique is also introduced. A client/server database environment is developed with a selected SQL server, which is Oracle, Sybase, Microsoft SQL Server or other depending on the availability, and a database application development tool. (3-0) Y

MIS 6327 Analysis and Design of Telecommunication Networks (3 semester hours) The focus of this course will be how to perform a financial analysis of telecommunication projects, schedule and manage a telecommunication project and understand mathematical modeling and design tools for voice and data networks. Prerequisite: MIS 6316, 6325. (3-0) Y

MIS 6328 Information Strategy Planning (3 semester hours) This course provides an overview of the issues involved in planning for corporate-wide information systems: how information systems are built to incorporate company goals and objectives, the implications of technology changes upon corporate cultures, project planning and task delegation and the changing role of upper management in today's information intensive business practices. Students use CASE software tools to demonstrate methodologies. Prerequisite: MIS 6204 or consent of the instructor. (3-0) Y

MIS 6329 Contemporary Issues in Telecommunications (3 semester hours) This course covers topics that relate to legal and regulatory issues faced by telecommunication service providers and users in the US as well as around the world. The telecommunications Act of 1996 as well as changes in the regulations for broadband services and expected trends in international markets will be discussed. Prerequisite: MIS 6316. (3-0) Y

MIS 6330 Information Technology Security and Audit (3 semester hours) This course provides an overview of common security practices and introduces the concepts related to applied security technologies. The focus of the class will be on the security and privacy of E-commerce systems. Topics include cryptography (encryption and decryption, digital signatures and certificates), risk management (threat analysis, cost benefit analysis), security audit (intrusion detection and security assurance), disaster recovery (contingency planning, incident handling,
MECO 6215 The Economic and Legal Environment of Business (2 semester hours) This course examines the regulatory and legal environment of business. Antitrust laws and cases are examined, with particular attention to their impact on high technology industries. Comparisons between the impact of these laws and their original intent are emphasized. Additional topics include cost/benefit analysis of government regulations concerning safety, the environment, and anti-discrimination. Prerequisite: MECO 6201 or MECO 6303. (2-0) T

MECO 6303 Business Economics (3 semester hours) Foundations of the economic analysis of business problems, with special emphasis on the function and determination of market prices in production and consumption. Supply and demand, price theory, production theory, trade theory with reference to the global economy, the effects of tax and other policies in the economy, and essential elements of the banking system and monetary policy are addressed. Prerequisite: MATH 5304 or equivalent. (3-0) S

MECO 6311 Economics of Information Goods (3 semester hours) Analysis of the creation, production, pricing and distribution of products that are mainly informational in nature such as software, television, and web pages. Network effects, path dependence, the choice of standards, and the problems of public goods will be analyzed. Includes examination of the roles of patent and copyright laws in the creation of these goods and the impacts of unauthorized copying. Several case studies will be examined in detail. Prerequisite: MECO 6201 or MECO 6303 or consent of the instructor. (3-0) T
MECO 6312 Business Forecasting and Time Series Analysis (3 semester hours) A survey of techniques used in making short-term, intermediate-term, and long-run forecasts of business activity with special emphasis on time series methods. Prerequisites: MECO 6201 or MECO 6303 and STAT 5311 or OPRE 6301, or consent of the instructor. (3-0) T

MECO 6313 The Business of Entertainment (3 semester hours) This course examines the economic factors at work in the entertainment industry. The revenue generation models used by the producers of motion pictures, programming for television, radio, and cable TV, as well as videogames and book publishing will be studied in detail. The impact of digitization on costs, the role of copying and copyright, network effects, peer-to-peer file sharing, the labyrinth of property rights, and digital rights management will be examined through the lens of economics. (3-0) T

MECO 6315 Approaches to Statistical Inference (3 semester hours) Theory and methods of statistical inference. Classical estimation theory, classical hypothesis testing, Bayesian and alternative approaches to statistical inference, general linear model with applications, and computational methods. Prerequisite: OPRE 6330. (3-0) Y

MECO 6320 Introduction to Econometrics (3 semester hours) Matrix algebra treatment of traditional econometrics methods leading to the central focus of the course: modern time-series econometrics. Topics include: stochastic difference equations, stationary time-series (ARMA) models, trends and volatility (ARCH and GARCH processes), Unit Root tests, simultaneous equation time series models, and co-integration and error-correction models. (3-0) Y

MECO 6345 Advanced Managerial Economics (3 semester hours) Advanced economic analysis of consumer theory, production theory, exchange, and market interactions. Managerial topics such as: comparable worth, product standardization, environmental spillover effects, and imperfect competition. Prerequisite: MECO 6201 or MECO 6303 and consent of instructor. (3-0) T

MECO 7320 Advanced Econometrics (3 semester hours) Estimation and testing of multivariate econometric models; sets of regression relationships; asymptotic distribution theory; simultaneous equation systems; applications of methods and models in the analysis of business and economic data. Prerequisite: MECO 6320. (3-0) T

Marketing Management

MKT 6220 Consumer Behavior (2 semester hours) An exposition of the theoretical perspectives of consumer behavior. Study of psychological, sociological, and anthropological findings with reference to consumer decision-making. Prerequisite: MKT 6301 or consent of instructor. (2-0) Y

MKT 6231 Sales Management (2 semester hours) Techniques of sales management with emphasis upon selection, training and evaluating sales performance. Prerequisite: MKT 6301 or consent of instructor. (2-0) T

MKT 6301 Marketing Management (3 semester hours) Overview of marketing management methods, principles and concepts including product, pricing, promotion and distribution decisions. (3-0) S

MKT 6309 Marketing Research (3 semester hours) Methods employed in market research to understand consumer behavior to enable better marketing decision-making. Topics include focus groups, understanding different sources of secondary data, questionnaire design, design of experiments, sampling plans, and data analysis using statistical techniques. In addition, the course will cover attitude measurement, and market research on the Internet. Prerequisites: MKT 6301 and STAT 5311 or OPRE 6301, or consent of instructor. (3-0) Y

MKT 6320 New Technology Forecasting (3 semester hours) Market analysis and demand forecasting of new technologies. Diffusion theory including Bass Model and extensions: multiple generations of technologies, effects of decision variables, and learning. Applications to new and developing high technology products and services. Use of software and computer programs. (3-0) T

MKT 6322 Internet Business Models (3 semester hours) Topics to be covered are: consumer behavior on the Internet, advertising on the Internet, competitive strategies, market research using the Internet, brand management, managing distribution and supply chains, pricing strategies, electronic payment systems, and developing virtual organizations. Further, students learn auction theory, web content design, and clickstream analysis. Prerequisites: MKT 6301 or consent of instructor. (3-0) Y

MKT 6323 Database Marketing (3 semester hours) Techniques to analyze, interpret, and utilize marketing databases of customers to identify a firm's best customers, understanding their needs, and targeting communications and promotions to retain such customers. In addition, students will learn to use SAS software. Prerequisites: MKT 6301 and STAT 5311 or OPRE 6301, or consent of instructor. (3-0) Y

MKT 6329 Product Management (3 semester hours) Development and introduction of new products and the management of existing products. Topics include product positioning, screening, concept development, test marketing, and branding strategies. Further students will learn to use conjoint analysis for new product
development, measurement of brand equity, product line extensions, and management of services. Prerequisite: MKT 6301 or consent of instructor. (2-0) Y

**MKT 6332 Advertising and Promotional Strategy** (3 semester hours) The process of formulating promotional strategy with particular emphasis on advertising and sales promotions. Topics include behavioral theories of communication, budgeting, media selection, scheduling of advertisements, measurement of advertising effectiveness, and management different types of sales promotions. Students analyze grocery scanner data to evaluate the effectiveness of promotions. Prerequisite: MKT 6301 or consent of instructor. (2-0) Y

**MKT 6336 Pricing** (3 semester hours) Techniques to price durable goods, packaged goods and services. Topics include: perceived value pricing, bundling, price discrimination, product-line pricing, dynamic pricing over the products' life-cycle, pricing through the marketing channel, and competitive pricing. In addition to microeconomic approaches to pricing, behavioral approaches to pricing will also be covered. Pricing decisions will be analyzed using spreadsheet analysis. Prerequisites: MKT6301 or consent of instructor. (3-0) T

**MKT 6350 Competitive Marketing Strategy** (3 semester hours) Students learn how firms develop their marketing strategy to compete effectively in different situations. Using game theory principles, they will be exposed to competitive strategies in new emerging markets, mature markets, and on the Internet. Prerequisites: MKT6301 or consent of instructor (3-0) T

**MKT 6380 Entrepreneurial Marketing** (3 semester hours) Addresses the marketing challenges facing the entrepreneurial firm, including the introduction and marketing of new products and services without the benefit of an established channel infrastructure or customer base. Topics include the development of marketing strategies, channel selection and design, product positioning, competitive pricing strategies, advertising and promotion within the framework of the resource limitations inherent in an entrepreneurial startup. This course is equivalent to ENTP 6380 and only one of these may count toward a degree. Prerequisites: BPS 6310 and BPS 6370 or permission of the instructor. (3-0) T

**MKT 7314 Marketing Models I** (3 semester hours) Study of mathematical models used in solving marketing problems including brand switching, new product adoption, and competitive strategy models. Prerequisites: OPRE 6201 or OPRE 6302 and MKT 6301, or consent of instructor. (3-0) Y

**MKT 7315 Marketing Models II** (3 semester hours) Advanced study of mathematical models used in solving marketing problems including brand switching, new product adoption, and competitive strategy models. Prerequisites: OPRE 6201 or OPRE 6302 and MKT 6301, or consent of instructor. (3-0) Y

**MKT 7316 Marketing Models III** (3 semester hours) Study of mathematical and statistical models used in the analysis of markets and marketing problems including dynamic models of marketing mix, applications of econometric methods in marketing. Prerequisites: STAT 5311 or OPRE 6301 and MKT 6301, or consent of instructor. (3-0) T

**MKT 7317 Marketing Models IV** (3 semester hours) Advanced study of mathematical models used in the analysis of markets and marketing problems including use of game theory and modeling uncertainty. Prerequisites: STAT 5311 or OPRE 6301 and MKT 6301, or consent of instructor. (3-0) T

**MKT 7318 Marketing Models V** (3 semester hours) Study of models relating to strategic issues in marketing including first mover advantages, interface of technology and marketing and management of novel technologies. Prerequisite: Consent of instructor. (3-0) T

**MKT 7V12 Research Applications in Marketing** (3 or 4 semester hours) Application of multivariate methods in statistics to marketing problems including discriminant analysis, logit/probit analysis, and other multivariate applications. Prerequisites: STAT 5311 or OPRE 6301 and MKT 6301, or consent of instructor. (May be repeated for credit.) [(3 or 4]-0] T

**Medical Management**

*Special admission and fee requirements apply to all MED courses.

**MED 6401 Negotiation and Conflict Management in Healthcare** (4 semester hours) Develops critical negotiating and conflict management skills to significantly improve the quality of life within a medical organization. Topics include learning how to recognize the difference between positive and disruptive conflict, developing systems that handle conflict at the least disruptive level, mediating disagreements among colleagues, negotiating effectively against a stronger opponent and dealing with disruptive or impaired colleagues. (4-0) T

**MED 6402 Financial Management of Healthcare Organizations** (4 semester hours) Develops the critical skills needed to measure and evaluate the financial consequences of important business decisions faced by healthcare professionals. Topics include learning how to read and interpret financial statements, how to manage financial risk, determining an organization’s cost of capital, using net present value to make value creating investment decisions and developing tools to measure a medical organization’s ability to attract and retain capital. (4-0) T
MED 6403 Medical Cost and Performance Management (4 semester hours) Cost control requires the systematic collection of revenue and cost information from both service lines and responsibility centers. Topics include using flexible budgeting to improve operating performance, identifying and controlling the major cost drivers in a medical practice, measuring the profitability of individual medical services and developing both financial and non-financial measures of organizational performance. (4-0) T

MED 6404 Service Quality Improvement and Patient Satisfaction (4 semester hours) Provides the tools physicians and administrators need to build, position and defend their practices by increasing patients awareness, satisfaction and demand for their services. Topics include learning how to define service quality, developing products and services that add patient value, evaluating and responding to competitors’ marketing strategies, using marketing positioning to defend their organization’s competitive advantage and assessing market data to measure marketing results. (4-0) T

MED 6405 Healthcare Information Management and Technology (4 semester hours) Effective use of information technology can improve service quality, lower costs and increase physician productivity. Participants learn the critical success factors for selecting and implementing a computer information system. Topics include analyzing new information technologies, developing an IT implementation plan and budget and managing computer consultants and contractors. (4-0) T

MED 6406 Strategic Leadership of Healthcare Organizations (4 semester hours) Develops the strategic thinking skills physicians and administrators need to guide their organizations’ development during times of turbulent change. Topics include critically assessing an organization’s strengths and weaknesses, detecting the competitive threats to long-term survival, identifying potential strategic partners, developing strategies that create sustainable competitive advantage and dealing with a failed alliance or joint venture. (4-0) T

MED 6407 Healthcare Policy and Regulation (4 semester hours) Examines the social and economic forces that are shaping healthcare policy. Analyzes the federal government’s role in the regulation, financing and delivery of healthcare, discusses the HCFA’s enforcement activities with OIG and develops a strategic response to expanding regulation and reductions in Medicare funding. This class is held in Washington, DC. (4-0) T

MED 6408 Leading Organizational Change in Healthcare (4 semester hours) Examines change processes how to apply them in an often uncertain and resistant environment. Topics include indepth analysis of the barriers to change in a healthcare organization, identifying the highest payoff actions and priorities, developing methods to deal with internal resistance and project management tools for tracking the change process. (4-0) T

MED 6409 Self-directed Field Study (4 semester hours) A self-directed, faculty supervised field study of the participant’s practice or medical organization using the knowledge and skills acquired in the residential program. This course is non-residential. (4-0) T

MED 6V10 Special Topics in Medical Management Issues in current Medical Management. Topics vary from semester to semester. May be repeated for credit to a maximum of six hours. (1-3-0) Y

Operations Research

OPRE 6202 Operations Research II (2 semester hours) Continued study of operations research techniques and their uses and limitations in managing the operations of an organization. Queuing theory, simulation methods, and mathematical programming techniques, including linear, non-linear and discrete methods will be discussed. Prerequisites: OPRE 6302. (2-0) T

OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business (3 semester hours) Introduction to statistical and probabilistic methods and theory applicable to situations faced by managers. Topics include: data presentation and summarization, regression analysis, fundamental probability theory and random variables, introductory decision analysis, estimation, confidence intervals, hypothesis testing, and One Way ANOVA (Some sections of this class may require a laptop computer). Prerequisite: MATH 5304 or equivalent. (3-0) S

OPRE 6302 Operations Management (3 semester hours) Operations Management integrates all of the activities and processes that are necessary to provide products and services. This course overviews methods and models that help managers make better operating decisions over time. How these methods will allow firms to operate both manufacturing and service facilities in order to compete in a global environment will also be discussed. Prerequisite: STAT 5311 or OPRE 6301 (3-0) S

OPRE 6310 Mathematical Programming I (3 semester hours) Optimization techniques of linear models including simplex method, duality theory, variants and special implementation of simplex methods, sensitivity analysis, parametric programming. Prerequisite: OPRE 6201 or OPRE 6302 or consent of instructor. (3-0) R

OPRE 6311 Game Theory (3 semester hours) Two person zero-sum and non-zero-sum games; Nash equilibrium; use of LP and Complementarity, N-person games; core, nucleolus, stable sets, etc. Applications to market equilibrium problems. Prerequisite: OPRE 6310 or consent of instructor. (3-0) R
OPRE 6330 Probability and Stochastic Processes (3 semester hours) Basic concepts and methods from probability theory that are useful in the modeling of complex systems. Topics include Poisson and renewal processes, discrete and continuous-time Markov chains, semi-Markov processes, and various concepts of stochastic ordering. Prerequisite: OPRE 6201 or OPRE 6302 and STAT 5311 or OPRE 6301, or consent of instructor. (3-0) Y

OPRE 6331 Stochastic Models in Operations Research (3 semester hours) Stochastic models in operations research. Topics include queuing models, stochastic dynamic programming, stochastic scheduling, inventory models, and simulation. Prerequisite: OPRE 6330 or consent of instructor. (3-0) R

OPRE 6335 Risk and Decision Analysis (3 semester hours) This course provides an overview of the main concepts and methods of risk assessment, risk management, and decision analysis. The methods used in industry, such as probabilistic risk assessment, six sigma, and reliability, are discussed. Advanced methods from economics and finance (decision optimization and portfolio analysis) are presented. Prerequisite: OPRE 6301. (3-0) T

OPRE 6340 Flexible Manufacturing Strategies (3 semester hours) The use of automation in manufacturing is continuously increasing. This course covers the variety of types of flexible automation, including flexible manufacturing systems, integrated circuit fabrication and assembly, and robotics. Examples of international systems are discussed to show the wide variety of systems designs and problems. Strategic as well as economic justification issues are covered. (3-0) R

OPRE 6360 Operations Strategy (3 semester hours) This course provides an overview of the key concepts that comprise manufacturing and service strategy. It assumes, in broad terms, overall corporate or business unit strategy as an input and focuses on building distinctive competencies within manufacturing and services. It deals specifically with resource allocation and reallocation—relating and combining corporate strategy, manufacturing strategy and service strategy. (3-0) T

OPRE 6361 Production Planning and Control (3 semester hours) Analysis of the production system of a manufacturing organization. Classical modeling and decision methods including simulation methods for stochastic models and exact and heuristic solutions of deterministic models. Material Requirement Planning systems and Flexible Manufacturing systems. Prerequisite: OPRE 6201 or OPRE 6302 or consent of instructor. (3-0) Y

OPRE 6362 Project Management (3 semester hours) Critical path methods for planning and controlling projects including time/cost tradeoffs, resource utilization, and stochastic considerations. Managerial considerations include project costing, organizational design, and conflict resolution. Applications include system startup/shutdown, new product introductions, management of research, and construction projects. Prerequisite: Consent of instructor. (3-0) T

OPRE 6363 Inventory Control (3 semester hours) Analysis of deterministic and simple stochastic inventory models. Stochastic periodic reorder models with simple deterministic and simulation solutions. Lot size models and their extensions, reorder point determination, price break, Wagner-Whitin, Modigliani-Holm models. Prerequisite: OPRE 6260 or OPRE 6302 or consent of instructor. (3-0) R

OPRE 6364 Quality Control (3 semester hours) Concepts and theory of quality control in manufacturing and service operations. Analysis of product design, process capability studies, statistical process control, and acceptance sampling. Prerequisite: STAT 5311 or OPRE 6301. (3-0) R

OPRE 6366 Supply Chain Management (3 semester hours) Key Issues associated with the design and management of industrial supply chains. The efficient integration of suppliers, factories, warehouses, and stores so that products are distributed to customers in the right quantity and at the right time. Prerequisite: OPRE 6201 or OPRE 6302 or consent of instructor (3-0) Y

OPRE 6367 Capstone Projects in Supply Chain Management (3 semester hours) Capstone projects are sponsored by local industries and provide the students an opportunity to apply the skills and knowledge gained to solve real world challenging problems in the area of supply chain management. Students work in a team environment, interact with industry leaders and gain some industry specific knowledge. Prerequisites: OPRE 6366 or consent of instructor (3-0) R

OPRE 6368 Industrial Applications in Supply Chains (3 semester hours) The course discusses and reviews major Supply Chain challenges and relevant decision making tools used in the industry. The course proceeds with the analysis of real-life cases during which the students obtain industry specific knowledge. Some of the industries of interest are Telecommunications, High-tech Electronics, Semiconductors, Consumer Goods and Retail. Prerequisites: OPRE 6366 or consent of instructor. (3-0) R

OPRE 6370 Logistics and Distribution (3 semester hours) This course focuses on the study of logistics systems, with emphasis on the design and analysis of transportation and supply chain systems, including the components of transportation and supply chain systems, such as suppliers, warehouse, material handling, customers, production, inventory, orders, transportation, and information systems; the interactions between these components; models and techniques for the analysis of logistics systems. Prerequisites: OPRE 6201 or OPRE 6302 or consent of instructor. (3-0) T
Management 239

OPRE 6271 Project Overview, Strategic and Process Management (2 semester hours) This course consists of an introduction to the entire project management process, including Initiation, Planning, Executing, Controlling and Closing processes. It also provides an overview of interpersonal skills and strategic and process management as related to project management and financial considerations in project selection. (2-0) R

OPRE 6372 Project Initiation (3 semester hours) Project selection, interpersonal and organizational issues related to the initiation of projects. Specific topics include investment criteria; project selection models; negotiation techniques and related interpersonal considerations. Prerequisite: OPRE 6271. (3-0) R

OPRE 6373 Project Planning (3 semester hours) Initial stages in planning a project to include scope definition; quality planning; organization considerations; negotiation; communication and decision making and related interpersonal considerations. Prerequisite: OPRE 6372. (3-0) R

OPRE 6374 Project Planning and Execution (3 semester hours) Planning techniques continued from OPRE 6373 and introduction of execution phase requirements. Included are quantitative decision making techniques; earned value measurements; interpersonal leadership principles; planning for control and execution of the project; risk management techniques and procurement principles. Prerequisite: OPRE 6373. (3-0) R

OPRE 6375 Project Execution and Closeout (3 semester hours) Techniques required for successful execution of a project continued from OPRE 6374 plus project closeout requirements. These include procurement; quality measurement; balanced scorecard; understanding of power and politics within organization and how they impact project success; integration of multiple projects; interpersonal consideration such as motivation and commitment and recognition and reward systems; and project closeout techniques. Prerequisite: OPRE 6374. (3-0) R

OPRE 6376 Advanced Project Management and Simulation (3 semester hours) Advanced methods for managing projects including capability maturity models; enterprise project management and a simulation modeling all 5 phases of the project management process. Prerequisite: OPRE 6375. (3-0) R

OPRE 6385 Scheduling (3 semester hours) Concepts and theory of scheduling problems with business applications. Combinatorial approaches for simple systems, and queuing/simulation methods for large and/or complex systems. Prerequisite: OPRE 6201 or OPRE 6302 or consent of instructor. (3-0) T

OPRE 6386 Applied Programming Languages (3 semester hours) An introduction to various mathematical, simulation and statistical software such as Mathematica, Gauss, SAS, and CPLEX. Students will use these package programs to solve problems in various business disciplines. Prerequisite: OPRE 6201 or OPRE 6302, STAT 5352, or consent of instructor. (3-0) Y

OPRE 7313 Network Flow (3 semester hours) Network flow models and solution algorithms. Matrix representations and properties, max-flow algorithms, min-cost flow algorithms, circulation and feasibility theorems, sensitivity analysis, integrality property of solutions, shortest route methods. Problems with special structure. CPT-PERT, multicommodity flows, matching, traveling salesperson problem. Prerequisite: OPRE 6310 or consent of instructor. (3-0) T

OPRE 7314 Optimization in Combinatorial Structures (3 semester hours) Optimization methods for combinatorial problems, e.g., for independent systems, blocking/antiblocking systems, matroids, graphs and hypergraphs. Polyhedral representation of convex hull of solutions and related optimization algorithms. Graph theoretic and algebraic characterizations of problems involving (totally, locally) unimodular, balanced, perfect matrices. Prerequisites: OPRE 6310 and OPRE 7313, or consent of instructor. (3-0) R

OPRE 7315 Dynamic Programming (3 semester hours) This course is an introduction to both deterministic and stochastic dynamic programming. The basic ideas of recursion and functional equation will be introduced. A wide variety of applications will be used to illustrate these concepts. Specific topics include: Markov and Semi-Markov decision processes, principle of optimality, structure of optimal policies under various cost criteria, LP formulations, and policy-improvement techniques. Prerequisites: OPRE 6310 and OPRE 6331, or consent of instructor. (3-0) R

OPRE 7320 Optimal Control Theory and Applications (3 semester hours) This course is an introduction to Optimal Control Theory and a survey of it’s selected applications in finance, production, marketing and economics. Relationships to dynamic programming and Kuhn-Tucker conditions are also pointed out. Emphasis is on modeling and not on mathematical rigor. Prerequisites: Two semesters of calculus including some knowledge of differential equations and linear algebra or consent of instructor. (3-0) Y

OPRE 7330 Deterministic Models in Operations Research. (3 semester hours) Deterministic models in operations research. Topics include linear programming, sensitivity analysis and duality, assignment problems, network models, integer programming, nonlinear programming, sequencing and scheduling models. (3-0) Y

OPRE 7346 Differential Games and Applications (3 semester hours) Concepts and methods of game theory and differential games are presented, including both deterministic and stochastic models. The theory of necessary conditions, dynamic programming, and Nash equilibrium are discussed. Applications to economics and management are presented. Prerequisite: OPRE 7320 or consent of instructor. (3-0) T
Management

OPRE 7372 Advanced Topics in Supply Networks (3 semester hours) Important and contemporary supply chain models and related quantitative methods. Main focus is on models that treat uncertainty explicitly. Integration of supply network decisions with the associated technical difficulties is the central theme. Topics include supply network design, inventory centralization, multistage production systems, value of information, pricing, risk and contracts. Prerequisites: OPRE 6302, OPRE 6330 and OPRE 6366 or consent of the instructor. (3-0) R

Organizational Behavior

OB 6231 Power and Politics in Organizations (2 semester hours) Political processes and the development and use of power in organizations including the role of power in decision making, sources of power, conditions for the use of power, assessing power in organizations; political strategies and tactics; political language and symbols, and applications to budgeting, careers and organizational structure. (2-0) T

OB 6247 Performance Management Systems (2 semester hours) A systematic approach is taken to show how performance management adds value to the organization. Emphasis is on the manager-employee communication process involved in establishing clear expectations and understanding about the job. Job functions, the role of the job in reaching organizational goals, performance appraisal techniques and uses, and performance improvement issues are addressed. Prerequisite: OB 6301 or consent of instructor. (2-0) T

OB 6251 Organizations and Environments (2 semester hours) Analysis of organization-environment relations, with special emphasis on managing the organization for strategic advantage. Theories and concepts will be drawn from the fields of organizational sociology, industrial organization economics, and strategic management. Topics include mergers, acquisitions, and divestitures; regulation and deregulation; the role of boards of directors; the diffusion of organizational innovations; collective organizational actions such as joint ventures, the formation of trade associations, and industry evolution. (2-0) R

OB 6301 Organization Behavior (3 semester hours) The study of human behavior in organizations. Emphasizes theoretical concepts and practical methods for understanding, analyzing, and predicting individual, group, and organizational behavior. Topics include work motivation, group dynamics, decision making, conflict and negotiation, leadership, power, and organizational culture. Ethical and international considerations are also addressed. (3-0) S

OB 6303 Managing Organizations (3 semester hours) Macro-management: managing internal organizational processes such as restructuring, and external network relationships such as strategic alliances. Applications to current management issues. Prerequisite: OB 6301 or consent of instructor. (3-0) Y

OB 6305 Foundations of Work Behavior (3 semester hours) Individual work behaviors such as organizational choice, motivation, performance, turnover, and absenteeism. Motivational processes which support such behaviors and the personal reactions of persons to them. Prerequisite: OB 6301. (3-0) Y

OB 6307 Strategic Human Resource Management (3 semester hours) Theories, concepts, and procedures involved in managing human resources. Examination of the correspondence between organizational strategies and human resources needed to carry out those strategies. Topics include job analysis, compensation and benefits, performance management, succession planning, career development issues, legal considerations, and international issues. Prerequisite: OB 6301 or consent of instructor. (3-0) T

OB 6321 Principles of Leadership (3 semester hours) Theories and techniques of leadership, emphasizing the complementary roles of management and leadership in organizations. The course will address emotional intelligence, leadership styles, communications and leadership processes, focusing on how leaders turn challenging opportunities into successes and get extraordinary things done in organizations. Self-assessment exercises will focus on the development of individual leadership skills. Prerequisite: OB 6301 or consent of instructor. (3-0) Y

OB 6322 Interpersonal Dynamics (3 semester hours) Structures and processes governing interactions among persons in small groups, linking individuals into social units. Structures of power, leadership, norms, roles and status. Processes of intimacy, influence, communication, decision making, cooperation/conflict and change. Prerequisite: OB 6301. (3-0) T

OB 6325 Social Psychology of Organizations (3 semester hours) Current social psychological theories, organizational roles, organizational stress, leadership, power, decision making, structure, quality of working life, cross-cultural issues, organizational effectiveness and change. Prerequisite: OB 6305 or consent of instructor. (3-0) R

OB 6326 Organizations and Organizing (3 semester hours) Means by which people create, maintain, and change organized work structures. Resulting alternative organizational forms are examined. Prerequisites: OB 6303 and OB 6305, or consent of instructor. (3-0) T
OB 6332 Negotiation and Dispute Resolution (3 semester hours) This course explores the theories, processes, and practical techniques of negotiation so that students can successfully negotiate and resolve disputes in a variety of situations including interpersonal, group, and international settings. Emphasis is placed on understanding influence and conflict resolution strategies; identifying interests, issues, and positions of the parties involved; analyzing co-negotiators, their negotiation styles, and the negotiation situations; and managing the dynamics associated with most negotiations. Practical skills are developed through the use of simulations and exercises. Prerequisite: OB 6301 or consent of instructor. (3-0) T

OB 6333 Managerial Decision Making (3 semester hours) Normative and descriptive examination of managerial decision making at the individual, group, and organizational levels. Exploration of cognitive heuristics, rational and non-rational decision making, temporal decision processes, and strategic decision processes under the influence of uncertainty and ambiguity of organizational contexts. Prerequisite: OB 6301 or consent of instructor. (3-0) T

OB 6340 Leading Strategic Change Processes in an International Environment (3 semester hours) This course emphasizes practical skills required to be an effective change agent. Topics include entry in change projects, negotiating role expectations, contracting, diagnostic interviewing, motivating system change and overcoming resistance, group dynamics and large group interventions, and intercultural differences in leadership expectations. All participants will be involved in a change project as part of the course. Prerequisite: OB 6301 or consent of instructor. (3-0) T

OB 6360 Information Processing and Interpersonal Skills (3 semester hours) Communication theory and application including decoding/listening, processing/analyzing, and encoding/speaking and writing. Prerequisite: OB 6301. (3-0) R

OB 7300 Organization Theory (3 semester hours) Survey of major theoretical perspectives and current research in organization theory. Prerequisite: admission to OSIM Ph.D. program or consent of instructor. (3-0) Y

OB 7303 Research Methodology in Behavioral Sciences (3 semester hours) Advantages and disadvantages of research based on field experiments, field studies, survey analyses, laboratory experiments, participant observation, content analyses, interviewing, cross-cultural studies, simulations, demographic and data archive methods. Integration of research designs and multimethod techniques. (3-0) T

OB 7306 Macro-Organizational Empirical Investigation (3 semester hours) Ph.D. seminar in the process of empirical research on organizations including formulation of a research question; the development and application of theory leading to the construction of models and the formulation of hypotheses; the design of a study; identification of data sources and the collection of data; computer analysis of data to test hypotheses; and the presentation of the study in a research paper. Emphasis will be given to linear models, archival data, and regression analysis, but other approaches will be discussed. Prerequisite: OB 7300 or equivalent, or consent of instructor. (3-0) R

OB 7310 Theory and Research in Group and Intergroup Processes (3 semester hours) Current theories of group processes and group development in different social contexts. Work and non-work, intergroup relationships, group task and process issues, stages of group development, group norms, group roles, group structure, leadership, group cohesion, intergroup conflict and cooperation, intergroup interdependencies and organizational structure, boundary roles, intergroup communication, power, organizational politics, and managing intergroup differences. Prerequisites: OB 6301, OB 6303, and OB 6322, or consent of instructor. (3-0) R

General Course Descriptions
MAS 6V00-6V10: Special Topics (1, 2, 3 or 4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1,2,3, or 4]-0) S

MAS 6V00 Management Science
MAS 6V01 Management
MAS 6V02 Organizational Behavior
MAS 6V03 Business Policy and Strategy
MAS 6V04 International Management
MAS 6V05 Marketing Management
MAS 6V06 Finance
MAS 6V07 Managerial Economics
MAS 6V08 Operations Research
MAS 6V09 Accounting and Information Management
MAS 6V10 Management Information Systems
MAS 8V00-8V10 Special Topics (1, 2, or 3 semester hours) May be lecture, seminar, readings or individualized study. May be repeated for credit. ([1, 2, or 3]-0) S

MAS 8V00 Management Science
MAS 8V01 Management
MAS 8V02 Organizational Behavior
MAS 8V03 Business Policy & Strategy
MAS 8V04 International Management
MAS 8V05 Marketing Management
MAS 8V06 Finance
MAS 8V07 Managerial Economics
MAS 8V08 Operations Research
MAS 8V09 Accounting and Information Management
MAS 8V10 Management Information Systems

MAS 8V01 Management Internship (2-3 semester hours) Course develops a student's business knowledge through appropriate developmental work experiences in a real business environment. Student is required to identify and submit specific Business Learning Objectives at the beginning of the semester. The student must demonstrate exposure to the managerial perspective, via involvement or observation. At semester end, student prepares an oral presentation, reflecting on the work experience. Student performance is evaluated by the work supervisor. (consent of instructor required) S

MAS 8113 Practicum in Management (1 semester hour) Course develops a student's business knowledge through appropriate developmental work experiences in a real business environment. Student is required to identify and submit specific Business Learning Objectives at the beginning of the semester. The student must demonstrate exposure to the managerial perspective, via involvement or observation. At semester end, student prepares an oral presentation, reflecting on the work experience. Student performance is evaluated by the work supervisor. (consent of instructor required) (May be repeated for credit.) (1-0) S

MAS 8V20-8V32 Readings Series In Management Science (2, 3, 6 or 9 semester hours) Investigation into the literature of topical areas of management (May be repeated for credit.) ([2,3,6 or 9]-0) S

MAS 8V20 Operations Research
MAS 8V21 Management Information Systems
MAS 8V22 Organizational Behavior
MAS 8V23 Business Systems: Marketing
MAS 8V24 Business Systems: Financial
MAS 8V25 Operations Management
MAS 8V30 Accounting and Information Management
MAS 8V31 Strategic Management
MAS 8V32 Business Economics
MAS 8V40-8V528V43 Seminar Series in Management Science (2, 3, 6 or 9 semester hours) Discussion of selected concepts and theories in management. (May be repeated for credit.) ([2,3,6 or 9]-0) S

MAS 8V40 Operations Research
MAS 8V41 Management Information Systems
MAS 8V42 Organizational Behavior
MAS 8V43 Business Systems: Marketing
MAS 8V44 Business Systems: Financial
MAS 8V45 Operations Management
MAS 8V50 Accounting and Information Management
MAS 8V51 Strategic Management
MAS 8V52 Business Economics
MAS 8V80-8V92 Research Series in Management Science (2, 3, 6 or 9 semester hours) (May be repeated for credit) ([2, 3, 6 or 9]-0) S

MAS 8V80 Operations Research
MAS 8V81 Management Information Systems
MAS 8V82 Organizational Behavior
MAS 8V83 Business Systems: Marketing
MAS 8V84 Business Systems: Financial
MAS 8V85 Operations Management
MAS 8V90 Accounting and Information Management
MAS 8V91 Strategic Management
MAS 8V92 Business Economics
MAS 8399 Dissertation (3 semester hours) (May be repeated for credit.) (3-0) S
The School of Natural Sciences and Mathematics houses six departments, each with graduate programs: Chemistry (M.S., Ph.D); Geosciences (M.S., Ph.D); Mathematical Sciences, emphasizing Applied Mathematics and Statistics (M.S., Ph.D.); Molecular and Cell Biology (M.S., Ph.D.); Physics (M.S., M.S. in Applied Physics, Ph.D.); and Science and Mathematics Education (Master of Arts in Teaching). In addition, there are two interdisciplinary degrees offered: Master of Science in Bioinformatics and Computational Biology, and Master of Science in Biotechnology. Each is relatively small and thus able to provide excellent graduate student-faculty contact. However, each maintains a strong research program. Increasingly, Departments interact with each other in research, allowing interdisciplinary efforts to flourish. A number of well-funded Research Centers and Institutes are also housed in NS&M; these allow graduate students to approach real world, cutting edge research problems while working side by side with professional research staff and internationally recognized faculty. They are: the Center for Applied Biology; the Center for Lithospheric Studies; the UTD NanoTech Institute; the Center for Quantum Electronics; the Center for Sickle Cell Disease and Research; and the Center for Space Sciences.

**DEGREES OFFERED**

**BIOLOGY**
- Master of Science in Molecular and Cell Biology
- Doctor of Philosophy in Molecular and Cell Biology

**CHEMISTRY**
- Master of Science in Chemistry
- Doctor of Philosophy in Chemistry

**GEOSCIENCES**
- Master of Science in Geosciences
- Master of Science in Geographic Information Sciences
- Doctor of Philosophy in Geosciences
- Doctor of Philosophy in Geospatial Information Sciences
- Graduate Certificate in Remote Sensing

**MATHEMATICAL SCIENCES**
- Master of Science in Mathematical Sciences – Major in Applied Mathematics
- Master of Science in Mathematical Sciences – Major in Engineering Mathematics
- Master of Science in Mathematical Sciences – Major in Mathematical Sciences
- Master of Science in Mathematical Sciences – Major in Statistics
- Doctor of Philosophy in Mathematical Sciences – Major in Applied Mathematics
- Doctor of Philosophy in Mathematical Sciences – Major in Statistics

**PHYSICS**
- Master of Science in Applied Physics
- Master of Science in Physics
- Doctor of Philosophy in Physics

**EDUCATION**
- Master of Arts in Teaching in Science Education
- Master of Arts in Teaching in Mathematics Education

**INTERDISCIPLINARY PROGRAMS**
- Master of Science in Bioinformatics and Computational Biology
- Master of Science in Biotechnology
Department of Molecular and Cell Biology

http://utdallas.edu/nsm/biology/

Faculty

Professors: Hans Bremer (emeritus), Lee A. Bulla, Santosh R. D’Mello, Rockford K. Draper, Steven R. Goodman, Donald M. Gray, Franklyn G. Jenifer, Betty S. Pace, Lawrence J. Reitzer, C. S. Rupert (emeritus)

Associate Professors: Gail A.M. Breen, John G. Burr, Jeff L. DeJong, Juan E. González, Ernest M. Hannig, Stephen D. Levene, Robert C. Marsh, Dennis L. Miller,

Assistant Professors: Tianbing Xia

Senior Lecturers: Vincent P. Cirillo, John Moltz, Scott A. Rippel, Illya Sapoznikov, Joseph Wood

Objectives

The Graduate Program offers training in those aspects of molecular and cell biology that are the bases of modern biological and biomedical sciences.

The Master of Science degree is designed for students who wish to learn the methodology of research in molecular and cell biology and the fundamentals of problem solving in these areas.

The Master of Science degree without thesis is intended for students who wish to acquire a working knowledge of biotechnology, for other students who seek to gain knowledge of modern biology without the intent to seek positions as technical laboratory personnel, and for those students who are seeking additional preparation for admission to professional schools.

The Master of Arts in Teaching degree in Science Education with a specialization in Biology is designed to strengthen the knowledge of high school teachers in fundamental aspects of biology and to bring them up to date on advances in this rapidly developing field. For further information on this program and for course descriptions, see the Science/Mathematics Education section of this catalog.

The Doctor of Philosophy degree with a major in Molecular and Cell Biology is appropriate for students who show a potential for originality in research and is designed to develop a critical and analytical understanding of current developments which will enable them to keep abreast of the rapid advances that are likely to occur in the biological and biomedical fields.

The M.S. and Ph.D. degree plans offer students the opportunity to prepare for academic careers in colleges and universities including medical and dental schools, and for careers in industrial, hospital, public health, environmental and governmental laboratories and organizations.

Specializations

First-year students will normally complete a body of core courses that emphasize fundamental aspects of biochemistry, biophysics, molecular biology, and cell biology. Students may then proceed to advanced course work in any of these four general areas. Elective courses are open to all qualified students as recommended by their supervising committees. First year students are also encouraged to participate in rotations through research laboratories.

In the second year, research is initiated under the supervision of one or more of the Molecular and Cell Biology faculty. The faculty and their research interests are listed below. Prospective students should recognize that it is possible to do research in closely related areas not mentioned in this list, provided a faculty member is prepared to supervise the work.

Gail A.M. Breen, Isolation and characterization of the genes that code for proteins of the mammalian mitochondrion; mitochondrial biogenesis; eukaryotic gene regulation.
Lee A. Bulla, Molecular basis of biopesticides.
John G. Burr, Eukaryotic growth regulation; mechanism of viral oncogenic transformation.
Santosh D’Mello, Molecular control of neuronal apoptosis
Jeff L. DeJong, Eukaryotic transcription; initiation and activation of RNA polymerase II.
Rockford K. Draper, Membrane traffic; protein toxins; bio-nanotechnology.
Juan E. González, Cell-cell interactions, role of exopolysaccharides in nodulation of legumes by rhizobia; molecular genetics of plant-microbe interactions.
Steven R. Goodman, The spectrin membrane skeleton’s role in blood and neurologic disorders; sickle cell disease.
Donald M. Gray, Study of nucleic acids and single-strand DNA binding proteins.
Ernest M. Hannig, Control of protein synthesis; genetic and biochemical analysis of translation initiation factors; protein-protein interactions.
Stephen D. Levene, Structure and dynamics of nucleic acids and nucleic acid-protein complexes in solution.
Robert C. Marsh, Response of cells to damage; protein cross-linking by transglutaminase; nuclear matrix.
Robert L. Miller, Structure and organization of mitochondrial DNA; mitochondrial gene expression; RNA editing; mitochondrial biogenesis.
Betty S. Pace, Gene therapy, sickle cell disease.
Lawrence J. Reitzer, Regulation of gene expression and metabolism in prokaryotes.
Tianbing Xia, molecular recognition; RNA structure and RNA-protein interaction; conformational dynamics; femtochemistry

Facilities
Major items of equipment used by the faculty and available for graduate student research include a Leica TCS SP2 AOBs confocal microscope system, ThermoFinnigan LC QDECA XP ion trap mass spectrometer, complete Spectra-Physics femtosecond laser system, Becton Dickson fluorescence activated cell sorter, Veeco MultiMode SPM atomic force microscope, Perkin Elmer DNA chip reader, Molecular Dynamics Phospholimagers, BioRad real-time polymerase chain reaction instruments, Beckman scintillation counters and Optima ultracentrifuges, and a Jasco J-715 spectropolarimeter. Individual laboratories are well-equipped with instrumentation needed for research in molecular and cell biology, including thermal cyclers, spectrophotometers, chromatography and electrophoresis systems, chemical hoods, and mammalian cell culture facilities.
Other shared biology facilities include environmental chambers, a staffed media kitchen with autoclaves and washing machines, a darkroom with an x-ray film developer, and an electronics workshop. There is a modern research animal housing facility on campus, as well as a GE 500 MHz FT multinuclear magnetic resonance spectrometer.

Admission Requirements
The University’s general admission requirements are discussed on page 13.

For full participation in the Graduate Program in Molecular and Cell Biology, the student should have a good background in calculus, general physics, organic chemistry, biochemistry, and general biology, including genetics. Entering students not having this background may be required to take some additional course work in their first year or in the summer immediately preceding entry. A minimum GRE score of 1000 (verbal plus quantitative) is advisable based on our experience with student success in the program.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

Upon satisfactory completion of the core courses (and, for Ph.D. candidates, a favorable evaluation following the Spring semester as described below), a Supervising Committee is appointed for each student (except non-thesis M.S. students) based upon mutual agreement between student and faculty. The Supervising Committee, with the Supervising Professor as chairperson, will help the student plan an elective course curriculum and will oversee the student’s research and thesis or dissertation.

Master of Science
All students seeking the Master of Science degree in Molecular and Cell Biology must satisfactorily complete a total of at least 36 graduate semester hours which must include the following core courses: BIOL 5410, BIOL 5420, BIOL 5430, and BIOL 5440.

M.S. students intending to submit a thesis must, in addition to the core courses specified above, satisfactorily complete a further 20 hours of Biology courses which includes BIOL 6193, BIOL 8398, and a minimum of 6 credit hours of general electives for which a letter grade is assigned. The remainder of the credit hours usually reflects experimental research but may also be based on literature research as determined by mutual agreement of the student and Supervising Committee. For M.S. (thesis) students, the maximum number of Pass/Fail credits allowed within the 36 credit hour minimum is 13 semester credit hours.
M.S. (non-thesis) students must in addition to the core courses specified, satisfactorily complete a minimum of
four general elective courses in Biology (for which a letter grade is assigned) for a minimum of 9 credit hours, up to 11 semester credit hours of special electives, and/or, with approval of the Graduate Adviser, other graduate courses. For non-thesis M.S. students, the maximum number of Pass/Fail credits allowed within the 36 credit hour minimum is 11 semester credit hours.

In addition to the Master of Science degree in Molecular and Cell Biology, a Master of Science in Bioinformatics and Computational Biology (BCBM) is offered jointly by the Departments of Mathematical Sciences and Molecular and Cell Biology. This program combines coursework from the disciplines of biology, computer science, and mathematical sciences. Faculty from both Mathematical Sciences (MMS) and Molecular and Cell Biology (MCB) participate in the Bioinformatics and Computational Biology program, with the Mathematical Sciences Department serving as the administrative unit. Both departments participate in advising students. See the Department of Mathematical Sciences for more information on this degree program.

Doctor of Philosophy

All Ph.D. students must satisfactorily complete a total of at least 90 credit hours beyond the bachelor’s degree. Generally, all core courses are mandatory. In special cases the requirement for a core course can be substituted, but only with the permission of the instructor and the graduate adviser, and usually only after examination. Students must include a minimum of four general elective courses in Biology (for which a letter grade is assigned) for a minimum of 9 credit hours. After core courses BIOL 5410, BIOL 5420, BIOL 5430, BIOL 5440, BIOL 5V50 and BIOL 5V51 [and, in addition, BIOL 6V02—(The Art of Scientific Presentation) and BIOL 6193] have been completed, students are evaluated following the Spring semester. The evaluation is based upon performance in the core classes, laboratory rotations, and performance as teaching assistants (if applicable). Students who pass this evaluation must then pass an oral qualifying examination within three semesters to determine the student’s aptitude for continuation of dissertation research. A dissertation defense will be conducted after the dissertation has been written. All students are required to submit a minimum of one manuscript for publication in an internationally recognized, peer-reviewed scientific journal. There is no foreign language requirement.

Biology Course Descriptions

Core Courses

BIOL 5410 Biochemistry of Proteins and Nucleic Acids (4 semester hours) Chemistry and metabolism of amino acids and nucleotides; biosynthesis of nucleic acids; analysis of the structure and function of proteins and nucleic acids and of their interactions including chromatin structure. Prerequisite: biochemistry or equivalent. (4-0) Y

BIOL 5420 Molecular Biology (4 semester hours) Genetic analysis of gene structure (mutations and their analysis, complementation, and recombination), gene expression (transcription, RNA processing, translation), and the regulation of gene expression in selected model systems (viral, prokaryotic, organellar, eukaryotic); principles of genetic engineering (cloning and recombinant DNA technology). (4-0) Y

BIOL 5430 Macromolecular Physical Chemistry (4 semester hours) Structures and properties of macromolecules, interactions with electromagnetic radiation, thermodynamics of macromolecular solutions, and transport processes. Calculus and general physics required. (4-0) Y

BIOL 5440 Cell Biology (4 semester hours) Molecular architecture and function of cells and subcellular organelles; structure and function of membranes; hormone and neurotransmitter action; growth regulation and oncogenes; immune response; eukaryotic gene expression. Prerequisites: BIOL 5410 and BIOL 5420, or the equivalent, or permission of the instructor. (4-0) Y

BIOL 5V50 Methods in Molecular and Cell Biology I (2-6 semester hours) Laboratory instruction in biological, biophysical, and biochemical techniques. Supplemental lectures and demonstrations. (1-[4-10]) Y

BIOL 5V51 Methods in Molecular and Cell Biology II (2-6 semester hours) Laboratory instruction in advanced techniques in molecular and cell biology. Supplemental lectures and demonstrations. (1-[4-10]) Y

Advanced Study

Work is offered beyond the core curriculum in four major areas that parallel four of the lecture-type core courses. Each area provides elective courses, advanced colloquia, and dissertation opportunities. Electives will usually be offered only one semester per year and in some cases only every other year.
Topics in Biochemistry
(Bulla, DeJong, González, Goodman, Gray, Hannig, Levene, Marsh, Miller, Reitzer)

General Electives
BIOL 6211 Posttranscriptional Regulation of Gene Expression (2 semester hours) Emphasis on current research in regulation of gene expression involving posttranscriptional mechanisms. Topics include translational regulation of gene expression, protein and messenger RNA turnover, regulation of protein folding and localization, protein phosphorylation, and the formation of active and inactive protein complexes. (2-0) T
BIOL 6352 Modern Biochemistry I (3 semester hours) Structure and function of proteins, including enzyme kinetics and catalytic mechanisms; structure and metabolism of carbohydrates, including oxidative phosphorylation and electron transport mechanisms. For students who have not had undergraduate biochemistry. (3-0) S
BIOL 6353 Modern Biochemistry II (3 semester hours) Continuation of BIOL 6352. Structure and metabolism of lipids, including membrane structure and function. Nitrogen metabolism: amino acids and nucleotides. Polynucleotide replication, transcription, and translation. For students who have not had undergraduate biochemistry. (3-0) Y
BIOL 6354 Microbial Physiology (3 semester hours) Microbial physiology considers the basic processes of microbes, especially those variations that are unique to microbes: energy generation, fermentations, and other pathways specific to bacteria, cellular structure and differentiation, and bacterial responses to the environment. (3-0) Y
BIOL 6V19 Topics in Biochemistry (2-5 semester hours) May be repeated for credit to a maximum of 9 hours. ([2-5]-0) Y
BIOL 6V28 DNA Replication, Recombination, and Repair (2-3 semester hours) Focuses on central aspects of DNA enzymology and metabolism. The mechanisms of DNA replication, recombination, and repair are fundamental to understanding many principles of molecular biology, genetics, molecular medicine, and evolution. This course is mechanistically oriented and will provide a strong working knowledge of these processes through an extensive overview, which includes discussions of some of the most recent publications on these topics. (2-3) T

Special Electives
BIOL 7V10 Research Seminar in Biochemistry (2-5 semester hours) Presentation and analysis of ongoing independent research projects, accompanied by evaluation of recent related literature. (P/F grading. May be repeated for credit.) ([2-5]-0) Y

Topics in Molecular Biology
(Breen, DeJong, González, Goodman, Hannig, Levene, Marsh, Miller, Pace, Reitzer)

General Electives
BIOL 5381 Genomics (3 semester hours) Genome sequence acquisition and analysis; genomic identification; biomedical genome research; DNA microarrays and their use in applied and healthcare research. (3-0) T
BIOL 5376 Applied Bioinformatics (3 semester hours) Genomic information content; data searches and multiple sequence alignment; mutations and distance-based phylogenetic analysis; genomics and gene recognition; polymorphisms and forensic applications; nucleic-acid and protein array analysis; structure prediction of biological macromolecules. Introductory statistics and 2 semesters of calculus required. (3-0) T
BIOL 6121-6123 Biotechnology I-III (1 semester hour) Gene cloning, nucleotide sequencing and other aspects of genetic engineering. This course has between one and five components, which will be offered sequentially and which may therefore be taken independently (with consent of instructor). (0-2) Y
BIOL 6227 RNA World (2 semester hours) The nature of modern RNA suggests a prebiotic RNA world. This course will begin with a presentation of the arguments that a “RNA world” existed before the evolution of protein synthesis. Additional topics will include RNA evolution, the origin and evolution of introns, RNA replication, the evolution and involvement of tRNAs and rRNAs in protein synthesis, the structure and mechanism of large catalytic RNAs such as Group I and Group II introns and the RNase P RNA, the structure and mechanism of small nuclear RNAs such as hammerheads and hairpins, RNA editing, and the mechanism of telomerase. (2-0) T
BIOL 6228 Prokaryotic Gene Expression (2 semester hours) Principles of gene regulation in bacteria are discussed. The readings consist of recent developments described in the research literature. Topics will vary, but
will include bacterial chromosome structure, function and structure of RNA polymerase and promoters, the
mechanism of action of various repressors and activators, the coordination of gene expression in phage lambda,
during nitrogen limitation, and during sporulation. (2-0) T

**BIOL 6335 Graduate Medical Microbiology**
(3 semester hours) This course expose students to advanced
concepts and principles of medical microbiology. In addition, the course will deal with mechanisms associated with
disease processes, microbial virulence, the control of bacterial growth, and host responses to infection. (3-0) T

**BIOL 6336 Parasitology**
(3 semester hours) A survey of microorganisms that live in close association with other organisms.
From bacteriophages to trypanosomes, this course will cover a wide range of plant and animal parasites
and symbionts and their interactions at the molecular level. (3-0) T

**BIOL 6337 Regulation of Gene Expression**
(3 semester hours) An in depth look at how the cell makes use of
its genetic information, with a primary focus on the mechanisms of transcription regulation. The course emphasizes
a critical discussion of techniques and results from the recent scientific literature. Topics are taken from eukaryotic
and/or prokaryotic systems and typically cover areas such as promoter organization, RNA polymerase and
transcription factor structure and function, the organization and packaging of chromosomes, whole-genome
analyses, and the pathways that control gene expression during growth and development. (3-0) Y

**BIOL 6338 Symbiotic Interactions**
(3 semester hours) An in depth look, at the molecular level, of well
characterized symbiotic interactions between prokaryotes and eukaryotes. This course makes use of recent
scientific literature and the latest discoveries in the area of
symbiosis. (3-0) R

**BIOL 6373 Proteomics**
(3 semester hours) Protein identification, sequencing, and analysis of post-translational
modifications by liquid chromatography/tandem mass spectrometry; determination of protein three dimensional
structure by x-ray crystallography; its use in drug design; understanding protein interactions and function using
protein chip microarrays. (3-0) T

**BIOL 6V29 Topics in Molecular Biology**
(2-5 semester hours) May be repeated for credit to a maximum of 9 hours. ([2-5]-0) Y

**BIOL 6V31 Molecular Genetics**
(3-4 semester hours) A graduate survey of the phenomena and mechanisms of
heredity, its cytological and molecular basis, with a focus on bacterial and model eukaryotic systems. Topics will
include fundamentals of Mendelian Genetics, genetic recombination and genetic linkage, as well as, gene structure
and replication, gene expression and the transfer of genetic information, mutation and mutagenesis, and
applications of recombinant DNA techniques to genetic analysis. ([3-4]-0) Y

**BIOL 6V34 Quorum Sensing**
(2-3 semester hours) The focus of this course is the analysis of quorum sensing
and its role in pathogenic and symbiotic interactions. This course makes use of recent scientific literature and the
latest discoveries in the area of population density dependent gene expression. ([2-3]-0) R

**Special Electives**

**BIOL 7V20 Research Seminar in Molecular Biology**
(2-5 semester hours) Presentation and analysis of ongoing
independent research projects, accompanied by evaluation of recent related literature. (P/F grading. May be
repeated for credit.) ([2-5]-0) Y

**Topics In Biophysics**

(Gray, Levene, Xia)

**General Electives**

**BIOL 6V30 Biopolymers**
(2-4 semester hours) Structure and properties of biologically important macromolecules. ([2-4]-0) R

**BIOL 6V32 Electron Microscopy**
(2-3 semester hours) Theory and practice of electron microscopy. The laboratory
section includes specimen preparation, operation of the electron microscope, and darkroom work. ([1-2]-2) R

**BIOL 6V33 Biomolecular Structures**
(2-3 semester hours) This course includes a discussion of protein motifs
such as alpha-domains, beta structures, and alpha/beta structures in enzymes, of protein folding and stability, and
of DNA structures. Circular dichroism, NMR, and crystallographic methods of structural determination are
presented. Types of proteins whose structure and function are considered include transcription factors,
proteinases, membrane proteins, proteins in signal transduction, proteins of the immune system, and engineered
proteins. Students also receive instruction in the viewing and manipulation of protein and DNA structures using an
advanced molecular modeling system. ([2-3]-0) Y

**BIOL 6V39 Topics in Biophysics**
(2-5 semester hours) May be repeated for credit to a maximum of 9 hours. ([2-5]-0) T
Special Electives

**BIOL 7V30 Research Seminar in Biophysics** (2-5 semester hours) Presentation and analysis of ongoing independent research projects, accompanied by evaluation of recent related literature. (P/F grading. May be repeated for credit.) ([2-5]-0) R

**Topics In Cell Biology**

(Breen, Burr, D’Mello, Draper, Goodman, Pace)

General Electives

**BIOL 6340 Developmental Neurobiology** (3 semester hours) Examines some of the remarkable progress made in recent years towards understanding how the nervous system develops. Among topics covered are signals regulating formation of neural tissue, patterning of the brain, differentiation and migration of neurons, formation of neural connections, neuronal survival, and elimination of superfluous cells. Course is designed to be interactive and will include lectures, student presentations, and discussion of important discoveries in the area. (3-0) Y

**BIOL 6345 Molecular Biology of HIV/AIDS** (3 semester hours) Topics include a discussion of the history and epidemiology of AIDS, the likely origins of human immunodeficiency virus (HIV), and the molecular and cell biology of HIV replication. The cell biological basis of the immunodeficiency induced by HIV infection is examined, as well as that of common accompanying pathologies such as Kaposi’s sarcoma. The molecular basis of a variety of existing and potential anti-viral therapies is considered. (3-0) Y

**BIOL 6351 Immunobiology** (3 semester hours) Interactions of antigens and antibodies. Fine structure of antibodies. Tissues and cells of the immune system. Response of B and T lymphocytes to antigens. Cellular interactions in humoral and cell-mediated immunity. Genetic basis of antibody diversity. Immunity and infectious diseases. (3-0) Y

**BIOL 6356 Eukaryotic Molecular and Cell Biology** (3 semester hours) Structural organization of eukaryotic cells; regulation of cellular activities; membranes and transport; cellular replication; examples of cell specialization such as blood (immunoglobins) and muscle cells. For students who have not had undergraduate cell biology. (3-0) S

**BIOL 6357 Cell Signaling** (3 semester hours) This course will provide information on signal transduction pathways controlling growth, development and diseases. Students will be required to present research papers and discuss experimental data. (3-0) R

**BIOL 6V41 Oncogenes** (2-4 semester hours) Subject matter includes a discussion of representative examples of the principal categories of dominantly acting oncogenes. The role in oncogenesis of tumor suppressor genes (“recessive oncogenes”) is also considered, as are anti-apoptotic oncogenes such as Bcl. The roles that the proteins encoded by these genes play in growth hormone signal transduction, gene regulation, cell cycle regulation, and programmed cell death will be examined. Students will also read and discuss the primary literature in this field. (2-4)-0) Y

**BIOL 6V42 Membrane Biology I** (2-4 semester hours) Membrane traffic in the secretory pathway. Topics covered include insertion of proteins into membranes, the mechanism of vesicular traffic from the rough endoplasmic reticulum through the Golgi apparatus to the plasma membrane, protein sorting during secretion and membrane biogenesis. ([2-4]-0) T

**BIOL 6V43 Membrane Biology II** (2-4 semester hours) Membrane traffic in the endocytic pathway. Topics covered include the structure, function and sorting of membrane receptors, the formation and function of clathrin-coated pits, membrane recycling and the biogenesis of endosomes and lysosomes. ([2-4]-0) R

**BIOL 6V44 Animal Cell Culture** (2-4 semester hours) Theory and practice of the growth of animal cells in culture. Topics include: the isolation and characterization of mammalian cell mutants, chromosome mapping, the use of somatic cell hybrids to investigate eukaryotic gene regulation, gene transfer into animal cells, gene targeting and production of “gene knockouts.” ([2-4]-0) R

**BIOL 6V49 Topics in Cell Biology** (2-5 semester hours) May be repeated for credit to a maximum of 9 hours. ([2-5]-0) Y

Special Electives

**BIOL 7V40 Research Seminar in Cell Biology** (2-5 semester hours) Presentation and analysis of ongoing independent research projects, accompanied by evaluation of recent related literature. (P/F grading, may be repeated for credit.) ([2-5]-0) Y
General Topics in Molecular and Cell Biology

General Electives

**BIOL 5V00 Topics in Biological Sciences** (1-6 semester hours) May be repeated for credit to a maximum of 9 hours ([1-6]-0) Y

**BIOL 5V01 Topics in Biological Sciences** (1-6 semester hours) Includes a laboratory component. May be repeated for credit to a maximum of 9 hours (1-[0-10]) Y

**BIOL 5V52 Methods in Molecular and Cell Biology III** (2-6 semester hours) Laboratory instruction in advanced techniques in molecular and cell biology. Supplemental lectures and demonstrations. (1-[4-10]) T

**BIOL 5V95 Individual Instruction** (1-6 semester hours) May be repeated for credit to a maximum of 6 hours ([1-6]-0) Y

**BIOL 6V00 Topics in Biological Sciences** (1-6 semester hours) May be repeated for credit to a maximum of 9 hours ([1-6]-0) Y

**BIOL 6V01 Topics in Biological Sciences** (1-6 semester hours) Includes a laboratory component. May be repeated for credit to a maximum of 9 hours (1-[0-10]) Y

**BIOL 6V04 Biology Seminar** (1-6 semester hours) May be repeated for credit to a maximum of 6 hours ([1-6]-0) Y

**BIOL 6V92 Readings in Molecular and Cell Biology** (3-9 semester hours) ([3-9]-0) Y

**BIOL 6V95 Individual Instruction** (1-6 semester hours) May be repeated for credit to a maximum of 6 hours ([1-6]-0) Y

Special Electives

**BIOL 6150 Current Research in Molecular and Cell Biology** (1 semester hour) Analysis of recent developments in molecular and cell biology. Students will attend presentations of current research literature. Normally required of all degree students. To be taken before the preliminary examination. (P/F grading, may be repeated for credit to a maximum of 4 hours.) (1-0) Y

**BIOL 6252 Current Research in Molecular Biology** (2 semester hours) Recent developments in biosynthesis, structure, function and expression of nucleic acids in prokaryotes and eukaryotes. Students will participate in a critical analysis of current research publications. (P/F grading, may be repeated for credit to a maximum of 8 hours.) (2-0) S

**BIOL 6193 Colloquium in Molecular and Cell Biology** (1 semester hour) Required for all degree students except non-thesis M.S., to be taken before a Supervising Committee is appointed. (P/F grading) (1-0) Y

**BIOL 6V02 The Art of Scientific Presentation** (1-2 semester hours) Students learn how to give an effective seminar by reading scientific articles on a central theme in biology and then delivering a presentation, first to their classmates, followed by another presentation to the Molecular and Cell Biology faculty and students. While learning the focused theme, students acquire skill sets in critical reading of scientific literature and oral presentation. Required for all Ph.D. students. (P/F grading) (1-[2]-0) Y

**BIOL 7450 Research Seminar in Molecular and Cell Biology** (4 semester hours) Presentation and analysis of ongoing independent research projects, accompanied by evaluation of recent related literature. (P/F grading. May be repeated for credit.) (4-0) S

**BIOL 8V01 Research in Molecular and Cell Biology** (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

**BIOL 8V98 Thesis** (3-9 semester hours) (May be repeated for credit.) ([3-9]-0) S

**BIOL 8V99 Dissertation** (3-9 semester hours) (May be repeated for credit.) ([3-9]-0) S
Department of Chemistry

http://www.utdallas.edu/dept/chemistry/

Faculty
Robert A. Welch Chair in Chemistry; Professor of Chemistry: Ray H. Baughman
James Von Ehr Distinguished Chair in Science and Technology; Professor of Physics and Chemistry: Alan G. MacDiarmid
Cecil and Ida Green Chair in Chemistry; Professor of Chemistry: A. Dean Sherry
Professors: Kenneth J. Balkus, Jr., Richard A. Caldwell, Rockford K. Draper (Biology), John P. Ferraris, Bruce E. Gnade (Electrical Engineering), Lynn A. Melton
Associate Professors: Michael C. Biewer, Gregg R. Dieckmann, Warren J. Goux, Inga H. Musselman, Paul Pantano
Assistant Professors: Jung-Mo Ahn, Donovan C. Haines, Steven O. Nielsen, John W. Sibert
Affiliated Professors: Lee A. Bulla (Biology), Anvar A. Zakhidov (Physics)
Research Professors: D. J. Yang
Research Associate Professors: Sanjeev K. Manohar
Senior Lecturers: Sergio Cortes, Sandhya R. Gavva

Objectives
The Ph.D. program is designed to produce graduates with a focus on innovation and problem solving in current materials, biotechnology, and industrial process research and development. These graduates, with their broad course background, research skills, and practical attitudes should find ready employment in industry or academic positions. A spectrum of courses provides the student with a broad knowledge of chemistry. A student may apply for either of two research tracks: an intramural research track or an extramural/intramural research track, which includes a one-year internship in an industrial or governmental R&D facility. The Master of Science program offers students the opportunity to prepare for positions in industry, for further training in related scientific fields, or for further training in chemistry.

Facilities
The department has the equipment and facilities necessary for routine use by its faculty and students in teaching and research. Larger items include a laser spectroscopy facility; 270 MHz (2), and 500 MHz multi-nuclear FT-NMR spectrometers; a single crystal x-ray diffractometer; a powder x-ray diffractometer; assorted spectrophotometers utilizing fluorescence, phosphorescence and absorption; a protein synthesizer; workstations with molecular modeling software; and scanning tunneling and atomic force microscopes. Chemistry also participates in the UTD NanoTech Institute which houses instrumentation for modern materials science research. Facilities external to chemistry, but readily available to its use, include a library, the computer center, the cleanroom, and well-equipped machine and electronics shops.

Admission Requirements
The University’s general admission requirements are discussed on page 13. Undergraduate preparation equivalent to the degree of Bachelor of Science in Chemistry is required. The Chemistry program has no other requirements above the general admission requirements beginning on page 24. However, admission is competitive and is decided case by case on the basis of the quality of previous relevant academic work, GRE scores (highly recommended), letters of reference, the student’s statement of academic interests and, for foreign students, evidence of fluency in English. Foreign students with TOEFL scores less than 600 (paper test) or 250 (computer test) are admitted only in special circumstances.

Degree Requirements
The University’s general degree requirements are discussed on page 18. Graduate students in chemistry are expected to demonstrate fundamental knowledge of lecture and laboratory skills by completing the following courses with a grade of B or better.
Core Courses (15 hours)
CHEM 5314 Advanced Physical Chemistry
CHEM 5331 Advanced Organic Chemistry I
CHEM 5341 Advanced Inorganic Chemistry I
CHEM 5355 Analytical Techniques I
CHEM 6389 Scientific Literature and Communication Skills

Master of Science
A minimum of 30 total graduate semester hours is required.
The M.S. degree can be pursued on a full- or part-time basis.

Other Course Requirements
The remaining requirements beyond the 15-hour core listed above may be satisfied in one of the two ways listed below.
• Presentation and defense of a written master’s thesis. The student must complete, as a minimum, 12 credit hours of research or other graduate electives plus CHEM 8398. A Supervising Committee will be appointed to guide the student’s thesis work and to assess the completed thesis.
• Completion of an approved internship in an industrial or governmental laboratory. The student must complete, as a minimum, 15 credit hours of research, chemistry internship or other graduate electives. A Supervising Committee must approve an internship in advance. The final written report must be defended before this committee and filed in the Chemistry department office.

Doctor of Philosophy
Normally pursued by full-time students enrolled in a minimum of 9 credit hours of approved graduate level courses per semester.

Other Course Requirements
In addition to the 15-semester hour core course requirements listed above, students seeking the Ph.D. degree must take two upper level chemistry courses, as specified by the Chemistry Graduate Committee. Ph.D. students are expected to complete these seven required courses within the first two years of their enrollment. CHEM 8399 is required as part of the preparation of the dissertation. Additional courses may be required by the student’s Supervisory Committee.

Well-prepared students may request substitution of portions of the course requirements from the Committee on Graduate Studies in Chemistry. At least three organized courses must be taken at the University of Texas at Dallas. The opportunity exists to take elective courses during their second and subsequent years.

Qualifying Examination: Original Research Proposal
In the second year, students seeking the Ph.D. degree are required to write, present, and defend an original research proposal. In addition to providing valuable experience to the student, this exam is used to assess the student’s originality and skills in organizing an effective approach to solving a novel problem. The results of this examination will be one criterion upon which admission to doctoral candidacy will be judged.

Research Practica
All students must complete a thesis Master’s degree as part of their doctoral candidacy preparation, unless this requirement has been satisfied at the time of admission. A student may apply for either of the two subsequent research tracks, the intramural research track or the extramural/intramural research track, and on achievement of doctoral candidacy, may pursue a track for which they have been accepted. Students in the intramural research track begin their intramural research immediately after achieving doctoral candidacy. Students in the extramural/intramural track begin their 9-12 month Industrial Practicum immediately after achieving doctoral candidacy, and after successful defense of their Industrial Practicum report, complete their doctoral research after returning to campus. In either case, the standard for the doctoral defense is the same: the student must present and defend a dissertation which describes new knowledge and the substance of which is ready for submission to a quality scientific journal. The Industrial Practicum provides a student research experience in innovation and/or problem solving in an industrial or governmental R&D facility. Students who apply for an Industrial Practicum but
who do not achieve placement will proceed to the intramural track.

The doctoral research, either intramural or extramural/intramural, may be taken in the same laboratory as the Master’s degree research or, in order to gain a broader research experience, in another laboratory.

**Research**

Within the Chemistry program, opportunities exist for course work and/or research in nanotechnology, biochemistry/biotechnology, organic, inorganic, materials, analytical, and physical chemistry. The opportunity to take course work in several of the other university programs allows the student to prepare for interdisciplinary work. Specific topics within these broad research areas include nanoscience (carbon nanotubes, sensors, actuators, nanoscale devices, synthesis of nanoporous materials); organic solid-state and polymer chemistry (energy storage, electrochromism, light-emitting polymers, membrane separations); inorganic solid-state (zeolites, membranes, laser ablation, sensors, fuel cells, electrospinning); biological NMR (structural biology, using NMR active tracers to follow metabolism in cells, isolated tissues and in vivo); supramolecular chemistry (design of novel host-guest systems; biologically responsive MRI agents, design, synthesis and study of macrocyclic receptors with applications in catalysis, materials science, and medicine); scanning probe microscopy (instrument development, image contrast, application to polymer microstructure); bioanalytical chemistry (fiber-optic microarrays for probing cells and tissue), synthetic chemistry (macrocycles, small protein domains to study membrane fusion; DNA recognition and modification; metalloprotein function); biochemistry/enzymology (study of oxidative stress; oxidative metabolism of signaling molecules; enzymology of monoxygenation, molecular modeling; and catalysis) and laser diagnostics for industrial mixing.

Special topics within the Industrial Practicum research areas have included silicon wafer inspection instrumentation development, laser engraving instrumentation development, process development and improvement in pharmaceutical manufacturing, and natural product identification.

**Course Descriptions**

**CHEM 5314 Advanced Physical Chemistry** (3 semester hours) Modern concepts from the three pillars of physical chemistry: quantum mechanics, thermodynamics/statistical mechanics, and kinetics. Prerequisite: CHEM 3411 or equivalent. (3-0) Y

**CHEM 5331 Advanced Organic Chemistry I** (3 semester hours) Modern concepts of bonding and structure in covalent compounds. Static and dynamic stereochemistry and methods for study. Relationships between structure and reactivity. (3-0) Y

**CHEM 5333 Advanced Organic Chemistry II** (3 semester hours) Application of the principles introduced in CHEM 5331, emphasizing their use in correlating the large body of synthetic/preparative organic chemistry. Prerequisite: CHEM 5331. (3-0) R

**CHEM 5341 Advanced Inorganic Chemistry I** (3 semester hours) Physical inorganic chemistry addressing topics in structure and bonding, symmetry, acids and bases, coordination chemistry and spectroscopy. Prerequisite: CHEM 3341, or consent of instructor. (3-0) Y

**CHEM 5343 Advanced Inorganic Chemistry II** (3 semester hours) Builds on CHEM 5341 to explore the synthesis and reactivity of inorganic/organometallic molecules. Practical applications will be demonstrated by discussing industrial processes catalyzed by metal complexes. Prerequisite: CHEM 5341. (3-0) R

**CHEM 5355 Analytical Techniques I** (3 semester hours) Study of fundamental analytical techniques, including optical spectroscopic techniques, mass spectrometry, and microscopical and surface analysis methods. (3-0) Y

**CHEM 5356 Analytical Techniques II** (3 semester hours) Study of chromatography (GC, LC, CZE), statistical methods (standard tests and ANOVA), chemical problem solving, and modern bioanalytical techniques such as biochips, microfluidics, and MALDI-MS. Prerequisite: CHEM 5355 or consent of instructor. (3-0) R

**CHEM 5357 Process Analytical Chemistry** (3 semester hours) An introduction to process analytical chemistry as practiced in the chemical process and other industries. Includes process control, instrumental techniques, sample and conditioning systems, project integration, and chemometrics. Prerequisite: CHEM 5355 or consent of instructor. (3-0) R

**CHEM 5V84 Special Topics in Chemistry/M.A.T.** (1-9 semester hours) Various special topics in chemistry of interest to teachers will be discussed. (May be repeated for credit.) (May not be counted as credit toward the M.S. or Ph.D. degrees.) ([1-9]-0) R
CHEM 5V87 Independent Study in Chemistry (1-9 semester hours) In conjunction with a member of the Chemistry faculty, the student will develop a paper or project which emphasizes the ways in which chemical knowledge is confirmed and extended or which leads to improved instruction in chemistry. (May not be counted as credit toward the M.S. or Ph.D. degrees.) ([1-9]-0) R

CHEM 6317 Industrial Chemistry (3 semester hours) Survey of chemical industry including commodities, chemical processes, scale-up and process development, environmental concerns, patents. Study of chemical engineering principles. (3-0) R

CHEM 6V19 Special Topics in Physical Chemistry (1-9 semester hours) Subject matter will vary and the course may be repeated for credit. Examples of topics include spectroscopy, quantum mechanics, computational chemistry, and surface chemistry. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V39 Special Topics in Organic Chemistry (1-9 semester hours) Subject matter will vary and the course may be repeated for credit. Examples of topics include organic photochemistry, organometallic chemistry, homogeneous and heterogeneous catalysis, solid state, polymer chemistry, and advanced NMR techniques. Prerequisite: CHEM 5331 or consent of instructor. ([1-9]-0) R

CHEM 6V49 Special Topics in Inorganic Chemistry (1-9 semester hours) Subject matter will vary and the course may be repeated for credit. Examples of topics include physical methods of inorganic chemistry, and bioinorganic chemistry. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V59 Special Topics in Analytical Chemistry (1-9 semester hours) Subject matter will vary. Examples of topics include NMR, X-ray crystallography. May be repeated to a maximum of 9 hours. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V69 Special Topics in Biochemistry (1-9 semester hours) Subject matter will vary. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6V79 Special Topics in Materials Chemistry (1-9 semester hours) Subject matter will vary. Examples of topics include polymers, membrane technology, zeolites, nanoscience and technology. May be repeated to a maximum of 9 hours. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 6361 Physical Biochemistry (3 semester hours) Protein structure, fundamental metabolism, structures and properties of macromolecules, interactions with electromagnetic radiation, thermodynamics of macromolecular solutions, transport processes, and other topics. Prerequisite: Consent of instructor (3-0). R

CHEM 6372 Materials Science (3 semester hours) Relationship between the properties and behavior of materials and their internal structure. Treatment of the mechanical, thermal and electrical properties of crystalline and amorphous solids including metals, ceramics, synthetic polymers and composites. Prerequisite: Consent of instructor. (3-0) R

CHEM 6383 Computational Chemistry (3 semester hours) The application of computer techniques to the understanding of molecular structure and dynamics: force field, semi-empirical, ab initio, and molecular dynamics techniques. Information retrieval from large structural databases and use of this information. Prerequisite: Consent of instructor. (3-0) R

CHEM 6389 Scientific Literature and Communication Skills (3 semester hours) Acquaints students with techniques for searching the scientific literature using hard copy and electronic approaches. Introduces students to important steps in creating and improving technical communications in both written and oral formats. (3-0) Y

CHEM 6V84 Special Topics in Applied Chemistry (1-9 semester hours) Subject matter will vary and may be repeated for credit to a maximum of 9 hours. Prerequisite: Consent of instructor. ([1-9]-0) R

CHEM 8981 Research Practicum (9 semester hours) Offers training of students in the direct solution of chemical problems through use of the literature; analysis; and the design, construction and performance of experiments. Method of instruction will be primarily individual direction, questioning, and feedback by the responsible faculty member and/or industrial scientist. Intended for Ph.D. students. May be repeated for credit. (9-0) S

CHEM 8V91 Research in Chemistry (2-9 semester hours) May be repeated for credit. ([2-9]-0) S

CHEM 8398 Thesis (3 semester hours) May be repeated for credit. (3-0) S

CHEM 8399 Dissertation (3 semester hours) May be repeated for credit (3-0) S
Department of Geosciences  
http://www.utdallas.edu/dept/geoscience/

Faculty  
Professors: Carlos L. V. Aiken, David E. Dunn (emeritus), Anton L. Hales (emeritus), William I. Manton, George A. McMechan, Richard M. Mitterer, Dean C. Presnall (emeritus), Robert H. Rutford, Robert J. Stern  
Associate Professors: Thomas H. Brikowski, James L. Carter, John F. Ferguson  
Assistant Professors: Mohamed G. Abdelsalam, Matthew I. Leybourne

Objectives  
The basic objective of the Department of Geosciences Graduate Program is to provide students with a broad fundamental background in geosciences as well as an in-depth emphasis in a particular specialty. The Master of Science degree (thesis option) is designed for students desiring research experience in a specific area of the geosciences. This degree will prepare the student for professional employment in the energy, mining, or environmental industries or government, as well as those seeking a doctoral degree. The Master of Science degrees (non-thesis options) are designed for students who seek employment in the environmental industry, and the industrial application of Geospatial Information Sciences (GIS).

The Doctor of Philosophy degree in Geosciences emphasizes basic research in one of the specialties in geosciences and is designed to prepare students for advanced positions in the energy, environmental or mining professions in industry or government, or for positions in academia.

The Doctor of Philosophy degree in Geospatial Information Sciences (GIS) is supported by the Department of Geosciences, the School of Social Sciences, and the School of Engineering and Computer Science. The degree reflects geospatial information science origins at the confluence of work in multiple disciplines. The degree focuses on advancement of the technology, its associated theory, and the enhancement of its applications. Graduates of this program will be well suited to advanced positions in the geospatial technology industry and academic positions.

Facilities  
Research facilities include: JEOL JSM-T300 scanning electron microscope, Nuclide ELM-2B luminoscope with a Nikon Optiphot equipped with an automated photographic system, two research quality Zeiss epifluorescence reflected light microscopes with a fluid inclusion stage and video monitor, photometer-indicator and an automated photographic system, petrographic microscopes, rock preparation facilities, and machine shop. Network access to a variety of LINUX workstations, Macintosh and PC computers is available. Parallel processing is done on two state of the art LINUX clusters with 10 64-bit processors, 42 32-bit processors, and 3 terabytes of disk.

Subsurface Sedimentology and Stratigraphy Laboratory  
Core viewing and subsurface data analysis lab. A large-scale scanner for digitizing well log data is also available.

Hydrology Laboratory  
Field equipment for measuring ground and surface water flow and chemistry, including borehole bailers, electric water level meter, FlowProbe hand-held flow meter, Hach DREL 2010 Basic Water Quality Lab (field spectrophotometer, pH and salinity meters), and YSI-85 DO/salinity/conductivity meter. Software for modeling water flow and transport, including general interfaces GMS and ArgusOne, Hydrus-2D (unsaturated flow and transport), TOUGH2 and Tetrad (2-3D multiphase flow and transport), and many public-domain models. Hardware and software for visualizing model results, including SGI O2 and Linux workstations, GoCAD and IBM DataExplorer software.

Geochemical Laboratories  
The Geochemical labs house sample preparation and analytical facilities. The sample prep lab uses multi-acid digestion and metabolate-tetraborate fusion techniques to take rock samples into solution for analysis. The analytical lab hosts the following instruments: 1) A Perkin-Elmer Optima 3300 DV inductively coupled plasma
optical emission spectrometer (ICP-OES) instrument, with both radial and axial determination modes, which permits rapid determination of major and trace elements in rocks and water samples; 2) A Perkin-Elmer Sciex Elan 6100 DRC inductively coupled plasma mass spectrometer (ICP-MS), used for trace and rare earth element determinations to low parts per trillion levels. The DRC (dynamic reaction cell) removes interfering Ar species in the plasma and allows trace determinations of several critical elements such as Fe, As, and Se. This machine is also used for Se isotope determinations; 3) A Dionex DX-600 ion chromatograph, used to determine anions and cations in waters, Cl, F, and Br in rocks, in addition to As and Se speciation; and 4) Titration station, for alkalinity determinations.

**Thermal Ionization Mass Spectrometry Laboratories**

The principal mass spectrometer is a Finnigan MAT 261 equipped with 9 collectors and a secondary electron multiplier. Also available are an updated NBS 12 inch instrument that is used principally for Rb isotope dilution measurements, and a fixed multicollector, donated by Mobil Oil Corp., that is used for studies of Sr in carbonates. The mass spectrometers are supported by Class 100 clean room facilities with sub-boiling acid distillation apparatus, micro- and semi-microbalances, and vessels for pressure decomposition of refractory silicates. Studies focus on using the evolution of Sr, Nd and Pb as indexes of petrogenetic processes, geochemistry, environmental Pb, use of Pb as an index of bone mineral resorption, and evolution of marine Sr. A large inventory of spikes allows precise isotopic dilution analyses of elements of geological (U, Th, REE), environmental (Ag, Cd), or metabolic interest (Ca, Cu, Fe, Mg, Zn).

**Remote Sensing Laboratory**

Remote sensing research is carried out using 12 PCs and 3 Sun Ultra workstations, color and black-and-white printers, and an HP 2500CP Plotter. A wide range of remote sensing data sets are processed and interpreted, including orbital radar (SIR-C/X-SAR) and optical (Landsat TM and ETM+, SPOT, and ASTER) imagery. We have extensive GIS (Geographic Information Systems) facilities including an ESRI site license with ARC/INFO, ARC/VIEW, ARC/GIS and MAPINFO. We have a GeoWall stereo projection system and 3D visualization and analysis packages such as GoCad, AutoCad, and 3D Studio Max.

**Geophysics Facilities**

Geophysical research is supported by two Scintrex CG-3M Gravimeters; a variety of surveying instruments including Nikon theodolite and data collector, a TOPCON GPT 2008 Total Station electronic distance meter and theodolite, two Laser Atlanta Advantage CI reflectorless laser rangefinders, two 16 channel 4000 SSE Trimble dual frequency geodetic GPS receivers, two dual frequency 18 channel Leica 530 RTK GPS systems, a Trimble GeoExplorer GPS system with GIS dictionary and post-processing capabilities, a Landstar RACAL DGPS real time sub-meter GPS system, and GPS post-processing software including Leica SKI, Spectra Precision GeoGenius, Trimble GPSurvey and Trimble Pathfinder Office. We also have two Scintrex GRS Differential Scintillometers. Seismic and radar equipment include a Bison 9048 48-channel floating point seismic acquisition system with Betsy, hammer, and explosive sources for shallow to deep exploration; and pulse EKKO IV and 1000 ground penetrating radars.

**Admission Requirements**

The University’s general admission requirements are discussed on page 13. Applicants are expected to take the GRE General Test (Verbal, Quantitative, and Analytical Writing). A combined score of no less than 1000 on the Verbal and Quantitative portions of the exam is advisable based on our experience with student success in the program. In addition, students should complete and submit a Supplemental Geosciences Application Form which can be obtained from the Geosciences Department Office by mail (FO21, University of Texas at Dallas, Box 830688, Richardson, TX, 75083-0688, USA), telephone (972-883-2401), or e-mail (geosci@utdallas.edu).

Entering students are expected to have completed the equivalent of the University’s B.S. degree in Geosciences, as well as a 3-hour scientific programming course. Students whose undergraduate training is in a science other than geology or geophysics are admitted to the program when their previous course work complements or supports their intended research interests. All entering students with non-geoscience degrees such as physics, math, chemistry, or biology should have completed the following undergraduate courses: physical geology, rocks and minerals, structural geology, and sedimentology. All students are expected to have completed a faculty approved field course. Students may be admitted with some deficiencies but these must be completed...
during the first 18 graduate hours. It is understood that the minimum course requirements for the intended degree, as specified below, apply to well-prepared students.

Degree Requirements
The University's general degree requirements are discussed on page 18. Additional requirements are specified below for each degree.

Graduate Certificate in Remote Sensing
The Remote Sensing Certificate is supported by both the Department of Geosciences and the School of Social Sciences. Faculty involved are Certificate Coordinator Mohamed G. Abdelsalam, Ronald Briggs, Fang Qiu, and Robert Stern.

The American Society for Photogrammetry and Remote Sensing (1997) defined remote sensing as the art, science, and technology of obtaining reliable information about physical objects and the environment, through the process of recording, measuring and interpreting imagery and digital representation of energy patterns derived from non-contact sensor systems.

Remote sensing is a powerful set of software and hardware, computer-based techniques for extraction and presentation of information represented by raster and vector spatial data acquired via non-contact sensors. It provides reliable and cost-effective means of studying the environment for protection, natural resources management and urban planning. Government and non-government organizations continuously seek qualified professionals to use remote sensing for a wide range of applications.

Pre-requisites and Admission
- B.S. or B.A. Degree. Competence in personal computers, especially Windows-based, is expected.
- Application for admission to UTD Graduate School as “non-degree or degree seeking”
- Only B.S. or B.A. transcripts are needed. No GRE score, or reference letters are needed for non-degree seeking students.
- On-line registration is at: www.utdallas.edu/student/admission/grad-admission.html

Course Requirements
The Graduate Certificate in Remote Sensing is obtained by completing 15 hours of courses. Students must complete the following courses: GEOS 5325 Introduction to Remote Sensing, GISC 6381 Introduction to GIS, GEOS 5326 or GISC 7365 Remote Sensing Digital Image Processing, and GEOS 7327 or GISC 7367 Remote Sensing Workshop. In addition, students can choose one of the following courses: GISC 7366 Applied Remote Sensing or GEOS 5328 Radar Remote Sensing.

Master of Science in Geosciences
Thesis Option
All students seeking the Master of Science degree (thesis option) must satisfactorily complete the following requirements (minimum of 35 graduate semester hours):
- GEOS 5304 (or acceptable equivalent) and GEOS 6205.
- A minimum of four courses (minimum of 12 semester hours) in a chosen specialization related to the student’s major area of study. Specialty areas are: geochemistry, geophysics, hydrogeology-environmental geosciences, mineral resources-petrology, sedimentology, seismology, remote sensing-geospatial science, and structural geology-tectonics.
- A minimum of three courses (minimum nine semester hours) in at least two specialties other than the chosen specialization.
- A minimum of nine semester hours of thesis research including GEOS 8398 and submit an acceptable thesis. In addition to the above requirements, students seeking the M.S. degree must submit, no later than the second semester of enrollment, an acceptable research proposal to the supervising committee. Upon completion of the thesis research, the M.S. degree candidate will publicly defend the thesis.

Non-Thesis Option
All students seeking the Master of Science degree (non-thesis option) must satisfactorily complete a minimum of 36 graduate semester hours of a specified curriculum in the general area of environmental geosciences.
260 Geosciences

- **Core**: Complete 24 semester hours including GEOS 5310, GEOS 5325, GEOS 5407.
  GEOS 5357, GEOS 5358, GEOS 5483, GEOS 5484.
- **Electives**: 9 hours of elective courses selected in consultation with the graduate advisor.
- **Research**: An 8000 level, 3-hour research course.

**Master of Science in Geographic Information Sciences**

The Master of Science in Geographic Information Sciences is a professional program that is offered jointly by the School of Social Sciences and the School of Natural Sciences and Mathematics. The program focuses on the use of Geographic Information Systems (GIS) and associated technologies such as remote sensing and global positioning systems for managing spatially referenced information. Students are provided with the concepts underlying GIS, the skills for implementing GIS projects in public and private sector organizations, and the ability to use GIS in pure or applied research in substantive areas. Prospective students should apply using established procedures to either Geosciences or Social Sciences depending on their background.

For the Master’s degree in Geographic Information Sciences, beginning students are expected to have completed college Mathematics through Calculus and at least one programming or computer applications course or possess equivalent knowledge. Students must have the equivalent of GISC 6381 Geographic Information Systems Fundamentals and GISC 6382 Applied GIS, or they must take these courses at UTD in addition to the 30 credit hours required for the MGIS. Additional details of the curriculum can be found under “Master of Science in Geographic Information Sciences,” in the School of Social Sciences section of the catalog.

**Doctor of Philosophy in Geosciences**

All students seeking a Doctor of Philosophy degree in Geosciences must satisfactorily complete the following requirements (90 graduate hours minimum).
- GEOS 5304 (or acceptable equivalent) and GEOS 6205.
- A minimum of five courses (minimum 15 semester hours) in a chosen specialization, related to the student’s major area of study, selected from the specialties listed under the Master of Science requirements.
- A minimum of five courses (minimum 15 semester hours) in at least three specialties other than the chosen specialization.

In addition to the above course requirements, students seeking the Ph.D. degree must submit an acceptable research proposal describing the intended project to be completed for the dissertation. Students entering with a Master’s should complete this proposal in the third semester; students entering without a Master’s have until the fourth semester. An oral qualifying examination covering the broad background and detailed knowledge relating to the student’s specialization and research proposal will be held in the same semester that the proposal is submitted. After satisfactory performance on the Qualifying Examination, the student will complete and publicly defend the dissertation.

Also, see the University’s general degree requirements on page 18. Please note that more detailed instructions for Geosciences Graduate students are given in the “Guideline for Graduate Students - Geosciences” that is available in the office of the Department Head.

**Doctor of Philosophy in Geospatial Information Sciences**

The Doctor of Philosophy in Geospatial Information Sciences is an advanced degree offered jointly by the School of Natural Sciences and Mathematics, the School of Social Sciences and the Eric Jonsson School of Engineering and Computer Science. Geospatial information is a unifying theme across a wide range of disciplines and the unique organization of this program permits a diverse range of expertise to the prospective student. The Ph.D. in GIS is intended to go beyond the M.S. in GIS degree in terms of analysis, the creation of new technology and the novel application of geospatial information technology. This program will prepare students for leadership positions in academy, industry or government.

Individual students can concentrate in particular discipline areas. The Geosciences component focuses on remote sensing and mapping technologies, including global positioning satellite and three-dimensional laser ranging based data capture as well as other imaging technologies. In particular, these methodologies are applied to geological, hydrological and environmental problems associated with the physical Earth.

It is expected that students will enter this program with diverse educational backgrounds. Applicants may have Bachelors, Masters or other advanced degrees in any relevant field including computer science, economics, engineering, geography, geology, information system management, resource management, geographical information science and possibly others. At least a Bachelors degree from an accredited (or equivalent) institution with an
undergraduate/graduate grade point average of 3.25 or better is required. A GRE score of 1150 or higher is desirable. Fluency in written and spoken English is required. (Please see detailed degree requirements under “Doctor of Philosophy in Geospatial Information Sciences,” listed in the School of Social Sciences section of the catalog.) Social Sciences. Faculty involved are Certificate Coordinator Mohamed G. Abdelsalam, Ronald Briggs, Fang Qiu, and Robert Stern.

Geosciences Course Descriptions

General Courses

**GEOS 5300 Cooperative Geosciences** (3 semester hours) An industrial internship in which a student gains real-world industry experience through temporary employment at a geoscience company or government agency. The activity may be in any area of geosciences, and must have a faculty monitor to receive UTD credit. The topic must be approved in advance by the faculty monitor. The student is required to provide regular updates on progress and a final project report for evaluation. Grading is P/F. Designed as an Individual Instruction Course. May be repeated for credit. (3-0) R

**GEOS 5301 Geology of the Metroplex** (3 semester hours) Lithologic constituents, stratigraphic history, and geologic environments of the greater Dallas-Fort Worth metropolitan area. Special emphasis is given to the Cretaceous sediments that underlie Tarrant and Dallas Counties, with a secondary focus on the broader geologic environment. Three to four 1-day (Saturday) field trips. (3-0) T

**GEOS 5302 Ocean Science** (3 semester hours) Overview of geological, chemical, physical and biological aspects of oceanography, marine resources and environmental concerns. This course is for students seeking the M.A.T. degree. This course cannot be used to satisfy degree requirements of geosciences majors. Cross-listed with ISNS 3367 The Oceans. (3-0) R

**GEOS 5303 Computing for Geoscientists** (3 semester hours) Application of computer techniques in solving geological problems. Includes instruction in the MATLAB software, plotting facilities, introductory matrix theory, and statistics. Students will examine problems in basic statistical analysis, graphics, and mapping of geological and geophysical data. Development of programming skills in areas directly related to thesis and dissertation research is encouraged. Serves as introduction to UNIX and the U.T. Dallas computing facility. Laboratory sessions are included. (2-3) Y

**GEOS 5304 Geosciences Field Trip** (3 semester hours) A study of the geology of a selected region within North America and the Caribbean followed by a field trip to the selected region in order to study the relationships of geologic features within that region. This course can only be used to partially satisfy the field experience requirement and breadth requirement for geosciences majors. Field trip course. (May be repeated for credit.) (3-0) Y

**GEOS 5305 Petroleum Geosciences** (3 semester hours) Survey of geological and geophysical methods used to find and produce oil and gas, and to perform economic and risk analyses that are crucial in reserve estimates and prospect evaluation. The course is designed to provide the student with the necessary knowledge to become an effective contributor in the oil and gas industry. Students are expected to have the equivalent of a BS or BA degree in Geosciences. (3-0) R

**GEOS 5306 Data Analysis for Geoscientists** (3 semester hours) Advanced statistical techniques with important applications in Earth science, beyond the level of GEOS 5303. Topics include robust statistics, exploratory data analysis, surface modeling and contouring, Kriging, analysis of point patterns and directional data. Factor, cluster and time series analysis may also be considered. Emphasis will be on application and theoretical understanding. Prerequisite: GEOS 5303 or equivalent. (3-0) R

**GEOS 5307 Well Log Interpretation** (3 semester hours) The principles and operational limitations of spontaneous potential (SP), normal (16” and 64”), lateral microcaliper, resistivity, induction, gamma-ray, neutron, density, sonic, dipmeter, and temperature logs will be discussed. Geologic examples will be used to explain the application of these logging tools. The effects of porosity, permeability, mineral, and fluid content to log response in various types of reservoirs will be developed. (3-0) R

**GEOS 5319 Principles of Environmental Health** (3 semester hour) Introduction to epidemiology and biostatistics. U.S. regulatory agencies. Ethics, risk assessment and public policy. Diseases spread by food and water. Lung diseases associated with particles and fibers. Health significance of exposures to arsenic, cadmium, chromium, lead and mercury compounds and to chemical substances — solvents, PCBs, PBBs, dioxins, and dibenzofurans. Ionizing radiation. Health implications of global warming (3-0) T

**GEOS 5400 Earth Science** (4 semester hours) A review of Earth processes as a whole: time and geology; igneous and sedimentary processes and products; metamorphism; structure; evolution of continents and oceans. This course is open only to those students whose major undergraduate study was in subjects other than geology. Laboratory and field trip course. (3-3) R
GEOS 5407 Instrumental Techniques in Geosciences (4 semester hours) An introduction to modern instrumental techniques, including inductively coupled plasma spectrophotometry, scanning electron microscopy, x-ray diffraction, electron microprobe techniques, stable isotope mass spectrometry, and thermal ionization mass spectrometry. Sample preparation, mineral separation, and lab safety. Laboratory course. (2-6) R

GEOS 5V08 Special Topics in Geosciences (1-4 semester hours) Courses dealing with a variety of topics including new techniques and specific problems in rapidly developing areas of the science. Hours vary depending on course requirements. (1-3)-[0-3) R

GEOS 5409 M.A.T. Field Trip (4 semester hours) Designed for students in the M.A.T. program to gain relevant field geological experience. (May be repeated for credit.) (4-0) R

GEOS 6205 Geoscience Presentations (2 semester hours) Students prepare oral and written presentations based on literature review or research interests and on critiquing oral presentations. Required of all Geosciences graduate students. (2-0) S

GEOS 7V00 Research and Literature Seminar (1 or 2 semester hours) Presentations and critical analysis of independent work and of the recent literature. (May be repeated for credit.) ([1-2]-0) Y

Hydrogeology-Environmental Geosciences Courses

GEOS 5310 Hydrogeology (3 semester hours) Introduction to the principles and practice of ground- and surface-water hydrology. Study of the principles of occurrence and geologic controls of groundwater, physical flow, and geochemistry of waters. Design and use of procedures for typical hydrologic investigations. (3-0) Y

GEOS 5311 Applied Groundwater Modeling (3 semester hours) This course is designed to provide students with hands-on experience using the most commonly-applied groundwater flow and transport models (e.g. modflow/modpath, MT3D/RT3D, GMS). Practical application of the models and design of modeling studies is emphasized, modeling theory and mathematics is de-emphasized. (3-0) Y

GEOS 5312 Contaminant Transport (3 semester hours) A study of physical and chemical processes of contaminant transport in ground-and surface-water, and approaches toward observing, monitoring and modeling these processes. Current site remediation practices are also reviewed. Prerequisites: GEOS 5310 or instructor’s permission. (3-0) T

GEOS 5313 Applied Surface Water Modeling (3 semester hours) The development and application of watershed models emphasizing runoff, stormflow and stormwater management design. This class combines aspects of GIS, remote sensing and surface water hydrology from an applied modeling perspective, using commonly applied computer models (e.g. Rational Method, TR-20, HEC-1) to address drainage problems related to urbanization and land-use changes. (3-0) T

GEOS 7110 Workshop in Environmental Geosciences (1 semester hour) Discussion of current topics in environmental geoscience, including student and faculty research, scientific literature, and advanced techniques in environmental geosciences. (1-0) R

GEOS 8V10 Research in Hydrogeology-Environmental Geosciences (1-9 semester hours) May repeat for credit. ([1-9]-0) S

Remote Sensing, GIS, and GPS Courses

GEOS 5325 Introduction to Remote Sensing (3 semester hours) Application of airborne and satellite remote sensing for understanding the surface of the earth. Focus on interpretation of images obtained by passive and active imaging systems using electromagnetic radiation, especially visible, infra-red, and radar. Laboratory course. (2-3) T

GEOS 5326 Remote Sensing Digital Image Processing (3 semester hours) Techniques of digital image processing for a variety of remote sensing data sets and their applications for environmental and geoscientific issues. Extraction of statistical data from remote sensing imagery, radiometric and geometric correction, image enhancement and classification, and techniques for utilizing digital remote sensing data for change detection of the earth’s surface. Use of different image processing software to manipulate digital remote sensing data and extract thematic information. Introduction to Remote Sensing (GEOS 5325) is a prerequisite for this course. Laboratory course. (2-3) T

GEOS 5328 Radar Remote Sensing (3 semester hours) Principles and applications of orbital and airborne radar remote sensing, including real and synthetic aperture radar systems. Principles of Radargrammetry, and single-path and repeat-path interferometry. Applications of radar remote sensing in geosciences, land use and land cover mapping, forestry and agriculture, urban analysis. Laboratory course. Prerequisite: Principles of Remote Sensing (GEOS 5325) (2-3) T
radiogenic nuclides as pertaining to the composition and history of the mantle and crust. Application of stable spiking techniques, and high precision isotope ratio measurements. Isotope geochemistry of noble gases and chronologies. The development of the modern multi-collector mass spectrometer. Mass fractionation laws, double the galaxy. Isotope systematics in meteorites, abundance anomalies, cosmogenic nuclides, and solar system GEOS 5356 Isotope Geochemistry year of chemistry or instructor's permission. (2-3) R

computer aqueous speciation/modeling software (The Geochemists Workbench, PHREEQC). Prerequisites: One stable isotopes. Lab work will include hands-on use of inductively-coupled plasma instrumentation and use of aqueous reactions, elemental speciation, activity diagrams, the carbonate system, water-rock reactions and sedimentary systems, weathering, and aqueous geochemistry. Course will include discussion of thermodynamics (3 semester hours) Low-temperature geochemistry including the major processes that control the distribution of the elements in silicate melts. Topics to be covered include the composition of the earth, the structure of silicate melts, trace element partitioning between crystals and melts, and the use of major and trace elements in deciphering the formation and evolution of silicate melts. (3-0) T

GEOS 5441 Stratigraphy and Sedimentology (3 semester hours) Origin of stratigraphic sequences and systems tracts, especially tectonic versus eustatic controls. Topics include lithostratigraphy, seismic stratigraphy, chronostratigraphy, and allostratigraphy, with an emphasis on high resolution subsurface sequence stratigraphic methods. Prerequisite: GEOS 3421 or equivalent. (3-0) Y

GEOS 5441 Stratigraphy and Sedimentology (4 semester hours) Origin and classification of sedimentary rocks, reconstruction of ancient environments, and basic principles of modern stratigraphic nomenclature. Concepts of space and time in the rock record and methods of stratigraphic correlation. Integrated stratigraphic techniques. Study of sedimentary rocks in hand specimen and outcrop. Laboratory course. Field trips. Course is directed to graduate students not majoring in geology and is meant to provide a practical overview of sedimentary geology. Permission of instructor is required to take this course. (3-3) Y

GEOS 5443 Carbonate Sedimentary Environments (4 semester hours) Description and classification of carbonate sediments and carbonate rocks. Aspects of carbonate geochemistry will be covered. The course will emphasize recent carbonate depositional environments and facies models for use as analogs for interpreting ancient sequences. Laboratory will stress identification and classification of carbonate sediments and rocks in hand sample and thin-section. Laboratory and field trip course. Prerequisite: GEOS 3421. (3-3) T or R

GEOS 5329 Applied Remote Sensing (3 semester hours) Methods for using optical and radar remote sensing data and techniques for study of issues related to physical and social sciences, including geological, environmental, and geomorphological studies, forestry, agriculture, and issues related to urban development and planning. Use of a variety of remote sensing data and software to address societal and scientific problems. Laboratory course. Prerequisite: Principles of Remote Sensing (GEOS 5325). Cross-listed with GISC 7366 Applied Remote Sensing. (2-3) T

GEOS 5422 GPS (Global Positioning System) Satellite Surveying Techniques (4 semester hours) The theory and application of satellite positioning utilizing the Global Positioning System Code and phase methodology in field observations, data processing and analysis of Differential GPS, high accuracy static and other rapid measurements, in real time and with post-processing. (3-3) Y

GEOS 5423 GIS (Geographic Information Systems) Applications to Geosciences (4 semester hours) The application of GIS to geologic, geophysical and environmental problems. Emphasis on hands-on digital geologic mapping and analysis with Arc/Info software package. Laboratory course. (3-3) T

GEOS 5424 3D Data Capture and Ground Lidar (3 semester hours) The theory and applications of 3D data acquisition in the field for geosciences and non-geosciences studies. The basics and applications of field digital mapping with emphasis on RTK GPS, laser range finder, and terrestrial scanners (ground lidar). 3D digital photorealistic modeling with field photographmetry and digital cameras. (3-3) T

GEOS 7327 Remote Sensing Workshop (3 semester hours) An independent project designed and conducted by the student. The project develops and demonstrates student's competence in using remote sensing techniques in a substantive application to his/her field of interest. Projects may be developed in coordination with a local government, utility, business or other entity which uses remote sensing in operations and research. Formal presentation and a project report are required. Prerequisites: GISC 6381 and GISC 7365 Cross-listed with GISC 7367 Remote Sensing Workshop. (3-0) Y

GEOS 8V21 Research in Remote Sensing, GIS and GPS (1-9 semester hours) May repeat for credit. (1-9)-S

Sedimentology Courses

GEOS 5427 Sequence Stratigraphy (3 semester hours) Origin of stratigraphic sequences and systems tracts, especially tectonic versus eustatic controls. Topics include lithostratigraphy, seismic stratigraphy, chronostratigraphy, and allostratigraphy, with an emphasis on high resolution subsurface sequence stratigraphic methods. Prerequisite: GEOS 3421 or equivalent. (3-0) Y

GEOS 5441 Stratigraphy and Sedimentology (4 semester hours) Origin and classification of sedimentary rocks, reconstruction of ancient environments, and basic principles of modern stratigraphic nomenclature. Concepts of space and time in the rock record and methods of stratigraphic correlation. Integrated stratigraphic techniques. Study of sedimentary rocks in hand specimen and outcrop. Laboratory course. Field trips. Course is directed to graduate students not majoring in geology and is meant to provide a practical overview of sedimentary geology. Permission of instructor is required to take this course. (3-3) Y

GEOS 5443 Carbonate Sedimentary Environments (4 semester hours) Description and classification of carbonate sediments and carbonate rocks. Aspects of carbonate geochemistry will be covered. The course will emphasize recent carbonate depositional environments and facies models for use as analogs for interpreting ancient sequences. Laboratory will stress identification and classification of carbonate sediments and rocks in hand sample and thin-section. Laboratory and field trip course. Prerequisite: GEOS 3421. (3-3) T or R

Geochemistry Courses

GEOS 5352 Geochemistry of Igneous Rocks (3 semester hours) Chemical composition of igneous rocks and the major processes that control the distribution of the elements in silicate melts. Topics to be covered include the composition of the earth, the structure of silicate melts, trace element partitioning between crystals and melts, and the use of major and trace elements in deciphering the formation and evolution of silicate melts. (3-0) T

GEOS 5355 Low Temperature Geochemistry (3 semester hours) Low-temperature geochemistry including sedimentary systems, weathering, and aqueous geochemistry. Course will include discussion of thermodynamics of aqueous reactions, elemental speciation, activity diagrams, the carbonate system, water-rock reactions and stable isotopes. Lab work will include hands-on use of inductively-coupled plasma instrumentation and use of computer aqueous speciation/modeling software (The Geochemists Workbench, PHREEQC). Prerequisites: One year of chemistry or instructor's permission. (2-3) R

GEOS 5356 Isotope Geochemistry (3 semester hours) Synthesis of the elements in stars and chronologies for the galaxy. Isotope systematics in meteorites, abundance anomalies, cosmogenic nuclides, and solar system chronologies. The development of the modern multi-collector mass spectrometer. Mass fractionation laws, double spiking techniques, and high precision isotope ratio measurements. Isotope geochemistry of noble gases and radiogenic nuclides as pertaining to the composition and history of the mantle and crust. Application of stable
isotopes to studies of diagenesis and water-rock interaction, groundwater management, paleoceanography and secular variations in the isotopic composition of seawater. High-temperature and, where applicable, low-temperature water-rock interactions pertaining to the origin of igneous rocks. The evolution of radiogenic Sr in seawater. Radiometric age dating as applied to the solution of geologic problems. (3-0) R

GEOS 5359 Aqueous Geochemistry Modeling (3 semester hours) Quantitative modeling of water-water and water-rock chemical interactions using standard computer programs (e.g. PHREEQC, NETPATH, The Geochemists Workbench). Modeling of isotopic indicators of water-rock interaction and hydrologic processes; surface water chemistry. Prerequisites: One year of chemistry or instructor’s permission. (3-0) T

GEOS 5361 Low Temperature Isotopic Tracers (3 semester hours) Stable isotopes in low temperature systems. Oxygen, hydrogen, carbon, sulfur and nitrogen isotopes in aqueous systems. Isotopic fractionation. Stable isotopes in marine sediments. New areas of isotopic research including Li, B, Se, and Sr isotopes in aqueous and sedimentary environments. Prerequisites: One year of chemistry or instructor’s permission (3-0) T

GEOS 6455 Geochemical Exploration (4 semester hours) Origin, movement, and fate of elements in the natural environments. Geochemical methods in mineral and petroleum exploration including analytical techniques and studies of weathering, soil formation, primary and secondary dispersion patterns and anomalies. Case studies including environmental applications. Laboratory and field trip course. (3-3) T

GEOS 8V50 Research in Geochemistry (1-9 semester hours) (May repeat for credit.) ([1-9]-0) S

Mineral Resources-Petrology Courses

GEOS 5462 Rocks and Minerals (4 semester hours) Crystallography; identification of common rocks and minerals; origins and occurrences of rocks and minerals. Laboratory course. This course cannot be used to satisfy degree requirements for geosciences majors. (2-6) R

GEOS 5464 Mineral Resources (4 semester hours) Principles and relationships of economics and politics to the utilization of mineral and industrial deposits; ore mineralogy; classification of commercial Earth materials; geochemical cycle of various elements; geology, distribution, characteristics, formation, enrichment and localization of various economic mineral and industrial deposits. Relationship of mineral and industrial deposits to global tectonics. Laboratory and field trip course. (3-3) T

GEOS 5465 Ore Petrology (4 semester hours) Essentials of reflected light microscopy; mineralogy, textural relationships, paragenesis, phase chemistry, and origin of major ore minerals; detailed study of selected ore bodies. Laboratory course. Prerequisite: GEOS 5464 or consent of instructor. (2-6) T

GEOS 6462 Hydrothermal Ore Deposits (4 semester hours) Physical, chemical, and isotopic characteristics of hydrothermal ore deposits and enclosing rocks; properties of ore-forming solutions; solubilities of ore and non-ore minerals; characteristics of geothermal systems; mass transfer; isotopes; and thermal aspects of ore deposition. Laboratory and field trip course. Prerequisite: GEOS 5465 or consent of instructor. (3-3) T

GEOS 8V60 Research in Petrology (1-9 semester hours) (May repeat for credit.) ([1-9]-0) S

Structural Geology-Tectonics Courses

GEOS 5373 Physical Properties of Rocks (3 semester hours) This course provides an understanding of the physical phenomena and processes that determine properties of rocks and soils. Topics include porosity and permeability; surface energy, roughness, and absorption; percolation, fractures and heterogeneous media; problems of scale; mechanical behavior of dry and fluid saturated rocks; elasticity; viscoelasticity, and plasticity; acoustic, electric, dielectric, thermal, and magnetic properties. The approach is practical, with emphasis on understanding why rocks behave as they do, and how simple physical principles can be used to predict rock and soil properties under various conditions. Suitable for graduate students in any branch of geosciences who wish to obtain a broad introduction to physical properties as they pertain to lab and field measurements, and are applied to reservoir, engineering, and environmental problems. (3-0) R

GEOS 5375 Tectonics (3 semester hours) Study of the earth’s present tectonic environments, including geochemistry, sedimentology, and structure; application of present tectonic environments towards the reconstruction of ancient crustal events; consideration of temporal aspects of crustal evolution. Oral and written presentations required. Prerequisite: Structural geology. (3-0) T

GEOS 5470 Structural Geology (4 semester hours) Examination of stress and strain, failure criteria, fault analysis, rheologic properties of geologic materials, fold analysis, and a survey of major structural provinces in North America, with supplemental readings. Laboratory includes map interpretation, standard graphical techniques, and use of stereographic projections, oral presentations, and problem sets. Laboratory and field trip course. Prerequisite: PHYS 1301 or equivalent. Cross-listed with GEOS 3470 Structural Geology. (3-3) Y
GEOS 6476 Analysis of Geologic Structures (4 semester hours) Study of strain analysis and the origin of tectonic fabrics, including use of stereonet and petrographic microscope to outline deformational and metamorphic history. Laboratory and field trip course. Prerequisite: Structural geology and petrology, with sedimentology and linear algebra recommended. (3-3) R

GEOS 7170 Workshop in Structure/Tectonics (1 semester hour) Presentation and discussion of current research with emphasis on problems, techniques, and recent literature. (May be repeated for credit.) (1-0) Y

GEOS 8V70 Research in Structural Geology-Tectonics (1-9 semester hours) May be repeated for credit. ((1-9)-0) S

General Geophysics Courses
GEOS 5380 Seismic Interpretation (3 semester hours) Seismic reflection profiling as it is used to map the distribution of sedimentary layers and faults in the subsurface. Special emphasis is given to applications in hydrocarbon exploration. Extensive use is made of software processing packages. (3-0) T

GEOS 5389 Exploration Gravity (3 semester hours) The gravity method is studied in detail with regard to its application to exploration for hydrocarbons, minerals, geothermal sources, groundwater, and geotechnical studies, including surveying, processing, analysis, and modeling of gravity data. Prerequisite: Consent of instructor. (3-0) T

GEOS 5481 Digital Geophysical Signal Processing (4 semester hours) Principles of the analysis of geophysical signals in both time and space. Includes integral transforms, spectral analysis, linear filter theory and deconvolution techniques. Computer applications are emphasized. Laboratory course. Prerequisite: GEOS 5303 or equivalent, may be taken concurrently. (3-3) R

GEOS 5483 Geophysical Techniques I (4 semester hours) Part one of a two-part course on the theoretical basis and practical aspects of geophysical data collection, processing and interpretation. The planning and execution of small scale surveys, of the type employed in engineering, groundwater and environmental site evaluations, is featured. Techniques include conventional and satellite (Global Positioning System) positioning and the potential field geophysical methods, including gravity, magnetic, and electric (resistivity and electromagnetic). The integrated interpretation of different data types is emphasized. A background in calculus and general physics is required. (3-3) T

GEOS 5484 Geophysical Techniques II (4 semester hours) Part two of a two-part course on the theoretical and practical aspects of geophysical data collection. The planning and execution of small scale surveys, of the type employed in engineering, groundwater and environmental site evaluations, is featured. Techniques covered include both refraction and reflection seismology and both low and high frequency, single and multi-channel ground-penetrating radar. Advantage is taken of both the similarities and complimentary behaviors of seismic and radar waves. An integration, of both seismic and radar data, as well as data from the methods covered in Geophysical Techniques I, is emphasized in interpretation. A background in calculus and general physics is required. Permission of instructor is required. (3-3) T

GEOS 6382 Geophysical Inversion Theory (3 semester hours) Theoretical and practical aspects of fitting mathematical models to data in geophysics. Topics covered include the inversion of both discrete systems and integral equations, for linear and non-linear relationships between data and parameters. Particular attention is paid to assessment of model accuracy and uniqueness. Prerequisites: Advanced calculus and linear algebra or equivalent. (3-0) R

GEOS 8V80 Research in Geophysics (1-9 semester hours) May be repeated for credit. ((1-9)-0) S

Seismology Courses
GEOS 5392 Foundations of Seismology (3 semester hours) Introduction to the theory and mathematical methods of seismology. Tensor analysis of elasticity, and wave equation in terms of rays, waves and modal vibrations are covered. Analytical solutions of the elastic wave equation for layered media will be studied by a variety of methods. (3-0) R

GEOS 6391 Earthquake Seismology (3 semester hours) Near and far field representations of earthquake sources, engineering (strong motion) seismology, characteristics and interpretation of earthquake phases, use of earthquakes in determining Earth structure, risk and prediction, instrumentation. Includes a case study of a recent large earthquake. (3-0) R

GEOS 6392 Reflection Seismology (3 semester hours) Theoretical and practical aspects of seismic reflection data acquisition and processing. Includes the wave equation, the convolutional model, coded sources, the array response, velocity estimation, statics, filtering, pre- and post-stack migration, and direct and indirect detection of hydrocarbons, VSPs, AVO and 3-D processing. Prerequisites: GEOS 5481, and GEOS 5392 or equivalent. (3-0) R
GEOS 6393 Computational Seismology (3 semester hours) Principles of parallel computing with applications to seismology. Includes overviews of Intel and Sun E6000 architectures, writing and debugging parallel code, characterization of machine performance, fast Fourier transforms, Radon transforms, solution of matrix and wave equations. Laboratory course. Prerequisites: GEOS5303, GEOS5481, and any numerical analysis course. (2-3)R

GEOS 6395 Seismic Modeling (3 semester hours) Theory and application of the major techniques for computation of synthetic seismograms. Topics include asymptotic ray theory, spectral and slowness methods, finite differences, finite elements, Kirchhoff, and boundary integral methods. Readings will be drawn from the literature. Prerequisite: GEOS 5392 and any two graduate seismology courses. (3-0) R

GEOS 6396 Seismic Inversion (3 semester hours) Theory and application of the major techniques for inversion of seismic data. Topics include linear and nonlinear matrix methods, Wiechert-Herglotz integration, extremal inversion, migration, wavefield imaging of body and surface waves, and tomography, imaging of VSPs, and Born inversion. Readings will be drawn from the literature. Prerequisite: Any two graduate seismology courses. (3-0) R

GEOS 7190 Workshop in Seismology (1 semester hour) Informal presentation and discussion of current research of graduate students and faculty, of new computing equipment and software, and of current research literature. (Pass/Fail grading only. May be repeated for credit.) (1-0) S

GEOS 8V90 Research in Seismology (1-9 semester hours) May repeat for credit. ([1-9]-0) S

Thesis And Dissertation Courses

GEOS 8398 Thesis (3 semester hours) May repeat for credit. (3-0) S

GEOS 8399 Dissertation (3 semester hours) May repeat for credit. (3-0) S
Department of Mathematical Sciences

http://www.utdallas.edu/nsm/math/

Faculty

Professors: Larry P. Ammann, M. Ali Hooshyar, Patrick L. Odell (Emeritus), Istvan Ozsvath, Viswanath Ramakrishna, Ivor Robinson (Emeritus), Robert Serfling, Janos Turi, John W. Van Ness (Emeritus), John Wiorkowski

Associate Professor: Michael Baron

Assistant Professors: Pankaj Choudhary, Mieczyslaw Dabkowski

Adjunct Professors: Jose Carlos Gomez Larranage, Adolfo Sanchez Valenzuela

Affiliated Faculty: Thomas Butts and Titu Andreescu (Science and Mathematics Education)


Objectives

The Mathematical Sciences Department at The University of Texas at Dallas offers graduate study in five majors: applied mathematics, engineering mathematics, mathematics, statistics, and an interdisciplinary degree in Bioinformatics and Computational biology. The degree programs offer students the opportunity to prepare for careers in these disciplines themselves or in any of the many other fields for which these disciplines are such indispensable tools. As other sciences develop, problems which require the use of these tools are numerous and pressing.

In addition to a wide range of courses in mathematics and statistics, the Mathematical Sciences Department offers a unique selection of courses that consider mathematical and computational aspects of engineering, biology and other scientific problems.

The Master of Science degree programs are designed for persons seeking specializations in applied mathematics, engineering mathematics, mathematics, statistics, bioinformatics and computational biology. The Master of Science degree is available also for those who plan to teach mathematical sciences above the remedial level at a community college or at a college or university. The Master of Science degree is recommended as a minimum, since an earned doctorate is sometimes required.

For information concerning the Master of Arts in Teaching in Mathematics Education, designed for persons who are teaching in grades 6-12, see the Science and Mathematics Education section.

The Doctor of Philosophy degree programs cover two basic areas of concentration: statistics and applied mathematics. They are designed for those who plan to pursue academic, financial or industrial careers.

Facilities

The faculty, staff and students have access to a large network of Sun workstations and servers on campus. In addition, the Department has a classroom equipped with a cluster of 20 high-end Linux PCs that are used for instruction and special research purposes.

Admission Requirements

The University’s general admission requirements are discussed on page 13.

Specific additional admission requirements for students in Mathematical Sciences follow. Students lacking undergraduate prerequisites for graduate courses in their area must complete these prerequisites or receive approval from the graduate adviser and the course instructor before registering.

One of the components of a student’s academic history which is evaluated when the student is seeking admission to the graduate program is his/her performance on certain standardized tests. Since these tests are designed to indicate only the student’s potential for graduate study, they are used in conjunction with other measures of student proficiency (such as GPA, etc.) in determining the admission status of a potential graduate student. Accordingly, there is no rigid minimum cut-off score for admission to the program. However, a student with at least a Graduate Record Examination (GRE) combined score of 1050 with at least 550 on the math portion would have a reasonable probability of admission as a Master's student, assuming that the student’s other credentials were in order.
Similarly, a student with a GRE score of 1200 (with at least 650 in the quantitative portion) would have a reasonable probability of admission as a Ph.D. student, assuming that all other credentials were in order. Higher standards prevail for students seeking Teaching Assistantships.

Degree Requirements

Master of Science

The University’s general degree requirements are discussed on page 18.

Students seeking a Master of Science in Mathematical Sciences must complete a total of 12 three-credit hour courses. In some cases, credit for 3 hours is approved for good mathematics background. The student may choose a thesis plan or a non-thesis plan. In the thesis plan, the thesis replaces two elective courses with completion of an approved thesis (six thesis hours). The thesis is directed by a Supervising Professor and must be approved by the Head of the Mathematical Sciences Department.

Each student must earn a 3.0 minimum GPA in the courses listed for the student’s program.

Applied Mathematics Major

MATH 5301-5302 Elementary Analysis I and II (or equivalent)
MATH 6303 Theory of Complex Functions
MATH 6313 Numerical Analysis
MATH 6315 Ordinary Differential Equations
MATH 6318 Numerical Analysis of Differential Equations
MATH 6319-6320 Principles and Techniques in Applied Mathematics I and II
MATH 6308 Inverse Problems and their Applications
MATH 6321 Optimization

Plus two guided electives.

Engineering Mathematics Major

MATH 5301-5302 Elementary Analysis I and II (or equivalent)
MATH 6303 Theory of Complex Functions
MATH 6313 Numerical Analysis
MATH 6315 Ordinary Differential Equations
MATH 6318 Numerical Analysis of Differential Equations
MATH 6319-6320 Principles and Techniques in Applied Mathematics I and II
MATH 6331 Systems, Signals and Control
MATH 6305 Mathematics of Signal Processing

plus two guided electives.

Mathematics Major

MATH 5301-5302 Elementary Analysis I and II (or equivalent)
MATH 6303 Theory of Complex Functions
MATH 6313 Numerical Analysis
MATH 6315 Ordinary Differential Equations
MATH 6318 Numerical Analysis of Differential Equations
MATH 6301 Real Analysis
MATH 6302 Real and Functional Analysis
MATH 6306 Topology and Geometry
MATH 6311 Abstract Algebra I

plus two guided electives.

Statistics Major

Students seeking a Master of Science in Mathematical Sciences with a major in Statistics must complete the following core courses:

STAT 6331 Statistical Inference I
STAT 6337-38 Statistical Methods I, II
STAT 6339 Linear Statistical Models
STAT 6341 Numerical Linear Algebra and Statistical Computing
One course from each of any two of the following sets of courses:

\{STAT 6329, STAT 6343, STAT 7334\} Stochastic Processes or Experimental Design or Nonparametric and Robust Statistical Methods
\{STAT 6348, STAT 7331\} Multivariate Analysis
\{STAT 6347, STAT 7338\} Time Series Analysis

Students must choose remaining courses from among the following electives:
MATH 6301, MATH 6302, MATH 6313, MATH 6331 or any 6300- or 7300-level statistics courses. Also, a maximum of two of the following prerequisite 5000-level courses may be counted as electives: MATH 5301, 5302, Elementary Analysis I, II and STAT 5351, 5352 Probability and Statistics I, II.

Other Requirements
Electives must be approved by the graduate adviser. Typically, electives are 6000- and 7000-level mathematical sciences courses. Courses from other disciplines may also be used upon approval. Substitutions for required courses may be made if approved by the graduate adviser. Instructors may substitute stated prerequisites for students with equivalent experience.

Doctor of Philosophy
The University’s general degree requirements are discussed on page 18.

Each Doctor of Philosophy degree program is tailored to the student. The student must arrange a course program with the guidance and approval of the graduate adviser. Adjustments can be made as the student’s interests develop and a specific dissertation topic is chosen. A minimum of 90 semester hours beyond the bachelor’s degree is required.

Applied Mathematics Major
MATH 6301 Real Analysis
MATH 6302 Real and Functional Analysis
MATH 6303 Theory of Complex Functions I
MATH 6306 Topology and Geometry
MATH 6311 Abstract Algebra I
MATH 6313 Numerical Analysis
MATH 6315 Ordinary Differential Equations
MATH 6316 Differential Equations
MATH 6318 Numerical Analysis of Differential Equations
MATH 6319-6320 Principles and Techniques in Applied Mathematics I and II
MATH 7313 Partial Differential and Integral Equations I
MATH 7319 Functional Analysis

Statistics Major
MATH 6301 Real Analysis
MATH 6302 Real and Functional Analysis
STAT 6331-6332 Statistical Inference I, II
STAT 6337-6338 Statistical Methods I, II
STAT 6339 Linear Statistical Models
STAT 6344 Probability Theory I
STAT 7330 Decision Theory
STAT 7331 Multivariate Analysis
STAT 7334 Nonparametric Statistics
STAT 7338 Time Series Modeling and Filtering
STAT 7345 Stochastic Processes
MATH 6303 Theory of Complex Functions I, or MATH 6313 Numerical Analysis, or
MATH 6315 Ordinary Differential Equations I, or MATH 7319 Functional Analysis
Electives and Dissertation

An additional 18-24 credit hours for Applied Math and 18-24 credit hours for Statistics designed for the student’s area of specialization are taken as electives in a degree plan designed by the student and the graduate adviser. This plan is subject to approval by the Department Head. After completion of the first 3 or 4 academic semesters of the course program, the student must pass a Ph.D. Qualifying Examination in order to continue on to the research and dissertation phase of the Ph.D. program. Finally, a dissertation is required and must be approved by the graduate program. Areas of specialization include:

- **Applied Mathematics**: applied analysis, biomathematics, differential equations, relativity, scattering theory, systems theory, signal processing.
- **Statistics**: statistical inference, applied statistics, statistical computing, probability, stochastic processes, linear models, time series, statistical classification, multivariate analysis, nonparametric and robust statistics, asymptotic theory.

Other specializations are possible, including interdisciplinary topics. There must be available a dissertation research adviser or group of dissertation advisers willing to supervise and guide the student. A dissertation Supervising Committee should be formed with at least four members from the Mathematical Sciences faculty. The dissertation may be in Mathematical Sciences exclusively or it may involve considerable work in an area of application.

Research

Within the Mathematical Sciences programs opportunities exist for work and/or research in applied mathematics, engineering mathematics, mathematics and statistics. The opportunity to take course work in several of the other university programs also allows the student to prepare for interdisciplinary work. Special topics within research areas include functional analysis, operator theory, differential and integral equations, optimization, numerical analysis, system theory and control with application in material and molecular sciences, inverse problems with applications in geosciences and medical sciences, relativistic cosmology, differential geometry, applications of topology to biology, mathematical and computational biology with applications in cardiovascular physiology, neurobiology and cell biology; probability theory, applied probability, stochastic processes, mathematical statistics, statistical inference, asymptotic theory, statistical time series, Bayesian analysis, robust multivariate statistical methods, robust linear models, robust and nonparametric methods, sequential analysis, statistical computing, signal processing, remote sensing, change-point problems, forecasting and applications in their respective areas such as energy finance, semiconductor manufacturing, psychology, actuarial sciences, physical and medical sciences.

For a complete list of faculty and their areas of research, visit the website www.utdallas.edu/nsm/math/faculty.

Course Descriptions

### Mathematics and Applied Mathematics Courses

**MATH 5300 Mathematics for Non-Majors** (3 semester hours) Algebraic and analytical mathematics for mathematics in the social, behavioral and management sciences. The course also prepares for MATH 5304. No credit allowed to mathematical sciences majors. (3-0) S

**MATH 5301 Elementary Analysis I** (3 semester hours) Real numbers, differentiation, integration, metric spaces, basic point set topology, power series, analytic functions, Cauchy’s theorem. Prerequisite: Multivariable calculus (MATH 2421) and theoretical concept of calculus (MATH 3310) or equivalent. (3-0) Y

**MATH 5302 Elementary Analysis II** (3 semester hours) Continuation of MATH 5301. Prerequisite: MATH 5301. (3-0) Y

**MATH 5304 Applied Mathematical Analysis for Non-Majors** (3 semester hours) Techniques of mathematical analysis applicable to the social, behavioral and management sciences. Differential and integral calculus of one and many variables. No credit allowed to mathematical sciences majors. Prerequisite: College Algebra (3-1) S

**MATH 5305 Higher Geometry for Teachers** (3 semester hours) Topics in modern Euclidean geometry including distinguished points of a triangle, circles including the nine-point circle, cross ratio, transformations; introduction to projective geometry. No credit allowed to mathematical sciences majors except those in M.A.T. program. Prerequisite: Junior level mathematics course. (3-0) T
MATH 5306 Non-Euclidean Geometry for Teachers (3 semester hours) The relations among elliptic, Euclidean and hyperbolic geometries, Euclidean models of elliptic and hyperbolic geometries. No credit allowed to mathematical sciences majors except those in M.A.T. program. Prerequisite: Junior-level mathematics course. (3-0) T

MATH 5313 Modern Algebra for Teachers (3 semester hours) Study of modern algebra involving groups, rings, fields and Galois theory. No credit allowed to mathematical sciences majors except those in M.A.T. program. Prerequisite: Junior-level mathematics course. (3-0) R

MATH 5390 Topics in Mathematics (3 semester hours) (3-0) R

MATH 6301 Real Analysis (3 semester hours) Measure theory and integration. Hilbert and Banach spaces. Prerequisites: Undergraduate analysis course (e.g., MATH 4301-2 or MATH 5301-2) undergraduate course in linear algebra (MATH 2418) or equivalent. (3-0) Y

MATH 6302 Real and Functional Analysis (3 semester hours) Continuation of MATH 6301, Hilbert and Banach space techniques. Prerequisite: MATH 6301. (3-0) Y

MATH 6303 Theory of Complex Functions I (3 semester hours) Complex integration, Cauchy's theorem, calculus of residues, power series, entire functions, Riemann mapping theorems. Riemann surfaces, conformal mapping with applications. Prerequisite: Undergraduate analysis (e.g., MATH 4301-2). (3-0) Y

MATH 6304 Theory of Complex Functions II (3 semester hours) Continuation of MATH 6303. Prerequisite: MATH 6303. (3-0) T

MATH 6305 Mathematics of Signal Processing (3 semester hours) The course is devoted to a mathematical foundation of some of the key topics in signal processing: discrete and continuous signal transforms, analysis and design of filters [e.g. lattice filters], least square methods and algorithms. Prerequisites: Undergraduate analysis (MATH 4301-2 or MATH 5301-2); undergraduate course in linear algebra (MATH 2418); undergraduate course in complex variables (MATH 3379) or equivalent. (3-0) T

MATH 6306 Topology and Geometry (3 semester hours) Topics in topology, differential geometry and their applications to areas such as biological sciences and engineering. Prerequisite: Undergraduate analysis (MATH 4301-2 or MATH 5301-2). (3-0) T

MATH 6307 Wavelets and Their Applications (3 semester hours) An introduction to windowed Fourier and continuous wavelet transforms, generalized frames, discrete wavelet frames, multiresolution analysis, Daubechies' orthogonal wavelet bases, and their applications in partial differential equations and signal processing. Prerequisite: Undergraduate linear algebra (MATH 2418) and differential equations (MATH 2420) or equivalent (3-0). T

MATH 6308 Inverse Problems and Applications (3 semester hours) Exact and approximate methods of nondestructive inference, such as tomography and inverse scattering theory in one and several dimensions, with applications in physical and biomedical sciences and engineering. Prerequisite: Undergraduate linear algebra (MATH 2418) and differential equations (MATH 2420) or equivalent. (3-0) T

MATH 6311 Abstract Algebra I (3 semester hours) Basic properties of groups, rings, fields, and modules. Topics selected from group representations, Galois theory, local rings, algebraic number theory, classical ideal theory, basic homological algebra, and elementary algebraic geometry. Prerequisite: Undergraduate algebra course (MATH 3311) or equivalent. (3-0) T

MATH 6313 Numerical Analysis (3 semester hours) A study of numerical methods including the numerical solution of non-linear equations, linear systems of equations, interpolation, iterative methods and approximation by polynomials. Prerequisites: Knowledge of a high level programming language, Linear algebra (MATH 2418) and multivariable calculus (MATH 2451). (3-0) T

MATH 6315 Ordinary Differential Equations (3 semester hours) The study of ordinary differential equations with emphasis on existence, uniqueness, linear systems, boundary value problems, and stability. Prerequisites: Undergraduate course in linear algebra (MATH 2418) or equivalent; undergraduate analysis (MATH 4301-2 or MATH 5301-2); undergraduate course in ordinary differential equations (MATH 2420). (3-0) Y

MATH 6316 Differential Equations (3 semester hours) Continuation of MATH 6315 and an introduction to partial differential equations. Prerequisite: MATH 6315. (3-0) T

MATH 6318 Numerical Analysis of Differential Equations (3 semester hours) Practical and theoretical aspects of numerical methods for both ordinary and partial differential equations are discussed. Topics selected from: initial value problems for ordinary differential equations, two-point boundary value problems, projection methods, finite difference, finite element and boundary element approximations for partial differential equations. Prerequisites: MATH 6313 or equivalent. (3-0) T

MATH 6319 Principles and Techniques in Applied Mathematics I (3 semester hours) Mathematical methods usually used in applied sciences and engineering. Topics chosen from basic linear space theory; Hilbert spaces; fixed point theorems and applications to differential and integral equations; spectral theorem; distributions; Sobolev
spaces; the Fourier transforms; complex function theory, calculus of residues; exact, approximate and asymptotic solutions to Laplace, heat and wave equations, Eikonal and WKB methods, and special functions. Prerequisite: Undergraduate linear algebra (MATH 2418), and differential equations (MATH 2420) or equivalent. (3-0) T

**MATH 6320 Principles and Techniques in Applied Mathematics II** (3 semester hours) Continuation of Math 6319. Prerequisite: MATH 6319. (3-0) T

**MATH 6321 Optimization** (3 semester hours) Introduction to theoretical and practical concepts of optimization in finite and infinite dimensional setting, least-squares estimation, optimization of functionals, local and global theory of constrained optimization, iterative methods. Prerequisites: Undergraduate ordinary differential equations (MATH 2420) and linear algebra (MATH 2418). (3-0) T

**MATH 6331 Linear Systems and Signals** (3 semester hours) Basic principles of systems and control theory: state space representations, stability, observableness, controllability, realization theory, transfer functions, feedback. Prerequisites: Undergraduate course in linear algebra (MATH 2418) and undergraduate analysis course or MATH 5301-2. (3-0) T

**MATH 6332 Advanced Control** (3 semester hours) Theoretical and practical aspects of modern control methodologies in state space and frequency domain, in particular LQG and H-infinity control: coprime factorizations, internal stability, Kalman filter, optimal regulator, robust control, sensitivity minimization, loop shaping, model reduction. Prerequisite: MATH 6331. (3-0) T

**MATH 6336 Nonlinear Control Systems** (3 semester hours) Differential geometric tools, input-output maps, feedback linearization, nonlinear observers, input-output linearization, output tracking, and regulation. Prerequisites: MATH 6315 and MATH 6331. (3-0) T

**MATH 6339 Control of Distributed Parameter Systems** (3 semester hours) Theoretical and technical issues for control of distributed parameter systems in the context of linear infinite dimensional dynamical systems: Evolution equations and control on Euclidean space, elements of functional analysis, semigroups of linear operators, abstract evolution equations, control of linear infinite dimensional dynamical systems, approximation techniques. Prerequisites: Undergraduate course in partial differential equations (MATH 4362) and analysis (MATH 4301). (3-0) T

**MATH 6341 Bioinformatics** (3 semester hours) Fundamental mathematical and algorithmic theory behind current bioinformatics techniques are covered and implemented. They include hidden Markov models, dynamic programming, genetic algorithms, simulated annealing, neural networks, cluster analysis, and information theory. Prerequisites: Knowledge of Unix and a high level programming language. (3-0) T

**MATH 6343 Computational Biology** (3 semester hours) Mathematical and computational methods and techniques to analyze and understand problems in molecular biology are covered. Topics include sequence homology and alignment, genetic mapping, protein folding, and DNA computing. Prerequisite: MATH 2418 or equivalent. (3-0) T

**MATH 6345 Mathematical Methods in Medicine and Biology** (3 semester hours) Introduction to the use of mathematical techniques in solving biologically important problems. Some examples of topics that might be covered are biochemical reactions, ion channels, cellular signaling mechanisms, kidney function, nerve impulse propagation. Prerequisites: MATH 2417, MATH 2419, MATH 2420 recommended. (3-0) T

**MATH 6364 Stochastic Calculus in Finance** (3 semester hours) Brownian Motion, Ito Calculus, Feynman-Kac formula and an outline of Stochastic Control, Black Scholes Analysis, Transaction Costs, Optimal Portfolio Investment. Prerequisites: STAT 4351 or equivalent, and MATH 2451 or equivalent. (3-0) T

**MATH 6390 Topics in Mathematics** (3 semester hours) (3-0) R

**MATH 6390 Topics in Mathematics** (3 semester hours) (3-0) R

**MATH 6V81 Special Topics in Mathematics** (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S

**MATH 7313 Partial Differential and Integral Equations I** (3 semester hours) Topics include theory of partial differential and integral equations. Classical and modern solution techniques to linear and nonlinear partial differential equations and boundary value problems. Introduction to the theory of Sobolev spaces. Prerequisite: MATH 6316 recommended. (3-0) T

**MATH 7314 Partial Differential and Integral Equations II** (3 semester hours) Continuation of MATH 7313. General theory of partial differential and integral equations, with emphasis on existence, uniqueness and qualitative properties of solutions. Prerequisite: MATH 7313. (3-0) T

**MATH 7316 Wave Propagation with Applications** (3 semester hours) Study of the wave equation in one, two and three dimensions, the Helmholtz equation, associated Green’s functions, asymptotic techniques for solving the propagation problems with applications in physical and biomedical sciences and engineering. Prerequisites: MATH 6303, MATH 6318. (3-0) T

**MATH 7319 Functional Analysis** (3 semester hours) Elements of operator theory, spectral theory, topics in Banach and operator algebras. Prerequisites: MATH 6301-2, MATH 6303 recommended. (3-0) T

**MATH 7390 Topics in Mathematics** (3 semester hours) (3-0) R
Statistics Courses

STAT 5191 Statistical Computing Packages (1 semester hour) Introduction to use of major statistical packages such as SAS, BMD, and Minitab. Based primarily on self-study materials. No credit allowed to mathematical sciences majors. Prerequisite: One semester of statistics. (1-0) S

STAT 5311 Applied Statistics for Management Sciences I (3 semester hours) Theory and methods of statistics used in management and business. Topics include: frequency distributions, measures of location, measures of variation, probability, Bayes theorem, sampling distributions, point and interval estimation, statistical decisions (hypotheses testing), correlation and regression. This course may only be taken by students seeking a management degree. Prerequisite: MATH 5304 or equivalent. (3-0) S

STAT 5351 Probability and Statistics I (3 semester hours) A mathematical treatment of probability theory. Random variables, distributions, conditioning, expectations, special distributions and the central limit theorem. The theory is illustrated by numerous examples. This is a basic course in probability and uses calculus extensively. Prerequisite: Multivariable calculus (MATH 2451). (3-0) T

STAT 5352 Probability and Statistics II (3 semester hours) Theory and methods of statistical inference. Sampling, estimation, confidence intervals, hypothesis testing, analysis of variance, and regression with applications. Prerequisite: STAT 5351. (3-0) T

STAT 5353 Applied Statistics and Data Analysis for Non-Majors I (3 semester hours) Statistical methods and theory with emphasis on applications in the social and natural sciences. Concepts of variability, sampling, point and interval estimation, testing hypotheses, correlation, regression, and analysis of variance. Use of a computer package. The concentration will be on applicability, appropriateness, and utility of statistics. This course may not be taken for credit by mathematical sciences majors. Prerequisite: College algebra. (3-0) R

STAT 5365 Statistical Quality and Process Control (3 semester hours) Application of statistical methods to the problem of controlling quality of production. Topics include control charts, sampling methods, and process control techniques. Prerequisite: STAT 5311, or STAT 5351, or equivalent. (3-0) T

STAT 5390 Topics in Statistics (3 semester hours) (3-0) R

STAT 6326 Sampling Theory (3 semester hours) Introduction to survey sampling theory and methods. Topics include simple random, stratified, systematic, cluster, unequal probability, multistage, spatial sampling designs. Estimation of means, proportions, variances, ratios, and other parameters for a finite population, optimal allocation, detectability, multiplicity. Prerequisite: STAT 5351. (3-0) T

STAT 6329 Applied Probability and Stochastic Processes (3 semester hours) Basic random processes used in stochastic modeling, including Poisson, Gaussian, and Markov processes with an introduction to queuing theory. Measure theory not required. Prerequisite: Probability theory. (3-0) T

STAT 6331 Statistical Inference I (3 semester hours) Introduction to fundamental concepts and methods of statistical modeling and decision making. Exponential families of models, sufficiency, estimation, hypothesis testing, likelihood methods, optimality, analysis of variance, linear models, decision theory. Prerequisites: Undergraduate analysis MATH4301-2, STAT 5351 or equivalent and MATH 5302 or equivalent. STAT 5352 strongly recommended. (3-0) Y

STAT 6332 Statistical Inference II (3 semester hours) Topics chosen from elementary and advanced asymptotic methods, including sample quantiles, U-statistics, differentiable statistical functions, the MLE, L-statistics, M-statistics, the bootstrap, advanced aspects of statistical inference, likelihood-based inference, robust statistics, linear models and the analysis of discrete data. Prerequisites: STAT 6331 and STAT 6344 should be taken either before or concurrently. (3-0) T

STAT 6337 Advanced Statistical Methods I (3 semester hours) Statistical methods most often used in the analysis of data. Study of statistical models, including multiple regression, nonlinear regression, stepwise regression, balanced and unbalanced analysis of variance, analysis of covariance and log-linear analysis of multiway contingency tables. Prerequisites: MATH 2451 and STAT 5352 or STAT 6331. (3-0) T

STAT 6338 Advanced Statistical Methods II (3 semester hours) Continuation of STAT 6337. Prerequisite: STAT 6337. (3-0) T
STAT 6339 Linear Statistical Models (3 semester hours) Vectors of random variables, multivariate normal distribution, quadratic forms. Theoretical treatment of general linear models, including the Gauss-Markov theorem, estimation, hypotheses testing, and polynomial regression. Introduction to the analysis of variance and analysis of covariance. Prerequisites: STAT 6331 and MATH 2418 or equivalent. (3-0) T

STAT 6341 Numerical Linear Algebra and Statistical Computing (3 semester hours) A study of computational methods used in statistics. Topics to be covered include the simulation of stochastic processes, numerical linear algebra, and graphical methods. Prerequisite: STAT 5352 or STAT 6337. (3-0) T

STAT 6343 Experimental Design (3 semester hours) This course focuses on the planning, development, implementation and analysis of data collected under controlled experimental conditions. Repeated measures designs, Graeco-Latin square designs, randomized block designs, balanced incomplete block designs, partially balanced incomplete block designs, fractional replication and confounding. The course requires substantive use of computer facilities. Prerequisite: STAT 6338 or equivalent knowledge of fixed and random effects crossed ANOVA designs. (3-0) T

STAT 6344 Probability Theory I (3 semester hours) A measure theoretic coverage of probability theory. Measure, integration, Fubini's theorem, random variables, distribution functions, characteristic functions, independence, laws of large numbers, central limit theorem, three-series theorem, Glivenko-Cantelli theorem, conditional probability and expectation, introduction to martingales. Prerequisite: MATH 6301. (3-0) T

STAT 6347 Applied Time Series Analysis (3 semester hours) Methods and theory for the analysis of data collected over time. The course covers techniques commonly used in both the frequency domain (harmonic analysis) and the time domain (autoregressive, moving average models). Prerequisite: STAT 6337 or STAT 6339 or equivalent. (3-0) T

STAT 6348 Applied Multivariate Analysis (3 semester hours) The most frequently used techniques of multivariate analysis. Topics include T/T2, MANOVA, principal components, discriminant analysis and factor analysis. Prerequisite: STAT 5352 or STAT 6331. (3-0) T

STAT 6390 Topics in Statistics (3 semester hours) (3-0) R

STAT 6V99 Statistical Consulting (1-3 semester hours) Practical experience in collaboration with individuals who are working on problems which are amenable to statistical analysis. Problem formulation, statistical abstraction of the problem, and analysis of the data. Course may be repeated but a maximum of three hours may be counted toward the requirements for the master's degree. Prerequisite: Consent of instructor. ((1-3)-0) T

STAT 7330 Decision Theory and Bayesian Inference (3 semester hours) Statistical decision theory and Bayesian inference are developed at an intermediate mathematical level. Prerequisites: MATH 4301 and MATH 4302 or MATH 5302 and either STAT 6331 or STAT 6338. (3-0) T

STAT 7331 Multivariate Analysis (3 semester hours) Vector space foundations and geometric considerations. The multivariate normal distribution: properties, estimation, and hypothesis testing. Multivariate t-test. Classification problems. The Wishart distribution. General linear hypothesis and MANOVA. Principal components, canonical correlations, factor analysis. Multivariate nonparametric methods. Prerequisite: STAT 6331 or equivalent. (3-0) T


STAT 7338 Time Series Modeling and Filtering (3 semester hours) Theory of correlated observations observed sequentially in time. Stationary processes, power spectra, stationary models fitting, correlation analysis and regression. Prerequisite: STAT 6331 or equivalent. (3-0) T

STAT 7345 Advanced Probability and Stochastic Processes (3 semester hours) Possible topics include Martingales, Kolmogorov's existence theorem, random walk, Markov chains, the Poisson process, the general birth and death process, other Markov processes, renewal processes, Brownian motion and diffusion, and stationary processes. Prerequisite: STAT 6344. (3-0) T

STAT 7390 Topics in Statistics (3 semester hours) (3-0) R

STAT 8V02 Individual Instruction in Statistics (1-6 semester hours) ((1-6)-0) S

STAT 8V03 Advanced Topics in Statistics (1-6 semester hours) ((1-6)-0) R

STAT 8V07 Research in Statistics (1-9 semester hours) Open to students with advanced standing, subject to approval of the graduate adviser. ((1-9)-0) S

STAT 8V98 Thesis (3-9 semester hours) May be repeated for credit. ((3-9)-0) S

STAT 8V99 Dissertation (3-9 semester hours) May be repeated for credit. ((3-9)-0) S

MATH 8V98 Thesis (3-9 semester hours) May be repeated for credit. ((3-9)-0) S

MATH 8V99 Dissertation (3-9 semester hours) May be repeated for credit. ((3-9)-0) S
Department of Physics

http://www.utdallas.edu/dept/physics/

Faculty
Associate Professors: Phillip Anderson, Gregory D. Earle, Yuri Gartstein
Assistant Professors: Mustapha Ishak-Boushaki
Senior Lecturers: Paul MacAlevey, Beatrice Rasmussen
Affiliated Faculty: Dale Byrne (Engineering), Cyrus D. Cantrell (Engineering), John P. Ferraris (Chemistry), Mary Urquhart (Science/Mathematics Education)

Objectives
The goal of the Graduate Program in Physics is to develop individual creativity and expertise in the fields of physics. In pursuit of this objective, study in the program is strongly focused on research. Students are encouraged to begin participating in ongoing research activities from the beginning of their graduate studies. The research experience culminates with the doctoral dissertation, the essential element of the Ph.D. program that prepares the student for careers in academia, government laboratories, or industry.

A Master of Science degree is offered to those seeking to acquire or maintain technical mastery of both fundamentals and current applications.

A Master of Science degree in Applied Physics is offered for students wishing to emphasize applications encountered in most industrial and high technology environments.

Admission Requirements
The University’s general admission requirements are discussed on page 13.

The Physics Program seeks students who have a B.S. degree in Physics or closely related subjects from an accredited university or college, and who have superior skills in quantitative and deductive analysis. Decisions on admission are made on an individual basis. However, as a guide, a combined score on the verbal and quantitative parts of the GRE of 1100, or 700 on the quantitative part, is advisable based on our experience with student success in the program.

For graduate work it is assumed that the student has an undergraduate background that includes the following courses at the level indicated by texts referred to: mechanics at the level of Symon, Mechanics; electromagnetism at the level of Reitz and Milford, Foundations of Electromagnetic Theory; thermodynamics at the level of Kittel, Thermal Physics; quantum mechanics at the level of Griffiths, Introduction to Quantum Mechanics (chapters 1-4), and some upper-division course(s) in modern physics, and atomic physics. Students who lack this foundation may be required to take one or more undergraduate courses to complete their preparation for graduate work.

Degree Requirements
The University’s general degree requirements are discussed on page 18.

The candidate for either the M.S., MS in Applied Physics, or Ph.D. must satisfy general University degree requirements.

Well prepared students may demonstrate by examination adequate knowledge of the core and basic course material.

Student Support
A limited number of assistantships are awarded to those students displaying the most promise in teaching or research. Specific decisions are made on an individual basis. Awardees are required to complete 8 graduate physics courses (not including research courses) during the first 12 months in residence. Continuation of support requires achievement of a minimum GPA of 3.3, and a satisfactory record in teaching or research assignments.
Research

The central principle in the structure of the graduate program is that a student’s progress and ultimate success is best served by early and varied research experiences coupled with individually tailored course sequences.

Current areas of research specialization in the Physics program are: Atmospheric and Space Physics; Atomic and Molecular Physics; Quantum Electronics and Applications; Optics; Astrophysics/Cosmology/Relativity; Solid State/Condensed Matter Physics/Materials Science; High Energy Physics and Elementary Particles; and Chemical Physics.

Astrophysics, Cosmology and Relativity

The Theoretical Cosmology and Relativity Group studies fundamental problems in astrophysics, contemporary cosmology, and relativity. These involve analytical, numerical, and cosmological-data related projects. The group is instrumental in organizing the biennial Texas Symposia on Relativistic Astrophysics, beginning in Dallas in 1963 and recurring regularly all over the world since then. Current areas of research include: gravitational lensing (lenses) and its applications to cosmology; the acceleration of the expansion of the universe (cosmological constant, dark energy); fitting cosmological models to observational data (e.g. CMB, Lensing, supernovae); dark matter; the structure of the big bang; the role of inflation; computer algebra systems applied to general relativity and cosmology; space-time junction conditions and wormholes; cosmological models of wider generality than the classical homogeneous models and their possible observational signatures. More information is available at: http://www.utdallas.edu/~mishak/relativitycosmology.html.

Atmospheric And Space Physics

Research in Atmospheric and Space Physics encompasses both theory and experiment, with emphasis on aeronomy, ionospheric physics, planetary atmospheres, atmospheric electricity and its effects on weather and climate, and space instrumentation. Much of the research occurs in the W. B. Hanson Center for Space Sciences, which includes laboratory facilities for instrument design, fabrication, and testing. Faculty and students participate in ongoing satellite missions sponsored by NASA and DoD, and suborbital sounding rockets. They also participate in analysis of large data sets from previous missions, and from ground-based optical and radar instruments at locations ranging from Greenland to South America. Particular areas of interest include large and small scale dynamics and electrodynamics, numerical modeling of the thermosphere and ionosphere, characteristics of the near earth plasma environment, the effects of solar variability on atmospheric electricity, cloud microphysics and tropospheric dynamics, plasma instabilities and irregularities, and development and testing of innovative space flight instrumentation. Computer facilities include a network of dedicated workstations and access to supercomputers. For further details see http://www.utd500.utdallas.edu.

Atomic And Molecular Physics

Experimental research in atomic and molecular physics is directed toward a more complete understanding of such processes as the dynamics of excitation and energy transfer, the thermal economy and transport properties that occur in a variety of plasma and discharge configurations.

Sophisticated diagnostic instrumentation used in these studies include ultraviolet, visible and infrared spectrometers and detectors, tunable pulsed and C. W. lasers, a shock tube facility and mass spectrometers. Several minicomputer systems are used for data acquisition and analysis.

Chemical Physics

Research in chemical physics centers on electrical and magnetic properties of conducting organic molecular crystals and polymers. A variety of laser-based diagnostic techniques for flame and combustion systems are under development. Examples include the detection of light atoms in flames, soot sizing and droplet/vapor evaporation processes. Intramolecular vibrational energy transfer and chemical reaction dynamics are studied via quanlal and classical dynamics in computer simulations.

High Energy Physics And Elementary Particles

The group’s main activity is the BaBar experiment, at the PEP-II asymmetric b factory located at the Stanford Linear Accelerator Center (SLAC). BaBar has published measurements of CP violation in the decays of bottom mesons and is exploring whether the origin of this CP violation lies within the Standard Model. BaBar data
is fertile ground for precision and rare decays of bottom and charm particles, and tau lepton. BaBar’s goal is to explore CP violation in the decays of bottom mesons and to study bottom and charm meson decay. Research with BaBar is funded by the U.S. Department of Energy. The BaBar group specializes in high performance computing, simulation production, and data analysis while contributing to the operation of the experiment. Graduate students utilize the HEP group’s own Linux processing farm. With 128 CPU’s, it is the most powerful computing facility on campus, but is continually expanding to scale with the growing BaBar data set. UTD is networked to SLAC via Internet2.

**Optics**

Research in Optics in the UTD Physics Program concentrates in quantum optics, nonlinear optics and selected applications in physics and chemistry. Areas of particular interest include quantum coherence theory and the quantum statistical properties of light; the effects of coherent nonlinear-optical processes on the propagation of electromagnetic waves.

**Quantum Electronics**

The research effort in Quantum Electronics is devoted mainly to the development of new types of lasers from the visible to the gamma-ray spectrum and to multiphoton spectroscopy of atoms and molecules. High-resolution multiphoton spectroscopy and high-power charge-transfer lasers originated at the university. Major research equipment includes two intense electron-beam devices that are used to excite potential laser plasmas at power levels of 4 and 100 gigawatts, respectively, and a state-of-the-art Nd: YAG laser system. In experiments on atomic and molecular spectroscopy, both pulsed and continuous narrowband tunable dye lasers are being used for basic studies of atomic structure and molecular interatomic potentials.

**Solid State/Condensed Matter Physics/Materials Science**

Materials Science is at the interface of many disciplines and involves a collaborative approach with colleagues in Chemistry, and Electrical Engineering. Our research facilities are distributed over the Physics Laboratories, NanoTech Institute and Electrical Engineering CleanRoom. Research in Materials Science involves both experiment and theory with emphasis on the physical aspects of Materials Science. A synopsis of our activities is given below: Measurements of optical properties of solids with emphasis on modulated reflectance and Raman scattering of semi-conductors are routinely carried out.

Various nanoscale and synthetic materials are being studied for their optical, electronic and transport properties, as well as applications in photonics and (opto)electronics. The materials of interest include nanostructures (quantum dots and wires, fullerenes and carbon nanotubes) and low-dimensional systems, photonic band gap crystals and “left-handed” electromagnetic meta-materials, organic and polymeric materials. The interaction of nanoscale materials, such as carbon nanotubes, with biological entities are being investigated for prospective biomedical and electronic applications. For example, chemically functionalized carbon nanotubes are being studied as building blocks in transistor and sensor applications.

**Master of Science in Applied Physics**

A minimum of 32 graduate credit hours are required. In order to receive the MSAP degree, students must successfully complete at least 16 semester credit hours of core courses. In addition to the core courses 16 additional credit hours may be chosen from the Physics elective courses listed below or from electrical engineering, computer science, biology, geosciences, chemistry and management courses. The complete list of these courses may be obtained from the MSAP Graduate Advisor, or from the Physics Department’s website.

1. **MSAP Core Courses (16 credit hours minimum)**
   **Required:**
   PHYS 5401 Mathematical Methods of Physics I, or
   PHYS 5406 Mathematical Methods of Applied Physics
   A minimum of 12 additional credit hours must be taken from the core list below. Elective courses totaling 16 additional credit hours may be chosen from the Physics elective courses listed below:
   PHYS 5305 Monte Carlo Simulation Method and its Applications
   PHYS 5411 Classical Mechanics
   PYHS 5317 Atoms, Molecules and Solids
   PHYS 5318 Atoms, Molecules and Solids II
2. Physics Elective Courses (up to 16 credit hours)
PHYS 5283 Plasma Technology Laboratory
PHYS 5304 Proposal and Report Preparation
PHYS 5323 Virtual Instrumentation with Biomedical Clinical and Healthcare Applications
PHYS 5324 Computer Interfacing and Data Acquisition
PHYS 5369 Special Topics in Applied Physics
PHYS 5372 Solid State Devices
PHYS 5367 Photonic Devices
PHYS 5375 Electronic Devices Based on Organic Solids
PHYS 5382 Space Science Instrumentation
PHYS 5385 Natural and Anthropogenic Effects On The Atmosphere
PHYS 6283 Plasma Science Laboratory
PHYS 5351 Basic Aspects and Practical Applications of Spectroscopy.
PHYS 6353 Atomic and Molecular Processes
PHYS 6374 Optical Properties of Solids
PHYS 6383 Plasma Science

Up to 6 hours of an industrial internship or supervised research may be substituted for up to two of the elective courses. The following research courses will satisfy this requirement:
PHYS 7V10 Internal Research
PHYS 7V20 Industrial Research

Master of Science
A minimum total of 32 graduate hours is required.

1. Core courses (12 hours)
PHYS 5401 Mathematical Methods of Physics I
PHYS 5421 Electromagnetism I
PHYS 6400 Quantum Mechanics I

2. Elective courses (20 hours)
20 hours of graduate level physics courses to be selected by the student with the approval of the Graduate Adviser. Six hours of research including an M. S. thesis may be substituted for two of the elective courses.

Doctor of Philosophy
A candidate for the Ph.D. must take the following courses: PHYS 5411, 5413, 5422, 5401, 5421, 6400, and PHYS 6401. Students whose research will be carried out in Space Science should substitute PHYS 6383 for PHYS 6401. A candidate must also take a minimum of 3 elective courses, 2 from within his/her area of specialization and 1 selected from outside the student’s specialty area. Additional courses may be required to satisfy the particular degree requirements and/or to ensure sufficient grounding in physical principles. The graduate advisor and the student’s supervisory committee must approve course selections. In the first two semesters in residence students in the Ph.D. track should also register for Phys5100. A minimum of one year residency after admission to the doctoral program is required.

Near the end of the first year in residence all Ph.D. track student must take a written qualifier examination. Continuation of teaching assistantships and GSS awards are contingent upon satisfactory performance on the qualifier.

When a student has completed the required course work with the minimum GPA of 3.3 and has decided
upon his/her field of specialization, a committee is formed to guide the student's dissertation work. Once a dissertation topic has been identified, the student must submit a proposal that outlines the present state of knowledge of the field and presents the research program the student expects to accomplish for the dissertation. This proposal must be approved by the committee and the Department Head.

A seminar on the dissertation proposal must be presented, followed by an oral examination conducted by the faculty on the proposed area of research and related topics. The Supervising Committee shall determine by means of the exam and any ancillary information whether the student is adequately prepared and has the ability to conduct independent research. The approved dissertation proposal is then filed with the Dean of Graduate Studies. A manuscript embodying a substantial portion of the dissertation research accomplished by the student must be submitted to a suitable professional refereed journal prior to the public seminar and dissertation defense.

A public seminar, successful defense of the dissertation, and its acceptance by the Supervising Committee conclude the requirements for the Ph.D. In lieu of the traditional dissertation, and at the discretion of the supervising professor, a manuscript dissertation following the guidelines published by the Graduate Dean's Office may be substituted.

Course listing for Doctor of Philosophy
Core Courses (28 credit hours required, 27 for Space Science.)
PHYS 5411 Classical Mechanics
PHYS 5413 Statistical Physics
PHYS 5422 Electromagnetism II
PHYS 5401 Mathematical Methods of Physics I
PHYS 5402 Mathematical Methods of Physics II
PHYS 5421 Electromagnetism I
PHYS 6400 Quantum Mechanics I
PHYS 6401 Quantum Mechanics II
PHYS 6383 Plasma Science (Space Science students only; in lieu of PHYS 6401)

General Elective Courses
PHYS 5100 Current Topics in Physics
PHYS 5V49 Special Topics in Physics
PHYS 5304 Proposal and Report Preparation
PHYS 5305 Monte Carlo Simulation Method and its Applications
PHYS 5416 Applied Numerical Methods
PHYS 5321 Experimental Operation and Data Collection Using Personal Computers
PHYS 5324 Computer Interfacing and Data Acquisition
PHYS 6303 Applications of Group Theory in Physics
PHYS 6309 Special Topics in Mathematical Methods of Physics
PHYS 6311 Relativistic Quantum Field Theory I
PHYS 6312 Relativistic Quantum Field Theory II
PHYS 8V20 Research in High Energy Astrophysics and Cosmology

Astrophysics/Cosmology
PHYS 5402 Mathematical Methods of Physics II
PHYS 5391 Relativity I
PHYS 5392 Relativity II
PHYS 5395 Cosmology
PHYS 6399 Special Topics in Relativity
PHYS 8V20 Research in High Energy Astrophysics and Cosmology
PHYS 8V90 Research in Relativity

Atomic and Molecular Physics
PHYS 5351 Basic Aspects and Practical Applications of Spectroscopy
PHYS 6353 Atomic and Molecular Processes I
PHYS 6V59 Special Topics in Atomic Physics
PHYS 8V50 Research in Atomic and Molecular Physics
High Energy Physics
PHYS 6314 High Energy Physics
PHYS 5402 Mathematical Methods of Physics II
PHYS 6311 Relativistic Quantum Field Theory I
PHYS 5391 Relativity I
PHYS 5416 Applied Numerical Methods
PHYS 5305 Monte Carlo Simulation Method and its Applications
PHYS 8V10 Research in High Energy Physics

Solid State/Condensed Matter Physics/Materials Science
PHYS 5371 Solid State Physics
PHYS 5372 Solid State Devices
PHYS 6371 Advanced Solid State Physics
PHYS 6374 Optical Properties of Solids
PHYS 5351 Basic Aspects and Practical Applications of Spectroscopy
PHYS 5367 Photonic Devices
PHYS 5402 Mathematical Methods of Physics II
PHYS 5324 Computer Interfacing and Data Acquisition
PHYS 5305 Monte Carlo Simulation Method and its Applications
PHYS 8V70 Research in Materials Science

Space Science
PHYS 5283 Plasma Technology Lab
PHYS 5381 Space Science
PHYS 5382 Space Science Instrumentation
PHYS 5383 Plasma Technology
PHYS 5385 Natural And Anthropogenic Effects On The Atmosphere
PHYS 6283 Plasma Science Lab
PHYS 6383 Plasma Science
PHYS 6388 Ionospheric Electrodynamics
PHYS 5416 Applied Numerical Methods
PHYS 5305 Monte Carlo Simulation Method and its Applications
PHYS 8V80 Research in Atmospheric And Space Physics

Optics
PHYS 5361 Fourier Optics
PHYS 6366 Optics of Photonic Band Gap Nanostructures
PHYS 6369 Special Topics in Optics
PHYS 8V60 Research in Optics

Quantum Electronics
PHYS 6339 Special Topics in Quantum Electronics
PHYS 8V30 Research in Quantum Electronics

Thesis and Dissertation Courses
PHYS 8398 Thesis
PHYS 8399 Dissertation
### Course Descriptions

**PHYS 5100 Current Topics In Physics** (1 semester hour) Study of current research topics in physics. (P/F grading, may be repeated for credit.) (1-0) R

**PHYS 5V49 Special Topics In Physics** (1-6 semester hours) Topics may vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) ([1-6]-0) R

**PHYS 5283 Plasma Technology Laboratory** (2 semester hours) Laboratory will provide a "hands-on" experience to accompany PHYS 5383. Topics to include: vacuum technology [pumps, gauges, gas feed], plasma uses [etch, deposition, lighting and plasma thrusters] and introductory diagnostics. Corequisite: PHYS 5383, Recommended Co-requisite: PHYS 7171, Cross-listed with: EE 5283. (0-6) R

**PHYS 5304 Proposal And Report Preparation** (3 semester hours) A discussion of techniques for writing successful proposals and formal reports. Topics include types of proposals, the importance of logical organization and outlines, interpretation of RFPs, preparation and submission of unsolicited proposals, elements of writing style, statements of work and milestones, estimation of project timelines, and the importance of accurate cost estimates. (3-0) R

**PHYS 5305 Monte Carlo Simulation Method and its Application** (3 semester hours) An introductory course on the method of Monte Carlo simulation of physical events. This course covers the generation of 0-1 random number, simulation of arbitrary distributions, modeling, simulation and statistical analysis of experimental activities in physics research and engineering studies. As a comparison the concepts and applications of the Neural Networks will be discussed. Prerequisite: Calculus, Statistics, C or FORTRAN programming languages. (3-0) T

**PHYS 5411 Classical Mechanics** (4 semester hours) A course that aims to provide intensive training in problem solving. Rigorous survey of Newtonian mechanics of systems, including its relativity principle and applications to cosmology; the ellipsoid of inertia and its eigenstructure, with applications, Poinset’s theorem; Euler’s equations, spinning tops; Lagrangian and Hamiltonian formalism with applications; chaos, small oscillations, velocity dependent potentials; Lagrange multipliers and corresponding constraint forces, canonical transformations, Lagrange and Poisson brackets, Hamilton-Jacobi theory. (4-0) Y

**PHYS 5413 Statistical Physics** (4 semester hours) Phase space, distribution functions and density matrices; Microcanonical, canonical and grand canonical ensembles; Partition functions; Principle of maximum entropy; Thermodynamic potentials and laws of thermodynamics; Classical and quantum ideal gases; Non-interacting magnetic moments; Phonons and specific heat of solids; Degenerate electron gas, its specific heat and magnetism; Statistics of carriers in semiconductors; Bose-Einstein condensation; Black-body radiation; Boltzmann transport equation and H-theorem; Relaxation time and conductivity; Brownian motion, random walks and Langevin equation; Einstein’s relation; Fluctuations in ideal gases; Linear response and fluctuation-dissipation theorem; Virial and cluster expansions, van der Waals equation of state; Poisson-Boltzmann and Thomas-Fermi equations; Phases, phase diagrams and phase transitions of the first and second order; Lattice spin models; Ordering, order parameters and broken symmetries; Mean-field theory of ferromagnetism; Landau and Ginzburg-Landau theories; Elements of modern theory of critical phenomena. (4-0) T

**PHYS 5317 Atoms, Molecules And Solids I** (3 semester hours) Core course for Applied Physics Concentration. Fundamental physical description of microsystems starting with the need for quantum mechanics and proceeding through the application of quantum mechanics to atomic systems. Emphasis will be on a physical understanding of the principles which apply to technologically important devices. Computer simulations will be used to focus the student on the important physical principals and not on detailed exact solutions to differential equations. Topics covered include: Justification for quantum mechanics, application of quantum mechanics to one-electron problems, application to multi-electron problems in atomic systems. Prerequisite: Undergraduate multi-variable calculus and two semesters of calculus based physics. (3-0) Y

**PHYS 5318 Atoms, Molecules And Solids II** (3 semester hours) Core course for Applied Physics Concentration. Application of quantum mechanics to molecules and solids. Topics in solids include optical, thermal, magnetic and electric properties, impurity doping and its effects on electronic properties, superconductivity, and surface effects. Various devices, such as, transistors, FET’s, quantum wells, detectors and lasers will also be discussed. PHYS 5317, or equivalent. (3-0) Y

**PHYS 5321 Experimental Operation And Data Collection Using Personal Computers** (3 semester hours) Computer interfacing to physical experiments using high level interface languages and environments. The student will have the opportunity to learn how to develop data acquisition software using LabView and LabWindows/CVI as well as how to write drivers to interface these languages to devices over the general purpose interface buss (GPIB). A laboratory is provided for hands-on training in these devices. (3-0) R

**PHYS 5422 Electromagnetism II** (4 semester hours) Fields and Potentials, Gauge transformations and the Wave
282. Physics

Equation Electromagnetic waves in unbounded media – non-dispersive and dispersive media Boundary conditions at interfaces. Solutions to the wave equation in rectangular cylindrical and spherical coordinates. Electromagnetic waves in bonded media – waveguides and resonant cavities. Radiating systems – electric and magnetic dipole radiation, electric quadrupole radiation. Fundamentals of scattering and scalar diffraction. Lorentz transformation and covariant forms for Maxwell’s equations. Radiation from moving charges – Synchrotron, Cherenkov and Bremstrahlung Radiation Pre-requisite PHYS 5421 or equivalent. (4-0) Y

PHYS 5323 Virtual Instrumentation with Biomedical Clinical and Healthcare Applications (3 semester hours) The application of the graphical programming environment of LabView will be demonstrated with examples related to the health care industry. Examples will be provided to highlight the use of the personal computer as a virtual instrument in the clinical and laboratory environment. A laboratory is provided for hands-on training to augment the lecture. (3-0) R

PHYS 5324 Computer Interfacing And Data Acquisition (3 semester hours) Hardware and software operation of various devices which interface computers into physical experiments. The student will have the opportunity to learn how to program personal computers using the C and C++ programming language for data acquisition and control of experiments. The operation of digital input and output devices, analog to digital converters, digital to analog converters, counters, and timers will be discussed as well as the operation of intelligent controllers over the general purpose interface buss (GPIB). A laboratory is provided for hands-on training in these devices. (3-0) Y

PHYS 5351 Basic Aspects and Practical Applications of Spectroscopy. (3 semester hours) Atomic and Molecular spectroscopy has played a pivotal role in our understanding of atomic structure and in the formulation of quantum mechanics. The numerous and rapidly growing field of spectroscopic applications spans many disciplines. Topics included in course: atomic structure; spin-orbit interactions and coupling; influence of applied fields; molecular bands, vibrations and rotations; selection rules and intensities. Laboratory exercises focus on acquisition and interpretation of spectroscopic signatures from active plasmas and on spectroscopic techniques suitable for surface analysis. (2-3) R

PHYS 5361 Fourier Optics (3 semester hours) Theory of diffraction and coherence; experiments with Gaussian beams and modes. Cross-listed with: EE 6309 (3-0) R

PHYS 5367 Photonic Devices (3 semester hours) Basic principles of Photophysics of Condensed Matter with application to devices. Topics covered include photonic crystals, PBG systems, low threshold lasers, photonic switches, Super-prisms and super-lenses. Photodetectors and photocells. (3-0) R

PHYS 5369 Special Topics in Applied Physics (3 semester hours) Topics may vary from semester to semester. (May be repeated for credit up to a maximum of 9 hours.) (3-0) R

PHYS 5371 Solid State Physics (3 semester hours) Symmetry description of crystals, bonding, properties of metals, electronic band theory, thermal properties, lattice vibration, elementary properties of semiconductors. Prerequisites: PHYS 5400 and 5421 or equivalent. (3-0) Y

PHYS 5372 Solid State Devices (3 semester hours) Basic concepts of solid state physics with application to devices. Topics covered include semiconductor homojunctions and heterojunctions, low dimensional physics, one and two dimensional electron gases, hot electron systems, semiconductor lasers, field effect and heterojunction transistors, microwave diodes and infrared and solar devices. Prerequisite: PHYS 5318 (3-0) T

PHYS 5375 Electronic Devices Based On Organic Solids (3 semester hours) Solid state device physics based on organic condensed matter structures, including: OLEDs (organic light emitting diodes), organic FETs, organic lasers, plastic photocells, molecular electronic chips. (3-0) R

PHYS 5376 Introduction to Materials Science The basic concepts of physics and chemistry that a materials scientist needs to understand internal interactions within materials. Emphasis is placed on the bio-physical aspects of materials. Cross-listed with: EE 7v82

PHYS 5381 Space Science (3 semester hours) Introduction to the dynamics of the middle and upper atmospheres, ionospheres and magnetospheres of the earth and planets and the interplanetary medium. Topics include: turbulence and diffusion, photochemistry, aurorae and airglow, space weather and the global electric circuit. (3-0) T

PHYS 5382 Space Science Instrumentation (3 semester hours) Design, testing and operational criteria for space flight instrumentation including retarding potential analyzers, drift meters, neutral and ion mass spectrometers, auroral particle spectrometers, fast ion mass spectrometers, Langmuir probes, and optical spectrometers; ground support equipment; microprocessor design and operations. (3-0) R

PHYS 5383 Plasma Technology (3 semester hours) Hardware oriented study of useful laboratory plasmas. Topics will include vacuum technology, gas kinetic theory, basic plasma theory and an introduction to the uses of plasmas in various industries. Cross-listed with: EE 5383 (3-0) R
PHYS 5385 Natural And Anthropogenic Effects On The Atmosphere (3 semester hours) An examination of the physical, chemical and electrical effects on the atmosphere and clouds due to varying solar photon and solar wind inputs; and of the physical and chemical effects on ozone and atmospheric temperature following anthropogenic release of CFC’s and greenhouse gases into the atmosphere. Suitable for Science Education and other non-physics majors. (3-0) R

PHYS 5391 Relativity I (3 semester hours) Mach’s principle and the abolition of absolute space; the principle of relativity; the principle of equivalence; basic cosmology; four-vector calculus; special relativistic kinematics, optics, mechanics, and electromagnetism; basic ideas of general relativity. (3-0) T

PHYS 5392 Relativity II (3 semester hours) Tensor calculus and Riemannian geometry; mathematical foundation of general relativity; the crucial tests; fundamentals of theoretical relativistic cosmology; the Friedmann model universes; comparison with observation. (Normally follows PHYS 5391.) (3-0) T

PHYS 5395 Cosmology (3 semester hours) The course is an overview of contemporary cosmology including: cosmological models of the universe and their parameters; large scale structure of the universe; dark matter; cosmological probes and techniques such as gravitational lensing, cosmic microwave background radiation, and supernova searches; very early stages of the universe; dark energy and recent cosmic acceleration. (3-0) T

PHYS 5401 Mathematical Methods Of Physics I (4 semester hours) Vector analysis and calculus, general curvilinear coordinates, tensor analysis, linear and matrix algebra, group theory, infinite series, and functions of a complex variable (including contour integration and the residue theorem). (4-0) Y

PHYS 5402 Mathematical Methods of Physics II (4 semester hours) Ordinary and partial differential equations, Sturm-Liouville theory of differential equations and orthogonal functions, special functions including Bessel, Legendre, Laguerre, Hermite, Chebyshev, and Hypergeometric functions, the Gamma and Beta functions, Fourier series, integral transformations, and Green’s functions. (4-0) Y

PHYS 5406 Mathematical Methods of Applied Physics (4 semester hours) Elements of applied mathematics relevant to real world applications, including vector calculus, linear algebra, transforms, differential equations, and numerical solutions of differential equations. (4-0) Y

PHYS 5416 Applied Numerical Methods (4 semester hours) Core course for Applied Physics Concentration. A hands-on approach to the development and use of computational tools in solving problems routinely encountered in upper level applied physics and engineering. Main topics include curve fitting and regression analysis, significance tests, principles of numerical modeling, verification and validation of numerical algorithms, and nonlinear model building. Examples from real world applications will be presented and discussed to illustrate the appropriate use of numerical techniques. Prerequisites: PHYS 5401 or equivalent, and proficiency in a programming language. (4-0) Y

PHYS 5421 Electromagnetism I (4 semester hours) Electrostatic boundary value problems, uniqueness theorems, method of images, Green’s functions, multipole potentials, Legendre polynomials and spherical harmonics, dielectric and magnetic materials, magnetostatics, time-varying field and Maxwell’s equations, energy and momentum of the field, Lienard-Wiechert potentials, electromagnetic radiation, polarization, refraction and reflection at plane interfaces. (4-0) Y

PHYS 5425 Applied Electromagnetics I (4 semester hours) Boundary value problems, method of images, Green’s functions, multipole potentials, Bessel Functions, Legendre polynomials and spherical harmonics, dielectric and magnetic materials, magnetostatics, time-varying field and Maxwell’s equations, energy and momentum of the field, electromagnetic radiation, polarization, refraction and reflection at plane interfaces. (4-0) Y

PHYS 5426 Applied Electromagnetics II (4 semester hours) Course content emphasizes advanced concepts in applied electromagnetism, including microwaves, magnetrons, propagation in anisotropic media, elementary scattering theory, antenna systems, waveguides, and optic fibers. Examples of real physical systems will be provided and examined. Software simulations will be used to study specific devices and applications. Prerequisites: Phys 5425 and Phys 5401. (4-0) Y

PHYS 54283 Plasma Physics Laboratory (2 semester hours) Laboratory will provide a "hands-on" experience to accompany PHYS 6383. Experiments will include measurements of fundamental plasma properties and understanding of important plasma diagnostics. Corequisite: PHYS 6383, Recommended Co-requisite: PHYS 7171, Cross-listed with: EE 6283. (0-6) T

PHYS 6400 Quantum Mechanics I (4 semester hours) Dirac formalism, kets, bras, operators and position, momentum, and matrix representations, change of basis, Stern-Gerlach experiment, observables and uncertainty principle, translations, wave functions, time evolution, the Schrödinger and Heisenberg pictures, simple harmonic oscillator, wave equation, WKB approximation, rotations, angular momentum, spin, Clebsch-Gordan coefficients, perturbation theory, variational methods. Prerequisite: PHYS 5411 or consent of the instructor. (4-0) Y

PHYS 6401 Quantum Mechanics II (4 semester hours) Non-relativistic many-particle systems and their second quantization description with creation and annihilation operators; Interactions and Hartree-Fock approximation, quasi-particles; Attraction of fermions and superconductivity; Repulsion of bosons and superfluidity; Lattice systems, classical fields and canonical quantization of wave equations; Free electromagnetic field, gauges and
quantization: photons; Coherent states; Interaction of light with atoms and condensed systems: emission, absorption and scattering; Vacuum fluctuations and Casimir force; Elements of relativistic quantum mechanics: Klein-Gordon and Dirac equations; Particles and antiparticles; Spin-orbit coupling; Fine structure of the hydrogen atom; Micro-causality and spin-statistics theorem; Non-relativistic scattering theory: scattering amplitudes, phase shifts, cross-section and optical theorem; Born series; Inelastic and resonance scattering; Perturbative analysis of the interacting fields: Time evolution and interaction representation, S-matrix and Feynman diagrams; Simple scattering processes; Dyson's equation, self-energy and renormalization. Prerequisite: PHYS 6400. (4-0) Y

PHYS 6303 Applications Of Group Theory In Physics (3 semester hours) Group representation theory and selected applications in atomic, molecular and elementary-particle physics. Survey of abstract group theory and matrix representations of SU(2) and the rotation group, group theory and special functions, the role of group theory in the calculation of energy levels, matrix elements and selection rules, Abelian and non-Abelian gauge field theories, the Dirac equation, representations of SU(3), and the Standard Model of elementary-particle physics. Prerequisite: PHYS 5401. (3-0) Y

PHYS 6309 Special Topics In Mathematical Methods of Physics (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

PHYS 6311 Relativistic Quantum Field Theory I (3 semester hours) Classical fields; relativistic quantum mechanics of spin 0 and 1/2 particles; Klein-Gordon and Dirac equations; fundamentals of quantum field theory and quantum electrodynamics; second quantization; spin and statistics; covariant perturbation theory; Mott scattering; annihilation and Compton scattering; Feynman graphs; Moller scattering; mass and charge renormalization. (Normally follows PHYS 6300 or 6301.) (3-0) R

PHYS 6312 Relativistic Quantum Field Theory II (3 semester hours) Introduction to Gauge Theories, Weinberg-Salam model of electroweak interactions, spontaneous symmetry breaking, introduction to QCD, renormalization theory. Prerequisite: PHYS 6311. (3-0) R

PHYS 6313 Elementary Particles (3 semester hours) Elementary particles and their interaction; classification of elementary particles; fermions and bosons; particles and antiparticles; leptons and hadrons; mesons and baryons; stable particles and resonances; hadrons as composites of quarks and anti-quarks; fundamental interactions and fields; electromagnetic, gravitational, weak and strong interactions; conservation laws in fundamental interactions; parity, isospin, strangeness, G-parity; helicity and chirality; charge conjugation and time reversal; strong reflection and CPT theorem; gauge invariance; quarks and gluons; discovery of c, b and t quarks and the W+ and Z° particles; recent discoveries. (Normally follows PHYS 6300 or 6301.) (3-0) T

PHYS 6314 High Energy Physics (3 semester hours) Electromagnetic and nuclear interactions of particles with matter; particle detectors; accelerators and colliding beam machines; invariance principles and conservation laws; hadron-hadron interactions; static quark model of hadrons; weak interactions; lepton-quark interactions; the parton model of hadrons; fundamental interactions and their unification; generalized gauge invariance; the Weinberg-Salam Model and its experimental tests: quantum chromo-dynamics; quark-quark interactions; grand unification theories; proton decay, magnetic monopoles, neutrino oscillations and cosmological aspects; supersymmetries. (Normally follows PHYS 6313.) (3-0) T

PHYS 6316 High Energy Physics Instrumentation (3 semester hours) High energy accelerators and colliders; electromagnetic interaction of charged particles and photons with matter; nuclear interactions with matter; particle counters, track detectors, show detectors and calorimeters; data acquisition, trigger, and data handling and analysis systems; design and construction of complex high-energy physics detectors. (3-0) T

PHYS 6318 High Energy Accelerators (3 semester hours) Cyclic accelerators (synchrotrons); proton and electron synchrotrons, focusing and beam stability; linear accelerators (linacs); colliders; hadron and electron colliders; cooling in pp colliders; accelerator complexes. (3-0) R

PHYS 6339 Special Topics In Quantum Electronics (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

PHYS 6341 Nuclear Physics I: The Principles Of Nuclear Physics (3 semester hours) Atomic physics; atomic spectra, x-rays and atomic structure; The constitution of the nucleus; isotopes, natural radioactivity, artificial nuclear disintegration and artificial radioactivity; alpha-, beta-, and gamma-decay; nuclear reactions, nuclear forces and nuclear structure. Nuclear models, neutron physics and nuclear fission. (3-0) T

PHYS 6342 Nuclear Physics II: Physics And Measurement Of Nuclear Radiations (3 semester hours) Interaction of nuclear radiation with matter; electromagnetic interaction of electrons and photons; nuclear interactions. Operation and construction of counters and particle track detectors; electronic data acquisition and analysis systems. Statistical evaluation of experimental data. (3-0) T

PHYS 6349 Special Topics In High Energy Physics (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

PHYS 6353 Atomic And Molecular Processes (3 semester hours) Study of theory and experimental methods applied to elastic scattering, excitation and ionization of atoms and molecules by electron and ion impact, electron attachment and detachment, and charge transfer processes. (3-0) R

**PHYS 6369 Special Topics In Optics** (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

**PHYS 6371 Advanced Solid State Physics** (3 semester hours) Continuation of PHYS 5371, transport properties of semiconductors, ferroelectricity and structural phase transitions, magnetism, superconductivity, quantum devices, surfaces. Prerequisite: PHYS 5371 or equivalent. (3-0) R

**PHYS 6372 Physical Materials Science** (3 semester hours) Advanced concepts of Materials Science. New directions in fabrication routes and materials design, such as biologically-inspired routes to electronic materials. Advanced materials and device characterization. Prerequisite: PHYS 5376 or equivalent. (3-0) R

**PHYS 6374 Optical Properties Of Solids** (3 semester hours) Optical response in solids and its applications. Lorentz, Drude and quantum mechanical models for dielectric response function. Kramers-Kronig transformation and sum rules considered. Basic properties related to band structure effects, excitons and other excitations. Experimental techniques including reflectance, absorption, modulated reflectance, Raman scattering. Prerequisite: PHYS 5371 or equivalent. (3-0) T

**PHYS 6376 Electronics and Photonics of Molecular and Organic Solids** (3 semester hours) Electronic energy bands in molecular solids and conjugated polymers. Elementary excitations: Frenkel, Wannier and charge transfer excitons. Polaron, bipolaron and solitons. Mobility of excitons and charge carriers, photoconductivity. Charge generation and recombination, electroluminescence, photovoltaic phenomena. Spin selective magnetic effects on excitons and carriers. Superconductivity: granular SC, and field induced SC in organic FETs. (3-0) R


**PHYS 6379 Special Topics In Solid State Physics** (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) Cross-listed with: EE 7V82 (3-0) R

**PHYS 6383 Plasma Science** (3 semester hours): Theoretically oriented study of plasmas. Topics to include: fundamental properties of plasmas, fundamental equations (kinetic and fluid theory, electromagnetic waves, plasma waves, plasma sheaths) plasma chemistry and plasma diagnostics. Prerequisite: PHYS 5421 or equivalent. Cross-listed with: EE 6383 (3-0) T

**PHYS 6385 Atmospheres and Ionospheres** (3 semester hours) Characteristics of the neutral upper atmospheres of the earth and planets; including dynamics and structure. Topics include: photochemistry; tides, winds and waves; eddy and molecular diffusion; and magnetospheric energy inputs. Prerequisite: PHYS 5381. (3-0) R

**PHYS 6388 Ionospheric Electrodynamics** (3 semester hours) Generation of electric fields in the earth’s ionosphere. The role of internal dynamos and external generators from the interaction of the earth with the solar wind. Satellite and ground-based observations of ionospheric phenomena such as ExB drift, the polar wind and plasma instabilities. Prerequisites: PHYS 5421, PHYS 6383 (3-0) R

**PHYS 6V59 Special Topics In Atomic Physics** (1-3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (1-3)-0) R

**PHYS 6389 Special Topics In Space Physics** (3 semester hours) Topics will vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

**PHYS 6399 Special Topics In Relativity** (3 semester hours) Topics vary from semester to semester. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

**PHYS 7V10 Internal Research** (3-6 Semester Hours) On campus research for Masters in Applied Physics. May be repeated for credit. ([3-6]-0) S

**PHYS 7V20 Industrial Research** (3-6 Semester Hours) Industrial research for Masters in Applied Physics. May be repeated for credit. ([3-6]-0) S
Department of Science Education and Mathematics Education

http://www.utdallas.edu/dept/sci_ed/

Faculty
Professors: Thomas R. Butts, Frederick L. Fifer, Jr.
Associate Professors: Cynthia E. Ledbetter (Head), Titu Andreescu
Assistant Professors: Homer Montgomery, Mary L. Urquhart
Visiting Faculty: Russell Hulse
Science Education Specialist: Barbara A. Curry
Affiliate Faculty: John Burr, John Hoffman, Scherry Johnson, Lynn Melton, Robert Stern

Disciplinary science and mathematics courses are taught by faculty members in that discipline.

Objectives
The Master of Arts in Teaching (M.A.T.) degree in Science Education stresses training in the art of teaching and advanced knowledge in the science selected for major specialization. Designed for individuals with significant ability in a discipline and a serious commitment to teaching, the program offers an opportunity for professional development of experienced teachers.

The M.A.T. degree in Mathematics Education is aimed at mathematics and computer science teachers in grades 8 - 12 and the community college level. [For mathematics teachers in grades 4 - 8, there is a comparable degree in the MAIS program.] It is a content-oriented program that strives to achieve a balance between increasing subject-matter knowledge and investigating relevant pedagogical and content issues of the mathematics curriculum with an emphasis on linking collegiate mathematics with secondary mathematics.

Facilities
Scientific equipment which supports the various programs at the university is available to students in the M.A.T. program. Facilities in biology, chemistry, computer science, geoscience, mathematics and physics are briefly described in the respective disciplinary sections of the catalog.
Admission Requirements
See the University’s general admission requirements on page 13. Special permission from the Department Head is required for admission.

Science Education
Admission to the Graduate Program in Science Education requires, in addition to general University requirements, at least 24 hours in science. Students with strong backgrounds in an area of specialization are encouraged to discuss alternate plans with the Science Education Graduate Adviser. Students without the required science content backgrounds will be required to correct the deficiencies prior to admission.

Mathematics Education
Admission to the Graduate Program in Mathematics Education requires, in addition to the general University requirements, includes at least one year of calculus, linear algebra and a junior-level course involving mathematical proof. Those teaching mathematics in grades 4 - 8 may wish to consider the option “The Teaching of Mathematics in Grades 4 - 8” in the Master of Arts in Interdisciplinary Studies [MAIS] program. Consult the Graduate Adviser for details.

Degree Requirements
The University’s general degree requirements are discussed on page 18. Additional requirements for each M.A.T. degree are described below.

Science Education (Thesis Option; both online and traditional)
All students seeking the Master of Arts in Teaching (M.A.T.) Science Education degree (thesis option) must satisfactorily complete the following requirements (minimum of 36 graduate semester hours):
• SCE 5301, SCE 5305, SCE 5308 and STAT 5353 (or acceptable equivalent as a prerequisite to enrolling in research hours),
• A minimum of four courses (minimum of 12 semester hours) in a chosen specialization related to the student’s major area of study. Specialty areas include biology, chemistry, geosciences and physics,
• A minimum of three courses (minimum nine semester hours) in one specialty other than the chosen specialization.
• A minimum of six semester hours in thesis research, SCE 6v03, and
• Submission an acceptable thesis which warrants publication in peer reviewed journals, scholarly books, monographs or the equivalent.

In addition to the above requirements, students must submit, no later than the second semester of enrollment, an acceptable research proposal to the supervising committee. Upon completion of the thesis research, the candidate will publicly defend the thesis. The thesis is directed by a Supervising Professor and must be approved by the Head of the Science/Mathematics Education Department.

“Opportunities may arise for students to work directly in local schools. Be advised that public schools and many private schools within the state of Texas will require criminal background checks of all volunteers or individuals working within the schools regardless of the potential of direct contact with students.”

Science Education (Non-Thesis)
The M.A.T. degree in Science Education requires 36 semester hours, distributed as follows:

Science Education Courses (9 hours)
SCE 5301 Critical Issues in Science Education
SCE 5305 Evaluating Research in Science Education
SCE 5308 Research Design and Methodology for Science Education

Science Content Courses (18-24 hours)
Primary Area: 12-16 hours in biology, chemistry, geosciences, or physics.
Secondary Area: 6-8 hours in biology, chemistry, geosciences, or physics.
288 Science and Math Education

**Electives (3-12 hours)**

Three to twelve hours of electives are taken to complete the required minimum of 36 hours. These elective hours, chosen with the Graduate Advisor, may include additional science, mathematics, education and science education courses.

No more than two of the four courses required for a primary area may be taken during a summer field trip. No more than 15 hours will be accepted for transfer credit. Under appropriate circumstances, the Department Head may make substitutions for portions of these requirements.

**Mathematics Education**

The M.A.T. degree in Mathematics Education requires 36 semester hours, distributed as follows:

**Mathematics Education Core Courses (15 hours)**

Five approved courses chosen from:
- Analysis: MATH 5301, 5302;
- Algebra and Discrete Mathematics: CS 5333, MATH 6311;
- Geometry: MATH 5305, 5306;
- Probability and Statistics: STAT 5351, 5352

Other relevant courses approved by the Graduate Adviser

Students wishing to emphasize computer science may substitute appropriate courses for those in the Mathematics Education Core as approved by the Graduate Adviser.

**Professional Course (3 hours)**

MATH 5310 (ED 5306) Seminar: The Teaching of Mathematics and Computer Science.

**Guided Electives (18 hours)**

Six courses in mathematics, computer science or other area involving applications of mathematics or pedagogy (approval by Graduate Adviser required). MATH 5320 (which may be repeated up to six times) is highly recommended.

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**Science Education Course Descriptions**

**SCE 5301 Critical Issues in Science Education** (3 semester hours) Examination of classic issues in science and technology and the relationships developed between them. Topics include population and population growth, food and food sources, energy and energy sources, water needs/solutions, diseases and cures, housing – safe and adequate, environmental issues – personal and political, and security – local and global. Also offered through the MAT-SE online strand. (3-0) Y

**SCE 5302 Photographic Field Collection Techniques** (3 semester hours) The use of a camera as a field collection instrument. Included topics are basic camera techniques, logging system for in-field use, coding system and cataloging procedure for access to stored slides. Field trip. (1-6) Y

**SCE 5305 Evaluating Research in Science Education** (3 semester hours) Examination of selected topics in the methodological and philosophical foundations of science education as applied to contemporary issues affecting today’s students. Topics include current research on hands-on/inquiry teaching, concept mapping, student misconceptions, learning/teaching styles, alternative assessment, gender differences, learning environments, action research, and knowledge transfer to provide a context for the history of science literacy and educational literacy; quantitative and qualitative research methods; and professional writing techniques. Prerequisite: one semester teaching experience in science or consent of instructor. Also offered through the MAT-SE online strand. (3-0) Y

**SCE 5308 Research Design and Methodology** (3 semester hours) Application of the methodological and philosophical foundations of research in science education pertaining to an individual research question. Topics include educational research ethics and design, measuring instruments and data manipulation, methodological rigor, evidence-based conclusions, and publication genres to support the development of a professional presentation and formal research paper. Also offered through the MAT-SE online strand. Prerequisite: SCE 5305 (3-0) Y

**SCE 5309 Critical Thinking** (3 semester hours) Study of critical issues, problem-solving techniques and reasoning abilities as they relate to science/mathematics education in today's classrooms. (3-0) Y
SCE 8398 Thesis Research (1 to 6 hours credit) May be repeated. (3-0) Y

SCI 5320 Astrobiology (3 hours credit) The ultimate integrated science, astrobiology brings together from the fields of astrophysics, planetary science, terrestrial geosciences, and of course, biology, an understanding how the history and diversity of life on our own planet relates to the possibilities for life on other worlds. (2-3) T

SCI 5321 Science for Elementary School Teachers (3 semester hours) Fundamental concepts in chemistry, physics, life and earth sciences, with particular emphasis on their applicability to the elementary science curriculum, including laboratory activities. (May be repeated to a maximum of 9 hours.) (2-3) Y

SCI 5322 Basis of Evolution (3 hours credit) Through discussions of the nature of science, Charles Darwin’s travels, natural selection, the geologic record, and other topics, students will be acquainted with the scientific data that supports evolutionary theory. (2-3) T

SCI 5324 Ecology (3 semester hours) General ecological principles as related to productivity, population diversity, communities and ecosystem functions. Field data collection techniques included. (2-3) Y

SCI 5325 Integrated Science for Teachers (3 semester hours) Investigation of science standards using pedagogical models of best practice applicable to a variety of learners in diverse contexts. Inquiry-based investigations feature various topics in physical, earth and life sciences—with a hands-on emphasis on the latest scientific research and educational application. Courses are offered online only. (May be repeated to a maximum of 9 hours as topics cycle through earth, life and physical sciences.) (3-0) Y

SCI 5326 Astronomy: Our Place in Space (3 hours credit) This course focuses on developing student understanding of our planet fits within a larger astronomical context. Topics will include common misconceptions in astronomy, scale in the solar system and beyond, phases of the moon, seasons, navigating the night sky, our sun as a star, properties and lifecycles of stars, galaxies, and cosmology. (2-3) T

SCI 5327 Comparative Planetology (3 hours credit) Every world in our solar system is unique, but none more so than our own planet Earth. In this course we will explore the astrophysical, chemical, and geological processes that have shaped each planet, moons and the myriad of rocky and icy bodies in our solar system. We will also investigate what discoveries of worlds orbiting other stars may tell use about our own solar system and home world. (2-3) T

SCI 5328 Marine Science (3 hours credit) The purpose of this class is to acquaint students with issues surrounding our use of the oceans and their resources. Students will also gain skills in writing an on-line lesson plan and in preparing a research report. (2-3) Y

SCI 5331 Physics in the Classroom I: Force and Motion (3 hours credit) The primary focus of the class will be deepening the participants’ conceptual understanding of physics, always with the added component of applicability to the pre-college classroom. We will use a hands-on approach, and will utilize FOSS, Cambridge Physics (CPO), and examples of physics in the everyday world. (2-3) T

SCI 5332 Physics in the Classroom II: Energy in Motion (3 hours credit) The physics content topics will be covered in workshop style, with hands-on materials available in local districts or demonstrations and experiments that can be done with inexpensive or common materials. Students will also be expected to think critically about how topics discussed in the course can relate to their own classrooms. (2-3) T

SCI 5333 Physics in the Classroom III: Physics in the Modern World (3 hours credit) The physics content topics covered in this course will deepen the participants’ conceptual understanding of physics, using hands-on materials available in local districts or demonstrations and experiments that can be done with inexpensive or common materials. (2-3) T

SCI 5334 Instructional Strategies in Science (3 hours credit) Designed for the master teacher/department leader, strategies for fostering an integrated science program based on national and Texas curriculum and assessment standards are presented through hands-on activities. (3-0) T

SCI 5335 Environmental Field Methods (3 hours credit) Hands-on activities explore the properties and qualities of water through traditional and digital sampling methods. Designed for teachers, this inquiry-based course addresses information technology and environmental science standards in the context of real-world constructivist practice. May be repeated for credit as topics change. (2-3) T

SCI 5330 Special Topics (3 semester hours) May repeat for credit to a maximum of 9 hours. (3-0) Y

SCE 5V06 Special Topics in Science Education (1-3 semester hours) (May be repeated for credit to a maximum of 9 hours.) ([1-3]-0) S

SCI 5V06 Special Topics in Science (1-3 semester hours) (May be repeated for credit to a maximum of 9 hours) ([1-3]-0) S
Interdisciplinary Programs in the School of Natural Sciences and Mathematics

Master of Science in Bioinformatics and Computational Biology

The Master of Science in Bioinformatics and Computational Biology (BCBM) is offered jointly by the Departments of Mathematical Sciences and Molecular and Cell Biology. This program will combine coursework from the disciplines of biology, computer science, and mathematical sciences. The BCBM program seeks to answer the demand for a new breed of scientist who has fundamental understanding in the fields of biology, mathematics, statistics, and computer science. With this interdisciplinary training, these scientists will be well prepared to meet the demand and challenges that have arisen and will continue to develop in the biotechnology arena.

Faculty from both Mathematical Sciences (MMS) and Molecular and Cell Biology (MCB) will participate in the Bioinformatics and Computational Biology program, with the Mathematical Sciences Department serving as the administrative unit. Both departments will participate in advising students.

For the Master's degree in Bioinformatics and Computational Biology, beginning students are expected to have completed multivariate calculus, linear algebra, two semesters of general Chemistry, two semester of organic Chemistry, two semesters of general physics, programming in C/C++, and two semesters of biology.

Requirements for completing a degree in BCBM are:

Core courses:
BIO 5410 Biochemistry
BIO 5420 Molecular Biology
BIO 5381 Genomics
STAT 5351 Probability and Statistics I
STAT 5352 Probability and Statistics II
MATH 6341 Bioinformatics

Mathematics Education Course Descriptions

MATH 5310 (ED 5306) Seminar: The Teaching of Mathematics and Computer Science (3 semester hours)
A forum for sharing ideas on current issues in the teaching of mathematics and computer science, grades 8-14, through participant presentations and discussions. Some work on mathematics history is included. Prerequisite: One year of teaching experience in mathematics or computer science. (May not be counted as credits toward the M.S. or Ph.D. degrees in Mathematical Sciences.) (3-0) Y

MATH 5320 Usual and Unusual Problems Using Secondary Mathematics (3 semester hours) For teachers only. Emphasis on (1) problem solving, (2) linking ‘college mathematics’ and ‘secondary mathematics’, and (3) using technology. Content varies from term to term with courses in algebra, geometry, precalculus, calculus, probability/statistics, discrete mathematics, mathematical modeling. (May be repeated to a maximum of 15 semester hours.) (May not be counted as credits toward the M.S. or Ph.D. degrees in Mathematical Sciences.) (3-0) Y

MATH 5330 Topics in Mathematics (3 semester hours) Special topics for mathematics teachers. (May be repeated for credit to a maximum of 9 hours.) (May not be counted as credits toward the M.S. or Ph.D. degrees in Mathematical Sciences.) (3-0) Y

MATH 5V06 Special Topics in Mathematics (1-3 semester hours) (May be repeated for credit to a maximum of 9 hours) (May not be counted as credits toward the M.S. or Ph.D. degrees in Mathematical Sciences.) (1-3-0) S

General Courses

SCI 6201 Scientific Writing (2 semester hours) Lectures and workshop on the principles of clear scientific exposition and the requirements for preparation of scientific papers for publication. Normally taken by students about to begin writing a thesis or dissertation. (P/F grading) (2-0) R

SCI 5300 Professional and Academic Communication (3 semester hours) Theory and practice of oral communication in professional and academic settings. Emphasis is on the application of communication theory to develop skills for natural sciences students. Topics include audience analysis, organization of presentations, using media to enhance messages, non-presentational professional communication situations. (3-0) R

Interdisciplinary Programs in the School of Natural Sciences and Mathematics
Additional core courses for the Computational Biology track:
MATH 6313 Numerical Analysis
MATH 6343 Computational Biology
MATH 6345 Mathematical Methods in Medicine & Biology

Additional core courses for the Bioinformatics track:
CS 5333 Discrete Structures
CS 5343 Algorithms Analysis and Data Structures
CS 6360 Database Design

Elective: A minimum of 7 semester credit hours of elective, approved by the student's adviser. Typically, electives are 6000- and 7000- level courses in mathematical sciences, biology or computer science. Courses from other disciplines may also be used upon approval.

Master of Science in Biotechnology

Faculty
The following faculty members have expressed a particular interest in working with the M.S. in Biotechnology degree program:
Profs: Ray Baughman (Chemistry), Lee Bulla (Molecular and Cell Biology), Santosh D’Mello (Molecular and Cell Biology), Rockford Draper (Molecular and Cell Biology), Steven Goodman (Molecular and Cell Biology), Don Gray (Molecular and Cell Biology), Ali Hooshyar (Mathematics), Lynn Melton (Chemistry), Raimund Ober (Electrical Engineering), Betty Pace (Molecular and Cell Biology), William Pervin (Electrical Engineering, Computer Science, Mathematics), Lawrence Reitzer (Molecular and Cell Biology), A. Dean Sherry (Chemistry), Robert Serfling (Mathematics), Laksman Tamil (Electrical Engineering)

Associate Professors: Mark Anderson (SOM), Gregg Dieckmann (Chemistry), Gail Breen (Molecular and Cell Biology), David Deeds (SOM), Matthew Goeckner (Electrical Engineering), Warren Goux (Chemistry), Robert Kieschnick (SOM), J B Lee (Electrical Engineering), Stephen Levene (Molecular and Cell Biology), Paul Pantano (Chemistry)

Assistant Professors: Jungmo Anh (Chemistry), Pankaj Choudhary (Mathematics), Ovidiu Daescu (Computer Science), Donovan Haines (Chemistry), Wenchuang Hu (Electrical Engineering), Ying Liu (Computer Science), Nirup Menon (SOM), Issa Panahi (Electrical Engineering)

Senior Lecturers: George Barnes (Management), Andrew Cilia (Electrical Engineering), Joseph Picken (SOM), Robert Robb (SOM), Ricardo Saad (Electrical Engineering)

Objectives
The M.S. degree in biotechnology is intended to prepare students for careers in biotechnology and to assist currently employed professionals in enhancing their career opportunities in the field of biotechnology. Biotechnology captures the exciting possibilities made possible by the decoding of the human genome and by the advances in bioanalytical instrumentation, and the field is projected for rapid growth. The M.S. in Biotechnology is designed so that students may enter the program with a wide range of prior disciplinary backgrounds, prepare for and take the four core courses, and, by choice from a wide range of approved electives, tailor the remainder of the degree program to their career opportunities. In this manner, students may develop areas of additional depth in fields such as:
- molecular and cell biology
- chemistry
- engineering and computer science
- health care policy
- management and business administration
- science education
The M.S. in Biotechnology requires 36 hours of courses, typically twelve courses of three semester hours each. Students may also elect to prepare and defend a thesis; more than 36 hours may be required for such a program.

The M.S. in Biotechnology is administered by the Department of Molecular and Cell Biology. Students seeking further information or advisement should contact the Molecular and Cell Biology Department office.

## Core Courses

The core consists of four courses – BIOL 5381 Genomics, BIOL 6373 Proteomics, and BIOL 6384 Biotechnology Laboratory, plus a choice of one of the three courses BIOL 5376 Applied Bioinformatics, Math 6341 Bioinformatics, or CS 6372 Biological Database Systems and Data Mining. Note: Students enrolled in the Biotechnology M.S., Cell and Molecular Biology M.S. and/or Ph.D. programs will have priority for enrollment in BIOL 6384. Students who can demonstrate that they have acquired the material and/or skills in a core course may petition the Committee on Biotechnology for permission to substitute an approved elective course.

## Program Policies

The program is open to all students who hold a bachelors degree, although those with laboratory science, mathematics, computer science, or engineering degrees are particularly encouraged to apply. In general, students seeking admission to the M.S. in Biotechnology program shall consult with the program advisor(s) and develop a mutually agreed degree plan. All requests for deviations from the degree program described in this catalog shall be discussed first with a program advisor, who will forward the request to the Committee on Biotechnology for decision.

There are no formal prerequisites for most of the core courses, and a student, after obtaining consent of the program advisor, may attempt one or more core courses. However, the level of the BIOL core courses is such that most students will want to have mastered the material in the following courses:

- General Chemistry (two semesters, with lab)
- Organic Chemistry (two semesters, with lab)
- BIO 2311 Introduction to Modern Biology I (with workshop)
- BIOL 3361 Biochemistry or BIOL 6352 Modern Biochemistry I
- BIOL 3301 Classical and Molecular Genetics or BIOL 6V31 Molecular Genetics

The four core courses should be taken in the following order: BIOL 5376 Applied Bioinformatics, BIOL 5381 Genomics, BIOL 6373 Proteomics, BIOL 6384 Biotechnology Laboratory. Consent of instructor is required for core courses taken out of this sequence.

BIOL 5384 Biotechnology Laboratory is a skills based course. Students must show that they have adequate laboratory skills in order to enroll in BIOL 5384.

Also available are four 1-SCH summer preparatory courses for students who do not have the background in both biology and mathematics that is required for success in the core courses. Students with a strong math background, who need access to modern biology, should take BIOL 5V00 (Biology Preparation – MS in Biotechnology I), BIOL 5V00 (Biology Preparation – MS in Biotechnology II), and MATH 5V06 (Mathematics Preparation – MS in Biotechnology II). Students with a strong biology background, who need access to mathematics/statistics, should take MATH 5V06-06A (Mathematics Preparation – MS in Biotechnology I), BIOL 5V00 (Biology Preparation – MS in Biotechnology II), and MATH 5V06 (Mathematics Preparation – MS in Biotechnology II).

Students who elect to prepare and defend a thesis must satisfy the MS thesis procedures specified by the department of their thesis supervisor.

## Electives

As a general rule, any course offered for M.S. and/or Ph.D. students by a department within the Schools of Natural Science and Mathematics, or Engineering and Computer Science or Management may be taken as an elective for the Biotechnology M.S. program. Exceptions may occur, and students should consult the program advisor for the current list of approved electives.

A joint program in Bioinformatics and Computational Biology, administered through the Mathematical Sciences Department, is also available, and courses offered within that program are also available as electives. M.S., Cell and Molecular Biology M.S. and/or Ph.D. programs may have priority for enrollment in BIOL 5384.
Course Descriptions

**BIOL 5376 Applied Bioinformatics** (3 semester hours) Genomic information content; database searches; pairwise and multiple sequence alignment; mutations and distance-based phylogenetic analysis; genomics and gene recognition; genetic polymorphisms and forensic applications; nucleic-acid and protein array analysis; structure prediction of biological macromolecules. Lectures are augmented with laboratory exercises and demonstrations. Introductory statistics and 2 semesters of calculus required. (3-0) Y

**BIOL 5381 Genomics** (3 semester hours) The fundamentals of how the human genome sequence was acquired and the impact of the human genome era on biomedical research, medical care and genetic testing will be explored. New tools such as DNA microarray, realtime PCR, mass spectrometry and data mining using bioinformatics will be covered. (3-0) Y

**MATH 6341 Bioinformatics** (3 semester hours) Fundamental mathematical and algorithmic theory behind current bioinformatics techniques will be taught. These methods will be implemented by the student. They include hidden Markov models, dynamic programming, genetic algorithms, simulated annealing, neural networks, cluster analysis, and information theory. Prerequisites: Knowledge of Unix and a programming language (C, C++, or FORTRAN) (3-0) Y

**BIOL 6373 Proteomics** (3 semester hours) Protein identification, sequencing, and analysis of post-translational modifications by mass spectrometry; understanding protein interactions and function using protein chip microarrays. (3-0) Y

**BIOL 6384 Biotechnology Laboratory** (3 semester hours) Laboratory instruction in LC/MS/MS analysis of protein sequence, ICAT reagents, and MS analysis of cellular proteomes, PCR and DNA Sequencing, and DNA microarray analysis; AFM and confocal microscopy and fluorescence activated cell sorting. Instructor may require students to demonstrate adequate laboratory skills in order to enroll. (1-4) Y

**CS 6372 Biological Database Systems and Datamining** (3 semester hours) Describes relational data models and database management systems; teaches the theories and techniques of constructing relational databases to store various biological data, including sequences, structures, genetic linkages and maps, and signal pathways. Introduces relational database query language SQL, with an emphasis on answering biologically important questions. Summarizes currently existing biological databases. Addresses questions in data integration from various sources and security. Introduces novel data mining methods in bioinformatics area with an emphasis on protein structure prediction, homology search, genomic sequence analysis, gene finding and gene mapping. The future directions for biological database development are also discussed. Prerequisites: BIOL 5373 (Proteomics), BIOL 5381 (Genomics), Data structures (satisfied by taking CS 5343: Data Structures and Algorithms): lists, stacks, queue, searching, sorting, binary search tree, hashing, priority queues, graphs). (3-0) Y.

**Electives**

A sampling of electives available to students in the Biotechnology M.S. program follows:

**BIOL 5202 The Human Genome** (2 semester hours) Analysis of the two groundbreaking articles published in 2001 in the journals Nature and Science on the human genome sequence, focusing on their impact on biotechnology, the treatment of human disease, and society. (2-0) T

**ENTP 6360 Entrepreneurial Ventures** (3 semester hours) This course is designed to provide an introduction to entrepreneurship for non-management students. The course emphasizes the development of technology-based ventures, addressing opportunity identification and evaluation, market assessment, startup strategies, business valuation, business plan development, venture financing, and startup management. Guest lectures by practicing entrepreneurs and investors provide a real-world perspective. The major deliverable of this course is an early stage feasibility analysis of a venture of the student’s choosing. This course is not available to students enrolled in degree programs in the School of Management. (3-0) S

**CS 6360 Database Design** (3 semester hours) Methods, principles, and concepts that are relevant to the practice of database software design. Database system architecture; conceptual database models; relational and object-oriented databases; database system implementation; query processing and optimization; transaction processing concepts, concurrency, and recovery; security. Prerequisite: CS 5343. (3-0) S

**CS 5343 Algorithm Analysis & Data Structures** (3 semester hours) Formal specifications and representation of lists, arrays, trees, graphs, multilinked structures, strings and recursive pattern structures. Analysis of associated algorithms. Sorting and searching, file structures. Relational data models. Prerequisites: CS 5303, CS 5333. (3-0) S
294 Biotechnology

CS 6363 Design and Analysis of Computer Algorithms (3 semester hours) The study of efficient algorithms for various computational problems. Algorithm design techniques. Sorting, manipulation of data structures, graphs, matrix multiplication, and pattern matching. Complexity of algorithms, lower bounds, NP completeness. Prerequisite: CS 5343 (3-0) S

FIN 6301 Financial Management (3 semester hours) Theoretical and procedural considerations in the administration of the finance function in the individual business firm; planning, fundraising, controlling of firm finances; working capital management, capital budgeting and cost of capital. Corequisites: STAT 5311 and ACCT 6305, or consent of instructor. (3-0) S

MATH 6343 Computational Biology (3 semester hours) Mathematical and computation methods and techniques to analyze and understand problems in molecular biology will be taught. This will include sequence homology and alignment, genetic mapping, protein folding, and DNA computing. Prerequisite MATH 2418.

MATH 6345 Mathematical Methods in Medicine and Biology (3 semester hours) Introduction to the use of mathematical techniques in solving biologically important problems. Some examples of topics that might be covered are biochemical reactions, ion channels, cellular signaling mechanisms, kidney function, nerve impulse propagation. Prerequisites: MATH 1471, MATH 1472, (MATH 2420 recommended)

OB 6232 Conflict and Negotiation in Organization (2 semester hours) Analysis of negotiation and conflict resolution techniques in interpersonal, group, and international negotiations. Theoretical concepts and practical techniques for successful negotiation with emphasis on understanding the co-negotiator; analyzing negotiation style and its fit with the situation; and managing the team dynamics associated with most negotiations. Prerequisite: OB 6301 or consent of instructor. (2-0) T

PHYS 5323 Virtual Instrumentation with Biomedical, Clinical and Healthcare Applications (3 semester hours) The application of the graphical programming environment of LabView will be demonstrated with examples related to the health care industry. Examples will be provided to highlight the use of the personal computer as a virtual instrument in the clinical and laboratory environment. A laboratory is provided for hands-on training to augment the lecture. (3-0)R

POEC 7341 Health Policy (3 semester hours) The history and political economy of the U.S. health care system and a review of major governmental programs to expand access to appropriate services, control rising costs, ensure the quality of care, and promote health through prevention. Analysis of current and recent proposals for reform of health care policy. (3-0) Y

ECO 7331 The Emerging Biotechnology Industry (3 semester hours) Examines economic and public policy influences shaping biotech industry development and shifting competitiveness factors. Patterns of R&D funding and investment, innovation and commercialization will be analyzed, as will prospects for drawing on science advances in other industries. (3-0) Y
Doctor of Philosophy in Geospatial Information Sciences

http://www.utdallas.edu/dept/socsci/

This degree program is jointly offered by the School of Economic, Political and Policy Sciences, the School of Natural Sciences and Mathematics (specifically in the Department of Geosciences) and the Eric Jonsson School of Engineering and Computer Science, and is administered by the School of Economic, Political and Policy Sciences. Please refer to page 99 for details.
# FACULTY ROSTER

## Tenure Track Faculty

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Institution Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABDELSALAM, MOHAMED G.</td>
<td>Assistant Professor, Geosciences</td>
<td>B.Sc., Univ. of Khartoum, Sudan, 1984; M.Sc., Univ. of Khartoum, Sudan, 1987; Ph.D., Univ. of Texas, Dallas, 1993</td>
</tr>
<tr>
<td>ABDI, HERVÉ</td>
<td>Professor, Cognition and Neuroscience</td>
<td>M.P., Univ. of Besançon, 1975; D.E.A., Univ. of Clermont, 1976; D.E.A., Univ. of Strasbourg, 1977; Ph.D., Univ. of Aix-en-Provence, 1980</td>
</tr>
<tr>
<td>ADLER, HANS-JOACHIM</td>
<td>Clinical Professor, Director for International Business Development</td>
<td>M.S., Univ. of Darmstadt, Germany, 1969; Ph.D., Univ. of Lyon, France, 1972</td>
</tr>
<tr>
<td>AHN, JUNG-MO</td>
<td>Assistant Professor, Chemistry</td>
<td>B.S., Seoul National Univ., 1992; M.S., Seoul National Univ., 1994; Ph.D., Univ. of Arizona, 2000</td>
</tr>
<tr>
<td>AIKEN, CARLOS L. V.</td>
<td>Professor, Geosciences</td>
<td>B.S., Univ. of Washington, 1965; M.S., Univ. of Washington, 1970; Ph.D., Univ. of Arizona, 1976</td>
</tr>
<tr>
<td>AL-DHAHIR, NAOFAL</td>
<td>Associate Professor, Electrical Engineering</td>
<td>B.S., Kuwait Univ., 1989; M.S., Stanford Univ., Ph.D., Stanford Univ., 1994</td>
</tr>
<tr>
<td>ALDRIDGE, MICHELLE</td>
<td>Clinical Faculty, Communication Disorders</td>
<td>B.S., Texas Women's Univ., 1992; M.S., Univ. of Texas at Dallas, 1995; Ph.D., Univ. of Texas at Dallas, 1997</td>
</tr>
<tr>
<td>ALEXANDER, BOBBY C.</td>
<td>Associate Professor, Sociology</td>
<td>B.A., Baylor Univ., 1973; M.Div., Union Theological Seminary, 1976; M.Phil., Columbia Univ., 1981; Ph.D., Columbia Univ., 1985; Ph.D., Union Theological Seminary, 1985</td>
</tr>
<tr>
<td>AMINGUTIÉRREZ DE PINERES, SHEILA</td>
<td>Associate Professor, Economics; Associate Dean for Undergraduate Education, School of Social Sciences</td>
<td>B.A., Texas A&amp;M Univ., 1988; M.A., Univ. of Chicago, 1989; Ph.D., Duke Univ., 1992</td>
</tr>
<tr>
<td>AMMANN, LARRY P.</td>
<td>Professor, Mathematical Sciences; participating Professor of Electrical Engineering</td>
<td>B.A., Florida State Univ., 1969; M.S., Florida State Univ., 1972; Ph.D., Florida State Univ., 1976</td>
</tr>
<tr>
<td>ANDERSON, MARK</td>
<td>Associate Professor, Accounting; Director, Accounting and Information Management Center</td>
<td>B.A., Univ. of Alberta, 1978; M.B.A., Univ. of Alberta, 1981; M.S., Univ. of Rochester, 1991; Ph.D., Univ. of Florida, 1996</td>
</tr>
<tr>
<td>ANDERSON, PHILLIP C.</td>
<td>Associate Professor, Physics</td>
<td>B.S., North Texas State Univ., 1982; M.S., Univ. of Texas, Dallas, 1985; Ph.D., Univ. of Texas, Dallas, 1990</td>
</tr>
<tr>
<td>ANDREESCU, TITU</td>
<td>Associate Professor, Mathematics Education</td>
<td>B.A., Univ. of West Timisoara, Romania, M.S., Univ. of West Timisoara, Romania, 1980; Ph.D., Univ. of West Timisoara, Romania, 2003</td>
</tr>
<tr>
<td>ARMOUR, PHILIP K.</td>
<td>Associate Professor, Sociology and Political Economy</td>
<td>B.A., Univ. of California, Santa Cruz, 1970; M.A., Univ. of California, Berkeley, 1972; Ph.D., Univ. of California, Berkeley, 1979</td>
</tr>
</tbody>
</table>
ASSMANN, PETER F.
Professor, Cognition and Neuroscience.  B.A., Univ. of Waterloo, 1976; M.S., Univ. of Alberta, 1979; Ph.D., Univ. of Alberta, 1985

ASUNDI, JAYATIRTHA M.

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BALKUS JR., KENNETH J.
Professor, Chemistry.  B.S., Worcester Polytechnic Inst., 1982; Ph.D., Univ. of Florida, 1986

BALSARA, PORAS T.

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Professor, Historical Studies.  B.A., State Univ. of New York at Cortland, 1974; M.A., Univ. of Michigan, 1976; Ph.D., Univ. of Michigan, 1987

BARANCHUK, NINA
Assistant Professor, Economics.  M.S., Moscow State Univ., Russia, 1998; M.A., New Economic School, Moscow, Russia, 1998; Ph.D., Washington Univ. in St. Louis, 2004

BARDHAN, INDRANIL R.
Assistant Professor, Accounting and Management Information Systems; Director, Center for Practice and Research in Software Management.  B.Tech., Indian School of Mines, India, 1988; M.Eng., Pennsylvania State Univ., 1992; Ph.D., Univ. of Texas, Austin, 1995

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Associate Professor, Mathematical Sciences.  M.S., Univ. of St. Petersburg, Russia, 1992; Ph.D., Univ. of Maryland, 1995

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Professor, Cognition and Neuroscience; Program Head, Cognition and Neuroscience.  B.A., Univ. of Texas at Austin, 1970; Ph.D., Yale Univ., 1975

BASS, FRANK M
Professor, Marketing; Eugene McDermott Univ. of Texas System Chair; Director, Ph.D. Programs, School of Management.  B.B.A., Southwestern Univ., 1949; M.B.A., Univ. of Texas at Austin, 1950; Ph.D., Univ. of Illinois, 1954

BASTANI, FAROKH B.
Professor, Computer Science; Excellence in Education Foundation Chair, School of Engineering and Computer Science; Director, Center for Application Specific Systems and Software Engineering.  B. Tech., Indian Inst. of Technology, Bombay, 1977; M.S., Univ. of California, Berkeley, 1978; Ph.D., Univ. of California, Berkeley, 1980

BAUGHMAN, RAY H.
Professor, Chemistry; Director, UTD Nanotech Institute; Robert A. Welch Chemistry Chair.  B.S., Carnegie-Mellon Univ., 1964; M.S., Harvard Univ., 1966; Ph.D., Harvard Univ., 1971

BENSOUSSAN, ALAIN

BEREG, SERGEY
Associate Professor, Computer Science.  B.S., Ural State Univ., USSR, 1983; M.S., Ural State Univ., USSR, 1985; Ph.D., Minsk Inst. Of Mathematics, Belarus, Russia, 1992
<table>
<thead>
<tr>
<th>Name</th>
<th>Title and Department</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>BERG, NATHAN</td>
<td>Associate Professor, Economics</td>
<td>B.A., Univ. of Kansas, 1995; Ph.D., Univ. of Kansas, 2001</td>
</tr>
<tr>
<td>BERON, KURT J.</td>
<td>Associate Professor, Economics and Political Economy</td>
<td>B.S./B.A., Univ. of North Carolina, Greensboro, 1977; M.S.W., Univ. of North Carolina, Chapel Hill, 1980; Ph.D., Univ. of North Carolina, Chapel Hill, 1985</td>
</tr>
<tr>
<td>BERRY, BRIAN J. L.</td>
<td>Professor, Political Economy; Dean, School of Social Sciences. The Lloyd Viel Berkner Regental Professor</td>
<td>B.Sc., (Econ. Hons.) Univ. Coll., London, 1955; M.A., Univ. of Washington, 1956; Ph.D., Univ. of Washington, 1958</td>
</tr>
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<td>BHERIA, DINESH</td>
<td>Associate Professor, Electrical Engineering</td>
<td>B.E., Regional Engr. Coll., Suratkal, India, 1985; M.S., Univ. of Texas, Dallas, 1987; Ph.D., Univ. of Texas, Dallas, 1990</td>
</tr>
<tr>
<td>BIEWER, MICHAEL C.</td>
<td>Associate Professor, Chemistry</td>
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</tr>
<tr>
<td>BLANCHARD, ANDREW J.</td>
<td>Professor, Electrical Engineering</td>
<td>B.S., Univ. of Southwestern Louisiana, 1972; M.S., Colorado State Univ., 1973; Ph.D., Texas A&amp;M Univ., 1977</td>
</tr>
<tr>
<td>BOWER, THOMAS G. R.</td>
<td>Professor, Psychology; Founders Professor</td>
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</tr>
<tr>
<td>BRANDT, PATRICK T.</td>
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</tr>
<tr>
<td>BRANDWEIN, PAMELA</td>
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</tr>
<tr>
<td>BRAY, TIMOTHY M.</td>
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</tr>
<tr>
<td>BREEN, GAIL A. M.</td>
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</tr>
<tr>
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</tr>
<tr>
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<td></td>
</tr>
<tr>
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<td></td>
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<tr>
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<td>B.S., California Inst. of Technology, 1979; M.S., Univ. of Oregon, 1983; Ph.D., Univ. of Arizona, 1987</td>
</tr>
</tbody>
</table>
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CHANDRASEKARAN, RAMASWAMY
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CHANNELL, DAVID F.
Professor, Historical Studies. B.S., Case Inst. of Technology, 1967; M.S., Case Western Reserve Univ., 1969; Ph.D., Case Western Reserve Univ., 1975

CHAPMAN, SANDRA B.
Professor, Behavior and Brain Sciences; Executive Director, Center for BrainHealth; Director, Center for Language and Brain Treatment Center. B.S., Univ. of North Texas, 1975; M.S., Univ. of North Texas, 1976; Ph.D., Univ. of Texas at Dallas, 1986

CHEVRIER, MARIE I.
Associate Professor, Political Economy; Coordinator, Master of Public Affairs Program, School of Social Sciences. B.A., Univ. of Nebraska, 1972; M.P.P., Harvard Univ., 1986; Ph.D., Harvard Univ., 1991

CHOWDHARY, PANKAJ K.
Assistant Professor, Statistics. B.S., Univ. of Delhi, India, 1996; M.S., Indian Inst. Of Technology, Kanpur, India, 1998; Ph.D., Ohio State Univ., 2002

CHUNG, LAWRENCE
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CLARK, ALEXANDER L.

CLARKE, HAROLD D.
Professor, Political Science; Ashbel Smith Professor, School of Social Sciences. B.A., Univ. of Western Ontario, 1966; M.A., Univ. of Western Ontario, 1967; Ph.D., Duke Univ., 1971

COBB, JORGE A.
Associate Professor, Computer Science. B.S., Univ. of Texas, El Paso, 1987; M.A., Univ. of Texas, Austin, 1989; Ph.D., Univ. of Texas, Austin, 1996

COHEN, MILTON A.

COKELY, CAROL G.

COLEMAN, J. MICHAEL
Professor, Psychology; Associate Provost; Dean, Undergraduate Education. B.S., Vanderbilt Univ., 1972; M.A., Vanderbilt Univ., 1974; Ph.D., Univ. of Virginia, 1978

COLLINS JR., CARL B.
Professor, Physics; Director, Center for Quantum Electronics. B.S., Univ. of Texas at Austin, 1960; M.A., Univ. of Texas at Austin, 1961; Ph.D., Univ. of Texas at Austin, 1963
<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Education</th>
</tr>
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<tbody>
<tr>
<td>Cong, Dachang</td>
<td>Senior Lecturer, Anthropology; Program Head,</td>
<td></td>
</tr>
<tr>
<td></td>
<td>American Studies. Diploma, Shanxi Supreme</td>
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<td></td>
<td>Normal Univ., 1976; M.Ph., Yale Univ., 1986;</td>
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<td></td>
<td>Ph.D., Yale Univ., 1991</td>
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</tr>
<tr>
<td>Cooper, Kendra M.L.</td>
<td>Assistant Professor, Electrical and Computer</td>
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<td>Engineering. B.A.Sc., Univ. of British</td>
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<td>Columbia, 1993; M.A.Sc., Univ. of British</td>
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<td>Cotter, Sean</td>
<td>Assistant Professor, Literary Studies. B.A.,</td>
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<td>Loyola Univ., 1992; M.A., Univ. of Texas,</td>
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<td>Dallas, 1998; Ph.D., Univ. of Michigan,</td>
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<td>1978; M.Acct., Ohio State Univ., 1980; Ph.D.,</td>
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<td>Ohio State Univ., 1985</td>
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<td>B.Sc., Queens Univ., Belfast, 1966; Ph.D.,</td>
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<td>Queens Univ., Belfast, 1969</td>
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<td>Curchack, Fred I.</td>
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<td>California, Santa Barbara, 2002</td>
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<td>D'Mello, Santosh</td>
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<td>George Washington Univ., 2003</td>
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Appendix I

Rules, Regulations, and Statutory Requirements

A. Student Conduct and Discipline

The University of Texas System and The University of Texas at Dallas have rules and regulations for the orderly and efficient conduct of their business. It is the responsibility of each student and each student organization to be knowledgeable about the rules and regulations which govern student conduct and activities. General information on student conduct and discipline is contained in the U.T. Dallas publication, A to Z Guide, which is provided to all registered students each academic year.

The University of Texas at Dallas administers student discipline within the procedures of recognized and established due process. Procedures are defined and described in the Rules and Regulations, Board of Regents, The University of Texas System, Series 50101, and in Title V, Rules on Student Services and Activities, Chapter 49 of the university’s Handbook of Operating Procedures. Copies of these rules and regulations are available to students in the Office of the Dean of Students, where staff are available to assist students in interpreting the rules and regulations (SU 1.602, 972/883-6391).

A student at the university neither loses the rights nor escapes the responsibilities of citizenship. He or she is expected to obey federal, state, and local laws as well as the Regents’ Rules, university regulations, and administrative rules. Students are subject to discipline for violating its standards of conduct whether such conduct takes place on or off campus, or whether civil or criminal penalties are also imposed for such conduct.

1. Academic Dishonesty

The faculty expects from its students a high level of responsibility and academic honesty. Because the value of an academic degree depends upon the absolute integrity of the work done by the student for that degree, it is imperative that a student demonstrate a high standard of individual honor in his or her scholastic work. Scholastic dishonesty includes, but is not limited to, statements, acts or omissions related to applications for enrollment or the award of a degree, and/or the submission as one’s own work of material that is not one’s own. As a general rule, scholastic dishonesty involves one of the following acts: cheating, plagiarism, collusion and/or falsifying academic records. Students suspected of academic dishonesty are subject to disciplinary proceedings.

2. Campus Solicitations

“Solicitations,” as defined by the Rules and Regulations of the Board of Regents of The University of Texas System, means the sale, lease, rental of any property, product, merchandise, publication, or service, whether for immediate or future delivery; an oral statement or the distribution or display of printed material, merchandise, or product that is designed to encourage the purchase, use or rental of any property, product, merchandise, publication, or service; the oral or written appeal or request to join an organization other than a registered student, faculty, or staff organization; the receipt of or request for any gift or contribution; or the request to support or oppose or to vote for or against a candidate, issue, or proposition appearing on the ballot at any election pursuant to state or federal law or local ordinances. All solicitations on the U.T. Dallas campus must conform to the Regents’ Rules, copies of which are available in the offices of the President, Executive Vice President and Provost, Vice Presidents, and Deans, and in numerous other administrative offices and the library.

3. Hazing

Hazing, submission to hazing, or failure to report first-hand knowledge of hazing incidents is prohibited by state law and, in addition to disciplinary actions, is punishable by fines up to $10,000 and confinement in county jail for up to two years. Hazing is defined by state law as, “…any intentional, knowing, or reckless act, occurring on or off the campus of an educational institution, by one person alone or acting with others, directed against a student, that endangers the mental or physical health or safety of a student for the purpose of pledging, being initiated into, affiliating with, holding office in, or maintaining membership in any organization whose members are or include students at an educational institution.” Any person with knowledge that a specific hazing incident has occurred on or off campus must report the incident to the Dean of Students (SU 1.602) or call 972/883-6391.

4. Other Disciplinary Situations

Any student organization as a group is subject to disciplinary action or revocation of registration as a student organization for violation of a rule or regulation of The University of Texas System or The University of Texas at Dallas.
B. Grievances Procedures

The University of Texas at Dallas is committed to a policy of nondiscrimination on the basis of age, color, disability, gender, race, religion, sexual orientation, national origin, or veteran status in its provision of services, activities, and programs, and in its treatment of students. Students seeking further information about this policy or related complaint procedures for alleged discrimination or sexual harassment should contact the Dean of Students. The dean will follow the procedures for student grievances that are found in Title V, Rules on Student Services and Activities, Chapter 51, summarized below.

Sexual harassment is a form of sex discrimination. Such harassment is defined as unwelcome sexual advances, requests for sexual favors, and other verbal or physical conduct of a sexual nature. Suggestions that academic or employment reprisals or rewards will follow the refusal or granting of sexual favors, also constitute sexual harassment. The full text of the University’s “Sexual Harassment Policy and Procedure” may be found in the Administrative Policies and Procedures Manual, Section D, D11-115.0.

Any student who perceives that he or she has been subject to any form of discrimination as defined above may file a written complaint with the Dean of Students using the following procedures:
• The complaint must contain the nature of the alleged discrimination, the date on which the alleged discrimination occurred, and other appropriate information as required by the dean.
• The dean will refer all complaints that name an employee of the university (including graduate assistants and other student employees) as the offender to the Office of Human Resources for investigation and resolution. When the nature of the complaint is discrimination on the basis of disability, the dean will refer the grievance or complaint to the ADA Coordinator who will investigate the complaint under the procedures given in the Administrative Policies and Procedures Manual, Vol. IIA, Section D, page D11-195.0, Americans With Disabilities Act Grievance Policy.
• With the exceptions noted in subsection (2) above, the student discipline procedure outlined in Title V, Chapter 49 Student Discipline and Conduct will be utilized for complaints that name a student as an alleged offender. Such complaints will be investigated by the dean.
• As a result of the investigation, the dean will, on the basis of the information presented, determine:
  o that the charges of discrimination are without basis,
  o that further investigation is required,
  o that campus action shall be initiated to alleviate a discriminatory situation, or
  o that a hearing will be held.

C. Academic Appeals

• Procedures for student grievances are found in Title V, Chapter 51, Rules on Student Services and Activities, of the university’s Handbook of Operating Procedures. In attempting to resolve any student grievance regarding grades, evaluations, or other fulfillments of academic responsibility, it is the obligation of the student first to make a serious effort to resolve the matter with the instructor, supervisor, administrator, or committee with whom the grievance originated (hereafter called “the respondent.”) Individual faculty members retain primary responsibility for assigning grades and evaluations. If the matter cannot be resolved at that level, the grievance must be submitted in writing to the respondent with a copy to the respondent’s school dean. If the matter is not resolved by the written response provided by the respondent, the student may submit a written appeal to the school dean. If the grievance is not resolved by the school dean’s decision, the student may make a written appeal to the dean of graduate or undergraduate studies, who will appoint and convene an Academic Appeals Panel. The decision of the Academic Appeals Panel is final. The results of the academic appeals process will be distributed to all involved parties.
• Copies of these rules and regulations are available to students in the Office of the Dean of Students where staff are available to assist students in interpreting the rules and regulations.

D. Privacy Act: Student Records

• The student’s university record is established and maintained to provide both the student and the university with information regarding the student’s progress while enrolled at the university. Any student enrolled in the university has access to and may inspect those records relating to his or her academic progress, to the extent allowed by the Family Educational Rights and Privacy Act and the Texas Public Information Act. The record is considered to be confidential and may be released only within the limitations clearly defined by university regulations and state and federal statutes or with the student’s written permission.
• The university may release directory information which is defined as public information and includes the student’s name, local and permanent address, telephone number, E-mail address, date and place of birth, major field of
study, participation in officially recognized activities and sports, weight and height of members of athletic teams, dates of attendance, degrees, awards and honors received, and the most recent educational agency or institution attended by the student. This information may be printed in various publications of the university such as the student directory, honors list, athletic programs, list of graduating students, or similar documents. Additionally, this information may be released upon request. A student may request that the university not release directory information by completing the appropriate forms during registration. The student must complete the forms each semester.

- Student records which the university maintains include official university academic and personal records relating to scholastic, disciplinary and fiscal matters as well as records maintained by university agencies and agencies providing services sought voluntarily by students. Students may challenge the contents of educational records and request corrections to inaccurate or misleading information. Any request for correction or explanation of record contents should be presented in writing to the person in charge of the office where the record is maintained.
- Detailed information pertaining to the content of and handling of student records is contained in Title V, Rules on Student Services and Activities of the university’s Handbook of Operating Procedures. Students wishing more information about their rights established under the Family Educational Rights and Privacy Act should contact the Office of Student Life, Student Union 1.602, (972) 883-6391.

E. The Student-Right-To-Know and Campus Security Act

In compliance with the Student-Right-to-Know and Campus Security Act, The University of Texas at Dallas collects specified information on campus crime statistics, campus security policies, and institutional completion or graduation rates. The university publishes an annual report of campus security policies and crime statistics and distributes copies during registration.

F. Use of Facilities

Pursuant to the general authority of Texas Education Code Chapter 65, and the specific authority of Texas Education Code Chapter 51, the Board of Regents of The University of Texas System, in Series 80101-80110 of the Rules and Regulations, promulgates rules relating to the use of buildings, grounds, and facilities for purposes other than programs and activities related to the role and mission of the U. T. System and the component institutions.

The property, buildings, or facilities owned or controlled by the U. T. System or U. T. Dallas are not open for assembly, speech, or other activities as are the public streets, sidewalks, and parks. The responsibility of the Board of Regents to operate and maintain an effective and efficient system of institutions of higher education requires that the time, place and manner of assembly, speech, and other activities on the grounds and in the buildings and facilities of the U. T. System or U. T. Dallas be regulated.

Complete copies of the regental and institutional rules and regulations are available to students in the Office of the Dean of Students where staff members are available to assist students in interpreting the rules.
Appendix II

Respective Responsibilities of Students and Faculty

A. Student Responsibility

Students are responsible for reading this catalog and understanding the programs, rules, and regulations affecting their academic progress. Further, students are responsible for fulfilling degree requirements and for enrolling in courses that fit into their degree programs.

Students are urged to plan their work with care, consulting their graduate advisers and those of the teaching staff under whom their work will be taken, and to bear in mind the requirements for the degree they seek. Students are responsible for developing a program of studies approved by their graduate adviser acting on behalf of the Graduate Studies Committee for the graduate program in which they are enrolled. The program of study must assure substantial mastery of the scholarly apparatus of the student’s chosen field as well as any languages or other research skills necessary to pursue the degree. The requirements for a particular degree are listed in this catalog under the name of the specific program.

In addition, all graduate students must visit their graduate advisers prior to registration for the semester in which they plan to graduate.

B. Faculty Responsibility

Faculty members are responsible for reading this catalog and understanding the programs, rules, and regulations so that they can effectively advise students.

Each graduate program has a Graduate Studies Committee that is responsible for the academic content of the programs of studies required for degrees, subject to certain administrative approvals. Each committee has responsibility for the acceptance of graduate students and for the approval of the specific program of study for each student. Each committee also has the responsibility for naming graduate advisers to advise graduate students until the time of appointment of their thesis or dissertation supervising committees, if any. Supervising committees must meet at least once each year and file an annual report on students’ progress with the Dean of Graduate Studies.
Appendix III

Rules and Regulations for Determining Residence Status

21.727. Authority and Purpose.
21.729. Effective Date of Subchapter.
21.731. Information Required to Establish Resident Status
21.733. Reclassification Based on Additional or Changed Information.
21.734. Errors in Classification.
21.735. Waivers that Permit Nonresidents to Pay Resident Tuition.
21.727. Authority and Purpose.

Texas Education Code, Section 54.075, requires the Board to adopt rules to carry out the purposes of Texas Education Code, Subchapter B, concerning the determination of resident status for tuition purposes.

The following words and terms, when used in this subchapter, shall have the following meanings, unless the context clearly indicates otherwise:

(1) Census date – the date in an academic term for which an institution is required to certify a person’s enrollment in the institution for the purposes of determining formula funding for the institution.
(2) Coordinating Board or Board – the Texas Higher Education Coordinating Board.
(3) Core Residency Questions – the questions promulgated by the Board and set forth in Revised Chart II, which is incorporated into this subchapter for all purposes, to be completed by a person and used by an institution to determine if the person is a Texas resident.
(4) Dependent – a person who:
(A) is less than 18 years of age and has not been emancipated by marriage or court order; or
(B) is eligible to be claimed as a dependent of a parent of the person for purposes of determining the parent’s income tax liability under the Internal Revenue Code of 1986.
(5) Domicile – a person’s principal, permanent residence to which the person intends to return after any temporary absence.
(6) Eligible for Permanent Resident Status – a person who has filed an I-485 application for permanent residency and has been issued a fee/filing receipt or notice of action.
(7) Established a domicile in Texas — a person has established a domicile in Texas if he or she has met the conditions shown in Section 21.730 (d) of this title (relating to Determination of Resident Status).
(8) Eligible Nonimmigrant – a person who has been issued a type of nonimmigrant visa by the USCIS that permits the person to establish a domicile in the United States.
(9) Gainful employment – activities intended to provide an income to a person or allow a person 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 purposes of establishing residency, as may a person whose primary support is public assistance.
(10) General Academic Teaching Institution — The University of Texas at Austin; The University of Texas at El Paso; The University of Texas of the Permian Basin; The University of Texas at Dallas; The University of Texas at San Antonio; Texas A&M University, Main University; The University of Texas at Arlington; Tarleton State University; Prairie View A&M University; Texas Maritime Academy (now Texas A&M University – Galveston); Texas Tech University; University of North Texas; Lamar University; Lamar State College — Orange; Lamar State College — Port Arthur; Texas A&M University — Kingsville; Texas A&M University — Corpus Christi; Texas Woman’s University; Texas Southern University; Midwestern State University; University of Houston; University of Texas — Pan American; The University of Texas at Brownsville; Texas A&M University — Commerce; San Houston State University; Texas State University — San Marcos; West Texas A&M University; Stephen F. Austin State University; Sul Ross State University; Angelo State University; and The University of Texas at Tyler, and as defined in Texas Education Code, Section 61.003(3).
(11) Institution or institution of higher education – any public technical institute, public junior college, public senior college or university, medical or dental unit, or other agency of higher education as defined in Texas Education Code, Section 61.003(8).

(12) Legal guardian – a person who is appointed guardian under the Texas Probate Code, Chapter 693, or a temporary or successor guardian.

(13) Maintain a residence – to physically reside in a location. The maintenance of a residence is not interrupted by a temporary absence from the state, as provided in Section 21.730 (e) of this title (relating to Determination of Resident Status).

(14) Managing conservator – a parent, a competent adult, an authorized agency, or a licensed child-placing agency appointed by court order issued under the Texas Family Code, Title 5.

(15) Nonresident tuition – the amount of tuition paid by a person who does not qualify as a Texas resident under this subchapter unless such person qualifies for a waiver program under Section 21.735 of this title, (relating to Waivers that Permit Nonresidents to Pay Resident Tuition).

(16) Parent – a natural or adoptive parent, managing or possessory conservator, or legal guardian of a person. The term does not include a step-parent.

(17) Possessory conservator – a natural or adoptive parent appointed by court order issued under the Texas Family Code, Title 5.

(18) Private high school – a private or parochial school accredited by an accrediting agency that is recognized and accepted by the Texas Private School Accreditation Commission. The term does not include a home school.

(19) Public technical institute or college – the Lamar Institute of Technology or any campus of the Texas State Technical College System.

(20) Regular semester – a fall or spring semester, typically consisting of 16 weeks.

(21) Residence – a person’s home or other dwelling place.

(22) Residence Determination Official – the primary individual at each institution who is responsible for the accurate application of state statutes and rules to individual student cases.

(23) Resident tuition – the amount of tuition paid by a person who qualifies as a Texas resident under this subchapter.

(24) Temporary absence – absence from the State of Texas with the intention to return, generally for a period of less than five years.

(25) United States Citizenship and Immigration Services (USCIS) – the bureau of the U.S. Department of Homeland Security that is responsible for the administration of immigration and naturalization adjudication functions and establishing immigration services policies and priorities.

21.729. Effective Date of this Subchapter.
Each institution shall apply these rules beginning with enrollments for the Fall Semester, 2006.

(a) The following persons shall be classified as Texas residents and entitled to pay resident tuition at all institutions of higher education:

(1) a person who:
(A) graduated from a public or accredited private high school in this state or, as an alternative to high school graduation, received the equivalent of a high school diploma in this state, and
(B) maintained a residence continuously in this state for:
   (i) the thirty-six months immediately preceding the date of graduation or receipt of the diploma equivalent, as applicable; and
   (ii) the 12 months preceding the census date of the academic semester in which the person enrolls in an institution.

(2) a person who:
(A) established a domicile in this state not less than 12 months before the census date of the academic semester in which the person enrolls in an institution; and
(B) maintained a residence continuously in the state for the 12 months immediately preceding the census date of the academic semester in which the person enrolls in an institution.

(3) a dependent whose parent:
(A) established a domicile in this state not less than 12 months before the census date of the academic semester in which the person enrolls in an institution; and
(B) maintained a residence continuously in the state for the 12 months immediately preceding the census date.
of the academic semester in which the person enrolls in an institution.

(b) The following non-U. S. citizens may establish a domicile in this state for the purposes of subsection (a)(2) or (3) of this section:

(1) a Permanent Resident;
(2) a person who is eligible for permanent resident status, as defined in Section 21.728(6) of this title (relating to Definitions);
(3) an eligible nonimmigrant that holds one of the types of visas listed in Chart I and incorporated into this subchapter for all purposes;
(4) a person classified by the USCIS as a Refugee, Asylee, Parolee, Conditional Permanent Resident, or Temporary Resident;
(5) a person holding Temporary Protected Status, and Spouses and Children with approved petitions under the Violence Against Women Act (VAWA), an applicant with an approved USCIS I-360, Special Agricultural Worker, and a person granted deferred action status by USCIS;
(6) a person who has filed an application for Cancellation of Removal and Adjustment of Status under Immigration Nationality Act 240A(b) or a Cancellation of Removal and Adjustment of Status under the Nicaraguan and Central American Relief Act (NACARA), Haitian Refugee Immigrant Fairness Act (HRIFA), or the Cuban Adjustment Act, and who has been issued a fee/filing receipt or Notice of Action by USCIS; and
(7) a person who has filed for adjustment of status to that of a person admitted as a Permanent Resident under 8 United States Code 1255, or under the “registry” program (8 United States Code 1259), or the Special Immigrant Juvenile Program (8 USC 1101(a)(27)(J)) and has been issued a fee/filing receipt or Notice of Action by USCIS.

(c) The domicile of a dependent’s parent is presumed to be the domicile of the dependent unless the dependent establishes eligibility for resident tuition under subsection (a)(1) of this section.

(d) A domicile in Texas is presumed if, at least 12 months prior to the census date of the semester in which he or she is to enroll, the person owns real property in Texas, owns a business in Texas, or is married to a person who has established a domicile in Texas. Gainful employment other than work-study and other such student employment can also be a basis for establishing a domicile.

(e) The temporary absence of a person or a dependent’s parent from the state for the purpose of service in the U.S. Armed Forces, Public Health Service, Department of Defense, U.S. Department of State, as a result of an employment assignment, or for educational purposes, shall not affect a person’s ability to continue to claim that he or she is a domiciliary of this state. The person or the dependent’s parent shall provide documentation of the reason for the temporary absence.

(f) The temporary presence of a person or a dependent’s parent in Texas for the purpose of service in the U.S. Armed Forces, Public Health Service, Department of Defense or service with the U.S. Department of State, or as a result of any other type of employment assignment does not preclude the person or parent from establishing a domicile in Texas.


(a) To initially establish resident status under Section 21.730 of this title, (relating to Determination of Resident Status), a person shall provide the institution with a completed set of Core Residency Questions as set forth in Revised Chart II, which is incorporated into this subchapter for all purposes.

(b) An institution may request that a person provide documentation to support the answers to the Core Residency Questions. A list of appropriate documents is included in Revised Chart IV, which is incorporated into this subchapter for all purposes. In addition, the institution may request documents that support the information the student may provide in Revised Chart II, Section H.

(c) If a person who establishes resident status under Section 21.730(a)(1) of this title is not a Citizen of the United States or a Permanent Resident, the person shall, in addition to the other requirements of this section, provide the institution with a signed affidavit, stating that the person will apply to become a Permanent Resident as soon as the person becomes eligible to apply. The affidavit shall be required only when the person applies for resident status and shall be in the form provided in Chart III and incorporated into this subchapter for all purposes.

(d) An institution shall not impose any requirements in addition to the requirements established in this section for a person to establish resident status.
(a) Except as provided under subsection (c) of this section, a person who was enrolled in an institution for any part of the 2006 state fiscal year and who was classified as a resident of this state under Subchapter B, Chapter 54, Texas Education Code, in the last academic period of that year for which the person was enrolled is considered to be a resident of this state for purposes of this subchapter, as of the beginning of the fall semester, 2006.
(b) Except as provided by subsection (c) of this section, a person who has established resident status under this subchapter is entitled to pay resident tuition in each subsequent academic semester in which the person enrolls at any institution.
(c) A person who enrolls in an institution after two or more consecutive regular semesters during which the person is not enrolled in a public institution shall submit the information required in Section 21.731 of this title, (relating to Information Required to Establish Resident Status), and satisfy all the applicable requirements to establish resident.

21.733. Reclassification Based on Additional or Changed Information.
(a) If a person is initially classified as a nonresident based on information provided through the set of Core Residency Questions, the person may request reclassification by providing the institution with supporting documentation as described in Revised Chart IV, which is incorporated into Section 21.731(b) of this title (relating to Information Required to Initially Establish Resident Status).
(b) A person shall provide the institution with any additional or changed information which may affect his or her resident or nonresident tuition classification under this subchapter.
(c) An institution may reclassify a person who had previously been classified as a resident or nonresident under this subchapter based on additional or changed information provided by the person.
(d) Any change made under this section shall apply to the first succeeding semester in which the person is enrolled, if the change is made on or after the census date of that semester. If the change is made prior to the census date, it will apply to the current semester.

21.734. Errors in Classification.
(a) If an institution erroneously permits a person to pay resident tuition and the person is not entitled or permitted to pay resident tuition under this subchapter, the institution shall charge nonresident tuition to the person beginning with the semester following the date that the institution discovers the error.
(b) Not later than the first day of the following semester, the institution may notify the person that he or she must pay the difference between resident and nonresident tuition for each previous semester in which the student should not have paid resident tuition, if:
(1) the person failed to provide to the institution, in a timely manner after the information becomes available or on request by the institution, any information that the person reasonably should know would be relevant to an accurate classification by the institution under this subchapter information; or
(2) the person provided false information to the institution that the person reasonably should know could lead to an erroneous classification by the institution under this subchapter.
(c) If the institution provides notice under subsection (b) of this section, the person shall pay the applicable amount to the institution not later than the 30th day after the date the person is notified of the person’s liability for the amount owed. After receiving the notice and until the amount is paid in full, the person is not entitled to receive from the institution a certificate or diploma, if not yet awarded on the date of the notice, or official transcript that is based at least partially on or includes credit for courses taken while the person was erroneously classified as a resident of this state.
(d) If an institution erroneously classified a person as a resident of this state under this subchapter and the person is entitled or permitted to pay resident tuition under this subchapter, that person is not liable for the difference between resident and nonresident tuition under this section.
(e) If an institution erroneously classifies a person as a nonresident and the person is a resident under this subchapter, the institution shall refund the difference in resident and nonresident tuition for each semester in which the student was erroneously classified and paid the nonresident tuition rate.

A person who is classified as a nonresident under the provisions of this section shall be permitted to pay resident tuition, if the person qualifies for one of the following waiver programs:
(1) **Economic Development and Diversification Program.**

(A) A nonresident person, (including a Citizen, a Permanent Resident of the U.S., a person who is eligible to be a Permanent Resident of the U.S., and an eligible nonimmigrant) whose family has been transferred to Texas by a company under the state’s Economic Development and Diversification Program, and a person’s spouse and children shall pay resident tuition as soon as they move to Texas, if the person provides the institution with a letter of intent to establish Texas as his/her home. A person who moves to Texas to attend an institution before his/her family is transferred is permitted to pay the resident tuition beginning with the first semester or term after the family moves to the state.

(B) After the family has maintained a residence in Texas for 12 months, the person may request a change in classification in order to pay resident tuition.

(C) A current list of eligible companies is maintained on the Coordinating Board website at [www.collegefortexans.com](http://www.collegefortexans.com).

(2) **Program for Teachers, Professors, their Spouses and Dependents.**

(A) A nonresident person (including a Citizen, Permanent Resident of the U.S., a person who is eligible to be a Permanent Resident of the U.S., and an eligible nonimmigrant) employed as a teacher or professor at least half time on a regular monthly salary basis (not as hourly employee) by an institution shall pay resident tuition at any institution in the state and the spouse and dependent children of the nonresident person shall also pay resident tuition.

(B) This waiver program is applicable only during the person’s periods of employment.

(C) If a spouse or dependent child of the teacher or professor attends an institution other than the employing institution, the employing institution shall provide a letter to the spouse or child’s institution verifying the employment of the teacher or professor.

(3) **Program for Teaching Assistants and Research Assistants, their Spouses and Dependents.**

(A) A nonresident person (including a Citizen, Permanent Resident of the U.S., a person who is eligible to be a Permanent Resident of the U.S., and an eligible nonimmigrant) employed by an institution as a teaching or research assistant on at least a half-time basis in a position related to his/her degree program shall pay resident tuition at any institution in this state and the spouse and dependent children of the nonresident person shall also pay resident tuition.

(B) The employing institution shall determine whether or not the person’s employment relates to the degree program.

(C) If a spouse or dependent child of the teacher or professor attends an institution other than the employing institution, the employing institution shall provide a letter to the spouse or child’s institution verifying the employment of the teaching or research assistant.

(D) This waiver program is applicable only during the person’s periods of employment.

(4) **Program for Competitive Scholarship Recipients.**

(A) A nonresident person (including a Citizen, Permanent Resident of the U.S., a person who is eligible to be a Permanent Resident of the U.S., and an eligible nonimmigrant) who receives a competitive scholarship from the institution is entitled to pay resident tuition.

(B) In order for the person to be eligible for this waiver program, the competitive scholarship must:

(i) total at least $1,000 for the period of time covered by the scholarship, not to exceed 12 months; and

(ii) be awarded by a scholarship committee authorized in writing by the institution’s administration to grant scholarships that permit this waiver of nonresident tuition; and

(iii) be awarded according to criteria published in the institution’s paper or electronic catalog, available to the public in advance of any application deadline; and

(iv) be awarded under circumstances that cause both the funds and the selection process to be under the control of the institution; and

(v) permit awards to both resident and nonresident persons.

(C) The scholarship award shall specify the semester or semesters for which the scholarship is awarded and a waiver of nonresident tuition under this provision shall not exceed the semester or semesters for which the scholarship is awarded.

(D) If the scholarship is terminated for any reason prior to the end of the semester or semesters for which the scholarship was initially awarded, the person shall pay nonresident tuition for any semester following the termination of the scholarship.

(E) The total number of persons receiving a waiver of nonresident tuition in any given semester under this provision shall not exceed 5 percent of the students enrolled in the same semester in the prior year in that institution.

(F) If the scholarship recipient is concurrently enrolled at more than one institution, the waiver of nonresident tuition is only effective at the institution awarding the scholarship. An exception for this rule exists for a nonresident person...
who is simultaneously enrolled in two or more institutions of higher education under a program offered jointly by
the institutions under a partnership agreement. If one of the partnership institutions awards a competitive
scholarship to a person, the person is entitled to a waiver of nonresident tuition at the second institution.
(G) If a nonresident person is awarded a competitive academic scholarship or stipend under this provision and the
person is accepted in a clinical biomedical research training program designed to lead to both a doctor of medicine
and doctor of philosophy degree, he or she is eligible to pay the resident tuition rate.

(5) Programs for Lowered Tuition for Individuals from Bordering States or Mexico.

(A) Programs that Require Reciprocity. Waivers of nonresident tuition made through each of the following three
programs for persons from states neighboring Texas must be based on reciprocity and the institution shall not grant
these waivers unless the institution has been provided with a current written agreement with a similar institution
in the other state, agreeing to lower tuition for Texas students attending that institution. A participating Texas
institution shall file a copy of such agreements with the Board and the agreements shall not be more than 2 years
old. The amount of tuition charged shall not be less than the Texas resident tuition rate.

(i) Persons residing in New Mexico, Oklahoma, Arkansas or Louisiana may pay a lowered nonresident tuition when
they attend Texas A&M-Texarkana, Lamar State College-Port Arthur, Lamar State College-Orange or any public
community or technical college located in a county adjacent to their home state.

(ii) Persons residing in New Mexico and Oklahoma may pay a lowered nonresident tuition when they attend a public
technical college located within 100 miles of the border of their home state.

(iii) Persons residing in counties or parishes of New Mexico, Oklahoma, Arkansas or Louisiana adjacent to Texas
may pay a lowered nonresident tuition at any institution.

(iv) If a person or a dependent child’s family moves to Texas from a bordering state after the person or dependent
child has received a waiver of nonresident tuition based on reciprocity as described in this section, the person is
eligible for a continued waiver of nonresident tuition for the 12-month period after the relocation to Texas.

(B) Programs That Do Not Require Reciprocity. Persons who reside in another state may pay a lowered nonresident
tuition not less than $30 per semester credit hour above the current resident tuition rate when they attend a general
academic teaching institution located within 100 miles of the Texas border if:

(i) the governing board of the institution approves the tuition rate as in the best interest of the institution and finds
that such a rate will not cause unreasonable harm to any other institution; and

(ii) the Commissioner approves the tuition rate by finding that the institution has a surplus of total educational and
general space as calculated by the Board’s most current space projection model. This obligation to obtain the
approval of the Commissioner is continuing and approval to participate in this waiver program must be obtained at
least every two years.

(C) Programs for Residents of Mexico. Subject to the following provisions, persons who are currently residents of
Mexico and those persons who are temporarily residing outside of Mexico but with definite plans to return to Mexico
shall pay resident tuition.

(i) An unlimited number of residents of Mexico who have demonstrated financial need and attend a general
academic teaching institution or a component of the Texas State Technical College System, if the institution or
component is located in a county adjacent to Mexico, Texas A&M University–Corpus Christi, Texas A&M
University–Kingsville, the University of Texas at San Antonio, or Texas Southmost College shall pay resident
tuition.

(ii) A limited number of residents of Mexico who have financial need may attend a general academic teaching
institution or campus of the Texas State Technical College System located in counties not adjacent to Mexico and
pay resident tuition. This waiver program is limited to the greater of two students per 1000 enrollment, or 10 students
per institution.

(iii) An unlimited number of residents of Mexico who have demonstrated financial need and register in courses that
are part of a graduate degree program in public health conducted by an institution in a county immediately adjacent
to Mexico shall pay resident tuition.

(6) Program for the beneficiaries of the Texas Tomorrow Fund. A person who is a beneficiary of the Texas
Tomorrow Fund shall pay resident tuition and required fees for semester hours paid under the prepaid tuition
contract. If the person is not a Texas resident, all tuition and fees not paid under the contract shall be paid at the
nonresident rate.

(7) Program for Inmates of the Texas Department of Criminal Justice. All inmates of the Texas Department
of Criminal Justice shall pay resident tuition.

(8) Program for Foreign Service Officers. A Foreign Service officer employed by the U.S. Department of State
and enrolled in an institution shall pay resident tuition if the person is assigned to an office of the U.S. Department
of State that is located in Mexico.
(9) **Program for Registered Nurses in Postgraduate Nursing Degree Programs.** An institution may permit a registered nurse authorized to practice professional nursing in Texas to pay resident tuition and fees without regard to the length of time that the registered nurse has resided in Texas, if the nurse:
(A) is enrolled in a program designed to lead to a master's degree or other higher degree in nursing; and
(B) intends to teach in a program in Texas designed to prepare students for licensure as registered nurses.

(10) **Programs for Military and Their Families.** Members of the U.S. Armed Forces, Army National Guard, Air National Guard, Army, Air Force, Navy, Marine Corps or Coast Guard Reserves and Commissioned Officers of the Public Health Service, and their Spouses or Dependent Children.

(A) **Assigned to Duty in Texas.** Nonresident members of the U.S. Armed Forces, members of Texas units of the Army or Air National Guard, Army, Air Force, Navy, Marine Corps or Coast Guard Reserves and Commissioned Officers of the Public Health Service who are assigned to duty in Texas, and their spouses, or dependent children, shall pay resident tuition. To qualify, the person shall submit during his or her first semester of enrollment in which he or she will be using the waiver program, a statement from an appropriately authorized officer in the service, certifying that he or she (or a parent) will be assigned to duty in Texas on the census date of the term he or she plans to enroll and that he or she, if a member of the National Guard or Reserves, is not in Texas only to attend training with Texas units. Such persons shall pay resident tuition so long as they reside continuously in Texas or remain continuously enrolled in the same degree or certificate program. For purposes of this subsection, a person is not required to enroll in a summer semester to remain continuously enrolled.

(B) **After Assignment to Duty in Texas.** A spouse and/or dependent child of a nonresident member of the U.S. Armed Forces, or of a Commissioned Officer of the Public Health Service who has been reassigned elsewhere after having been assigned to duty in Texas shall pay resident tuition so long as the spouse or child resides continuously in Texas. For purposes of this subsection, a person is not required to enroll in a summer semester to remain continuously enrolled.

(C) **Out-of-State Military.** A spouse and/or dependent child of a member of the U.S. Armed Forces, or of a Commissioned Officer of the Public Health Service who is stationed outside of Texas shall pay resident tuition if the spouse and/or child moves to this state and files a statement of intent to establish residence in Texas with the institution that he or she attends.

(D) **Survivors.** A spouse and/or dependent child of a member of the U.S. Armed Forces, or of a Commissioned Officer of the Public Health Service who died while in service, shall pay resident tuition if the spouse and/or child moves to Texas within 60 days of the date of death. To qualify, a person shall submit satisfactory evidence to the institution that establishes the date of death of the member and that the spouse and/or dependent child has established a domicile in Texas.

(E) **Spouse and Dependents who Previously Lived in Texas.** A spouse and/or dependent child of a member of the U.S. Armed Forces, or of a Commissioned Officer of the Public Health Service who previously resided in Texas for at least six months shall pay resident tuition, if the member or commissioned officer, at least 12 months prior to the census date of the spouse’s or dependent child’s enrollment in an institution:
(i) filed proper documentation with the military or Public Health Service to change his/her permanent residence to Texas and designated Texas as his/her place of legal residence for income tax purposes; and
(ii) registered to vote in Texas, and
(iii) has satisfied a least one of the following requirements for the 12 months prior to the first day of the relevant semester:
(I) ownership of real estate in Texas with no delinquent property taxes;
(II) registration of an automobile in Texas, or
(III) execution of a currently-valid will deposited with a county clerk in Texas that indicates he/she is a resident of Texas.

(F) **Honorably Discharged Veterans.** A former member of the U.S. Armed Forces or Commissioned Officer of the Public Health Service and his/her spouse and/or dependent child shall pay resident tuition for any semester beginning prior to the first anniversary of separation from the military or health service, if the former member:
(i) had, at least one year preceding the census date of the term or semester, executed a document with U.S. Armed Forces or Public Health Service that is in effect on the census date of the term or semester and that changed his/her permanent residence to Texas and designated Texas as his/her place of legal residence for income tax purposes; and
(ii) had registered to vote in Texas for at least 12 months prior to the census date of the term or semester, and
(iii) provides documentation that the member has, not less than 12 months prior to the census date of the term in which he or she plans to enroll, taken 1 of the 3 following actions:
(I) purchased real estate in Texas with no delinquent property taxes;
(II) registered an automobile in Texas, or
(III) executed a currently-valid will that has been deposited with a county clerk in Texas that indicates he/she is a resident of Texas.

(G) NATO Forces. Non-immigrant aliens stationed in Texas under the agreement between the parties to the North Atlantic Treaty regarding status of forces, their spouses and dependent children, shall pay resident tuition.

(H) Radiological Science Students at Midwestern State University. Members of the U.S. Armed Forces stationed outside the State of Texas who are enrolled in a bachelor of science or master of science degree program in radiological sciences at Midwestern State University by instructional telecommunication shall pay resident tuition and other fees or charges provided for Texas residents, if they began the program of study while stationed at a military base in Texas.

(11) Program for the Center for Technology Development and Transfer. Under agreements authorized by Texas Education Code, Section 65.45, a person employed by the entity with whom the University of Texas System enters into such an agreement, or the person’s spouse or child, may pay resident tuition when enrolled in a University of Texas System institution.

(a) Each institution shall designate an individual that is employed by the institution as a Residence Determination Official.
(b) The Residence Determination Official shall:
1) be knowledgeable of the requirements set out in these rules and the applicable statutes; and
2) attend at least one training or workshop provided by the Coordinating Board regarding these rules and the applicable statutes in each state fiscal year.

Chart I. Eligible Nonimmigrants – Persons with Visas that Allow them to Domicile in the United States

<table>
<thead>
<tr>
<th>Visa Type</th>
<th>Nonimmigrant (Temporary) Visa Categories</th>
<th>Eligible to Domicile in the United States?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-1</td>
<td>Ambassadors, public ministers or career diplomats and their immediate family members</td>
<td>Yes</td>
</tr>
<tr>
<td>A-2</td>
<td>Other accredited officials or employees of foreign governments and their immediate family members</td>
<td>Yes</td>
</tr>
<tr>
<td>A-3</td>
<td>Personal attendants, servants or employees and their immediate family members of A-1 and A-2 visa holders</td>
<td>Yes</td>
</tr>
<tr>
<td>B-1</td>
<td>Temporary visitor for business</td>
<td>No</td>
</tr>
<tr>
<td>B-2</td>
<td>Temporary visitor for pleasure</td>
<td>No</td>
</tr>
<tr>
<td>C-1</td>
<td>Foreign travelers in transit through the United States</td>
<td>No</td>
</tr>
<tr>
<td>C-1D</td>
<td>Combined transit and crewmen visa</td>
<td>No</td>
</tr>
<tr>
<td>C-2</td>
<td>Person in transit to UN Headquarters under §11 (3), (4), or (5) of the Headquarter Agreement.</td>
<td>No</td>
</tr>
<tr>
<td>C-3</td>
<td>Foreign government official, members of immediate family, attendant or personal employee in transit</td>
<td>No</td>
</tr>
<tr>
<td>C-4</td>
<td>Transit without Visa. See TWOV</td>
<td>No</td>
</tr>
<tr>
<td>D-1</td>
<td>Crewmember departing on same vessel of arrival</td>
<td>No</td>
</tr>
<tr>
<td>D-2</td>
<td>Crewmember departing by means other than vessel of arrival</td>
<td>No</td>
</tr>
<tr>
<td>E-1</td>
<td>Treaty traders, spouse and children</td>
<td>Yes</td>
</tr>
<tr>
<td>E-2</td>
<td>Treaty investors, spouse and children</td>
<td>Yes</td>
</tr>
<tr>
<td>F-1</td>
<td>Academic student</td>
<td>No</td>
</tr>
<tr>
<td>F-2</td>
<td>Spouse or child of F-1</td>
<td>No</td>
</tr>
<tr>
<td>F-3</td>
<td>Academic students who are Canadian or Mexican citizens, who commute across the border to study full-time or part-time in the United States.</td>
<td>No**</td>
</tr>
<tr>
<td>G-1</td>
<td>Principal resident representative of recognized foreign member government to international organization, and members of immediate family.</td>
<td>Yes</td>
</tr>
<tr>
<td>G-2</td>
<td>Other accredited representatives of recognized foreign member governments to international organization and their immediate family members</td>
<td>Yes</td>
</tr>
<tr>
<td>G-3</td>
<td>Representatives of non-recognized or nonmember government to international organization, and members of immediate family</td>
<td>Yes</td>
</tr>
<tr>
<td>Visa Type</td>
<td>Description</td>
<td>Eligibility</td>
</tr>
<tr>
<td>-----------</td>
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</tr>
<tr>
<td>G-4</td>
<td>International organization officer or employee, and their immediate family members</td>
<td>Yes</td>
</tr>
<tr>
<td>G-5</td>
<td>Attendants, servants and personal employees of G-1, G-2, G-3 or G-4 visa holders and their immediate family members</td>
<td>Yes</td>
</tr>
<tr>
<td>H-1B</td>
<td>Specialty Occupations, DOD workers, fashion models</td>
<td>Yes</td>
</tr>
<tr>
<td>H-1C</td>
<td>Nurses going to work for up to three years in health professional shortage areas</td>
<td>No</td>
</tr>
<tr>
<td>H-2A</td>
<td>Temporary agricultural workers</td>
<td>No</td>
</tr>
<tr>
<td>H-2B</td>
<td>Temporary workers, skilled and unskilled</td>
<td>No</td>
</tr>
<tr>
<td>H-3</td>
<td>Trainee</td>
<td>No</td>
</tr>
<tr>
<td>H-4</td>
<td>Spouse or child of H-1, H-2 or H-3 visa holders</td>
<td>Yes</td>
</tr>
<tr>
<td>H-4</td>
<td>Dependents of H-1B Yes; all other H-4 dependents, no</td>
<td>Yes</td>
</tr>
<tr>
<td>I</td>
<td>Visas for foreign media representatives</td>
<td>Yes</td>
</tr>
<tr>
<td>J-1</td>
<td>Visas for exchange visitors</td>
<td>No</td>
</tr>
<tr>
<td>J-2</td>
<td>Spouse or child of J-1 visa holders</td>
<td>No</td>
</tr>
<tr>
<td>K-1</td>
<td>Fiancé(e)</td>
<td>Yes</td>
</tr>
<tr>
<td>K-2</td>
<td>Minor child of K-1</td>
<td>Yes</td>
</tr>
<tr>
<td>K-3</td>
<td>Spouse of a U.S. citizen (LIFE Act)</td>
<td>Yes</td>
</tr>
<tr>
<td>K-4</td>
<td>Child of a K-3 (LIFE Act)</td>
<td>Yes</td>
</tr>
<tr>
<td>L-1A</td>
<td>Executive, managerial</td>
<td>Yes</td>
</tr>
<tr>
<td>L-1B</td>
<td>Specialized knowledge</td>
<td>Yes</td>
</tr>
<tr>
<td>L-2</td>
<td>Spouse or child of L-1</td>
<td>Yes</td>
</tr>
<tr>
<td>M-1</td>
<td>Vocational or other nonacademic students, other than language students</td>
<td>No</td>
</tr>
<tr>
<td>M-2</td>
<td>Immediate families of M-1 visa holders</td>
<td>No</td>
</tr>
<tr>
<td>M-3</td>
<td>Vocational students who are Canadian or Mexican citizens, who commute across the border to study full-time or part-time in the U.S.</td>
<td>No**</td>
</tr>
<tr>
<td>N-8</td>
<td>Parent of alien classified as SK-3 “Special Immigrant”</td>
<td>Yes</td>
</tr>
<tr>
<td>N-9</td>
<td>Child of N-8, SK-1, SK-2, or SK-4 “Special Immigrant”</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 1</td>
<td>Principal Permanent Representative of Member State to NATO and resident members of official staff or immediate family</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 2</td>
<td>Other representatives of Member State: Dependents of Member of a Force entering in accordance with the provisions of NATO Status-of-Forces agreement; Members of such a Force if issued visas</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 3</td>
<td>Official clerical staff accompanying Representative of Member State to NATO or immediate member</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 4</td>
<td>Official of NATO other than those qualified as NATO-1 and immediate family</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 5</td>
<td>Expert other than NATO officials qualified under NATO-4, employed on behalf of NATO and immediate family</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 6</td>
<td>Members of civilian component who is either accompanying a Force entering in accordance with the provisions of the NATO Status-of-Forces agreement; attached to an Allied headquarters under the protocol on the Status of International Military headquarters set up pursuant to the North Atlantic Treaty; and their dependents</td>
<td>Yes</td>
</tr>
<tr>
<td>NATO 7</td>
<td>Attendants, servants or personal employees of NATO-1, NATO-2, NATO-3, NATO-4, NATO-5 or NATO-6, or immediate</td>
<td>Yes</td>
</tr>
<tr>
<td>O-1</td>
<td>Extraordinary ability in the sciences, arts, education, business, athletics</td>
<td>Yes</td>
</tr>
<tr>
<td>O-2</td>
<td>Essential support staff of 0-1 visa holders</td>
<td>No</td>
</tr>
<tr>
<td>O-3</td>
<td>Immediate family members of 0-1 and O-2 visa holders</td>
<td>Yes</td>
</tr>
<tr>
<td>P-1</td>
<td>Individual or team athletes</td>
<td>No</td>
</tr>
<tr>
<td>P-2</td>
<td>Artists and entertainers in reciprocal exchange programs</td>
<td>No</td>
</tr>
<tr>
<td>P-3</td>
<td>Artists and entertainers in culturally unique programs</td>
<td>No</td>
</tr>
<tr>
<td>P-4</td>
<td>Spouse or child of P-1, P-2 and P-3</td>
<td>No</td>
</tr>
<tr>
<td>Q-1</td>
<td>International cultural-exchange visitors</td>
<td>No</td>
</tr>
<tr>
<td>Q-2</td>
<td>Irish Peace Process Cultural and Training Program (Walsh Visas)</td>
<td>No</td>
</tr>
<tr>
<td>Q-3</td>
<td>Spouse or child of Q-2</td>
<td>No</td>
</tr>
<tr>
<td>R-1</td>
<td>Religious workers</td>
<td>Yes</td>
</tr>
<tr>
<td>R-2</td>
<td>Spouse or child of R-1</td>
<td>Yes</td>
</tr>
<tr>
<td>S-5</td>
<td>Informant of criminal organization information</td>
<td>No</td>
</tr>
<tr>
<td>S-6</td>
<td>Informant of terrorism information</td>
<td>No</td>
</tr>
</tbody>
</table>
T-1 Victim of a severe form of trafficking in persons  Yes
T-2 Spouse of a T-1  Yes
T-3 Child of a T-1  Yes
T-4 Parent of a T-1 visa holder (if the child is under 21 years of age)  Yes
TC No longer issued. TN issued in its place.  No
TD Spouse or child accompanying TN
TN Trade visas for Canadians and Mexicans in NAFTA  No
TPS Temporary Protected Status  Yes
TWOV Passenger or Crew  No
U-1 Victim of certain criminal activity  Yes
U-2 Spouse of a U-1  Yes
U-3 Child of a U-1  Yes
U-4 Parent of a U-1 visa holder (if the child is under 21 years of age)  Yes
V-1 Spouse of Legal Permanent Resident (LPR) who is the principal beneficiary of a family-based petition (I-130) which was filed prior to December 21, 2000, and has been pending for at least three years  Yes
V-2 Child of Legal Permanent Resident (LPR) who is the principal beneficiary of a family-based petition (I-130) which was filed prior to December 21, 2000, and has been pending for at least three years  Yes
V-3 Derivative child of a V-1 or V-2 visa holder  Yes

** Please note: these international, commuting students may be eligible for a waiver of nonresident tuition under Texas Education Code §54.060(b).

Revised Chart II

Core Residency Questions

Texas Higher Education Coordinating Board rule 21.731 requires each student applying to enroll at an institution to respond to a set of core residency questions for the purpose of determining the student’s eligibility for classification as a resident.

PART A. Student Basic Information. All Students must complete this section.
Name: Student ID Number:
Date of Birth:

PART B. Previous Enrollment. For all students.
1. During the 12 months prior to the term for which you are applying, did you attend a public college or university in Texas in a fall or spring term?
Yes No ___
If you answered "no", please continue to Part C.
If you answered "yes", complete questions 2-5:
2. What Texas public institution did you last attend? (Give full name, not just initials.)
_________________________________________________
3. In which terms were you last enrolled? (Give full name, not just initials.)
___ fall, 200__ ___ spring, 200__
4. During your last semester at a Texas public institution, did you pay resident (in-state) or nonresident (out-of-state)?
___ resident (in-state) ___ nonresident (out-of-state) ___ unknown
5. If you paid in-state tuition at your last institution, was it because you were classified as a resident or because you were a nonresident who received a waiver?
___ resident ___ nonresident with a waiver ___ unknown

IMPORTANT: If you were enrolled at a Texas public institution during a fall or spring semester within the previous 12 months and were classified as a Texas resident, skip to Part I, sign and date this form and submit it to your institution. If you were not enrolled, or if you were enrolled but classified as a nonresident, proceed to Part C.

PART C. Residency Claim.
Are you a resident of Texas? Yes No ___
If you answered yes, continue to Part D.
If you answered no, complete the following question and continue to Part I.
Of what state or country are you a resident? _______________
If you are uncertain, continue to Part D.

PART D. Acquisition of High School Diploma or GED.
Yes No
1. a. Did you graduate from high school or complete a GED in TX?
1. b. If you graduated from high school, what was the name and city of the school?
2. Did you live in TX the 36 months leading up to high school graduation or completion of the GED?
3. When you begin the semester for which you are applying, will you have lived in TX for the previous 12 months?
4. Are you a U.S. Citizen or Permanent Resident?

Instructions to Part D:
" If you answered “no” to question 1a or 2 or 3, continue to Part E.
" If you answered “yes” to all four questions, skip to Part I.
" If you answered “yes” to questions 1, 2 and 3, but “no” to question 4, complete a copy of the Affidavit in Chart III, provided as an Attachment to this form, skip to Part I of this form, and submit both this form and the affidavit to your institution.

PART E. Basis of Claim to Residency. TO BE COMPLETED BY EVERYONE WHO DID NOT ANSWER “YES” TO QUESTIONS 1a, 2, AND 3 OF PART D.

1. Do you file your own federal income tax as an independent tax payer? Yes___ No ___
2. Are you claimed as a dependent or are you eligible to be claimed as a dependent by a parent or court-appointed legal guardian? Yes___ No ___
   (To be eligible to be claimed as a dependent, your parent or legal guardian must provide at least one half of your support. A step-parent does not qualify as a parent if he/she has not adopted the student.)
3. If you answered “No” to both questions above, who provides the majority of your support?
   Self___ parent or guardian___ other: (list)______________________

Instructions to Part E.
" If you answered “yes” to question 1, continue to Part F.
" If you answered “yes” to question 2, skip to Part G.
" If you answered “no” to 1 and 2 and “self” to question 3, continue to Part F.
" If you answered “no” to 1 and 2 and “parent or guardian” to question 3, skip to Part G.
" If you answered “no” to 1 and 2 and “other” to question 3, skip to Part H and provide an explanation, and complete Part I.

PART F. Questions for students who answered “Yes” to Question 1 or “Self” to Question 3 of PART E.

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years</td>
<td>Mo.</td>
</tr>
</tbody>
</table>

1. Are you a U.S. Citizen?
2. Are you a Permanent Resident of the U.S.?
3. Are you a foreign national whose application for Permanent Resident Status has been preliminarily reviewed? (You should have received a fee/filing receipt or Notice of Action (I-797) from USCIS showing your I-485 has been reviewed and has not been rejected).
4. Are you a foreign national here with a visa or are you a Refugee, Asylee, Parolee or here under Temporary Protective Status? If so, indicate which.
5. Do you currently live in Texas? If you are out of state due to a temporary assignment by your employer or other temporary purpose, please explain in Part H. Yes No
6. a. If you currently live in Texas, how long have you been living here? b. What is your main purpose for being in the state? If for reasons other than those listed, give an explanation in Section H.

<table>
<thead>
<tr>
<th>Months</th>
<th>Years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Go to College[ ]</td>
<td>Establish/maintain a home[ ]</td>
</tr>
</tbody>
</table>

7. If you are a member of the U.S. military, is Texas your Home of Record? What state is listed as your military legal residence for tax purposes on your Leave and Earnings Statement? Yes No

<table>
<thead>
<tr>
<th>State</th>
</tr>
</thead>
</table>

8. Do any of the following apply to you? (Check all that apply)
   a. Hold the title to real property (home, land) in Texas? If yes, date acquired: ________________________
   b. Own a business in Texas? If yes, date acquired: ________________________
   c. Hold a state or local license to conduct a business or practice a profession in TX? If
9. For the past 12 months, have you: (Check all that apply) a. been gainfully employed in TX? b. received services from a social service agency that provides services to homeless persons?

10. Are you married to a person who could answer "yes" to any part of question 8 or 9? a. If yes, indicate which question could be answered yes by your spouse: b. How long have you been married to the Texas resident?

PART G. Questions for students who answered “Parent” or “Legal Guardian” to Question 3 of PART E.

1. Is the parent or legal guardian upon whom you base your claim of residency a U.S. citizen?

2. Is the parent or legal guardian upon whom you base your claim of residency a Permanent Resident?

3. Is this parent or legal guardian a foreign national whose application for Permanent Resident Status has been preliminarily reviewed? (He or she should have received a fee/filing receipt or Notice of Action (I-797) from the USCIS showing his or her I-485 has been reviewed and has not been rejected)

4. Is this parent or legal guardian a foreign national here with a visa or a Refugee, Asylee, Parolee or here under Temporary Protective Status? If so, indicate which.

5. Does this parent or legal guardian currently live in Texas? If he or she is out of state due to a temporary assignment by his/her employer or other temporary purpose, please explain in Part H.

6. a. If he or she is currently living in Texas, how long has he or she been living here? b. What is your parent’s or legal guardian’s main purpose for being in the state? If for reasons other than those listed, give an explanation in Section H.

Months Years Go to College[ ] Establish/maintain a home[ ] Work Assignment[ ]

7. If he or she is a member of the U.S. military, is Texas his or her Home of Record? What state is listed as his or her military legal residence for tax purposes on his or her Leave and Earnings Statement?

State Yes No

8. Do any of the following apply to your parent or guardian? (Check all that apply) a. Hold the title to real property (home, land) in Texas? If yes, date acquired: ________________________ b. Own a business in Texas? If yes, date acquired: ________________________ c. Hold a state or local license to conduct a business or practice a profession in TX? If yes, date acquired: ________________________

9. For the past 12 months, has your parent or guardian: (Check all that apply) a. been gainfully employed in TX? b. received services from a social service agency that provides services to homeless persons? c. If yes, indicate which question could be answered yes by your parent or guardian’s spouse: b. How long have your parent or guardian been married to the Texas resident?

Question:
Months Years

Part H. General Comments. Is there any additional information that you believe your college should know in evaluating your eligibility to be classified as a resident? If so, please provide it below:

PART I. Certification of Residency. All students must complete this section.

I understand that officials of my college/university will use the information submitted on this form to determine my status for residency eligibility. I authorize the college/university to verify the information I have provided. I agree to notify the proper officials of the institution of any changes in the information provided. I certify that the information on this application is complete and correct and I understand that the submission of false information is grounds for rejection of my application, withdrawal of any offer of acceptance, cancellation of enrollment and/or appropriate disciplinary action.

Signature: __________ Date: ________________
Chart III
AFFIDAVIT
STATE OF TEXAS

COUNTY OF ________________

Before me, the undersigned Notary Public, on this day personally appeared ____________________________________________, known to me, who being by me duly sworn upon his/her oath, deposed and said:

1. My name is ________________________________________________________. I am ___ years of age and have personal knowledge of the facts stated herein and they are all true and correct.

2. I graduated or will graduate from a Texas high school or received my GED certificate in Texas.

3. I resided in Texas for three years leading up to graduation from high school or receiving my GED certificate.

4. I have resided or will have resided in Texas for the 12 months prior the census date of the semester in which I will enroll in ___________________________________ (college/university).

5. I have filed or will file an application to become a permanent resident at the earliest opportunity that I am eligible to do so.

In witness whereof, this ____________ day of _______________________, __________.

___________________________________
(Signature)

___________________________________
(Printed Name)

___________________________________
(Student I.D.#)

SUBSCRIBED TO AND SWORN TO BEFORE ME, on the ___________________ day of _________________________, ____________, to certify which witness my hand and official seal.

__________________________________
Notary Public in and for the State of Texas

Revised Chart IV
Documentation to Support Domicile and Residency

The following documentation may be requested by the institution in order to resolve issues raised by responses to the Core Residency Questions. The listed documents may be used to establish that the person is domiciled in Texas and has maintained a residence in Texas continuously for 12 months prior to the census date.

Part ADocumentation that can Support the Establishment of a Domicile and Demonstrate the Maintenance of a Residence in Texas for the 12 Months Prior to the Census Date of the Term in Which the Person Enrolls

1. An employer’s statement of dates of employment (beginning and current or ending dates) that encompass at least 12 months. Other documents that show the person has been engaged in activities intended to provide an income to a person or allow a person to avoid the expense of paying another person to perform the tasks (as in child care or the maintenance of a home) may also be used, as well as documents that show the person is self-employed, employed as a homemaker, or is living off his/her earnings, or through public assistance. Student employment, such as work-study, the receipt of stipends, fellowships or research or teaching assistanceships do not qualify as a basis for establishing a domicile.

2. For a homeless person, written statements from the office of one or more social service agencies located in Texas that attests to the provision of services to the homeless person for the 12 months prior to the census date of the term in which the person enrolls.

Part BDocumentation, which (if accomplished and maintained for the 12 months prior to the census date of the term in which the person enrolls and if accompanied by at least ONE type of document listed in Part C), can Support the Establishment of a Domicile and Demonstrate the Maintenance of a Residence in Texas for 12 Months

1. Title to real property in Texas
2. Marriage Certificate with documentation to support that spouse is a domiciliary of Texas
3. Ownership of business in Texas with documents that evidence the organization or the business as a partnership or corporation and reflect the ownership interest of the person or dependent’s parent
4. State or local licenses to conduct a business or practice a profession in this state.
Part C
Documents that May be Used to Demonstrate Maintenance of a Residence for 12 Months

These documents do not show the establishment of a domicile. They only support a person’s claim to have resided in the state for at least 12 months. Activities in Part A and B of this Chart may be used to establish a domicile.

1. Utility bills for the 12 months preceding the census date;
2. A Texas high school transcript for full senior year preceding the census date;
3. A transcript from a Texas institution showing presence in the state for the 12 months preceding the census date;
4. A Texas driver’s license or Texas ID card with an expiration date of not more than four years;
5. Cancelled checks that reflect a Texas residence for the 12 months preceding the census date;
6. A current credit report that documents the length and place of residence of the person or the dependent’s parent.
7. Texas voter registration card that has not expired.
8. Pay stubs for the 12 months preceding the census date;
9. Bank statements reflecting a Texas address for the 12 months preceding the census date;
10. Ownership of real property with copies of utility bills for the 12 months preceding the census date.
11. Registration or verification from licensor, showing Texas address for licensee;
12. Written statements from the office of one or more social service agencies, attesting to the provision of services for at least the 12 months preceding the census date.
13. Lease or rental of real property, other than campus housing, in the name of the person or the dependent’s parent for the 12 months preceding the census date.
Appendix IV

Travel and Risk-Related Activities

Release Forms

The University’s Release and Indemnification Agreement and Medical Information Release forms must be completed and signed by each student or member of the public prior to participating in University-sponsored travel or a risk-related activity (see Exhibits B4 through B4-E). There are separate forms for adults and minors and for foreign travel. In the case of a minor, the parent or guardian must sign the forms. A minor is any person who has not yet attained the age of eighteen (18). A student is any person presently enrolled in The University of Texas at Dallas.

A designated contact person in the academic or student affairs unit that is sponsoring the travel or activity must maintain the completed forms for a period of two years. When travel is involved, a Student Travel/Off-Campus Activity Checklist form (Exhibit B14- A), indicating that the required Release and Indemnification Agreements have been completed, should be attached to the unit’s copy of Student/Team/Group Travel Authorization (Exhibit B14) and must be provided to the Office of Procurement Management. (NOTE: If the travel is to a foreign country, Exhibit B14 must be approved by the President.)

In those cases where participants in the travel/activity have multiple events and the persons participating do not change, each participant may complete the Medical Information and Release form once at the beginning of a semester. Participants must update information on the form, as necessary, prior to each trip/activity.

Applicability

These policies and procedures apply to all University sponsored travel and other activities associated with high risks that involve one or more students and members of the public. In general, the applicable travel/activities may be categorized as follows:

- Activities associated with organized courses or officially recognized independent study, either for credit (e.g., field trip courses) or non-credit.
- Activities associated with individual work or research off-campus; e.g., co-ops, internships, student teaching, and practica.
- Extracurricular activities including, but not limited to intramural sports, intercollegiate athletics, and similar activities.

NOTE: This policy also applies to registered student organizations if the activity or event is organized and sponsored by UTD and if travel to the activity or event is funded and undertaken using a vehicle owned or leased by UTD. Registered student organizations may not require members to travel beyond 25 miles from UTD. Activities sponsored by an academic unit are under the purview of the Office of the Executive Vice President and Provost. Questions regarding the policies, procedures, or forms should be directed to the Vice Provost at extension 2791.

Activities sponsored by Student Affairs are under the purview of the Office of the Assistant Vice President for Student Affairs and Dean of Students. Questions regarding those activities should be directed to the Office of the Assistant Vice President for Student Affairs and Dean of Students at extension 6391.

Notifications

Students should be thoroughly informed through the catalog, the class schedule, and the course syllabus about all travel and other risk-related activities required by or associated with a credit course. For non-credit courses or programs, the course or program materials should provide this information.

Students and members of the public engaged in travel or other high-risk activities associated with the University should be informed of the nature of such risks prior to participating in the activity. An attachment to the Release and Indemnification Agreement that would be referenced on the form may be appropriate for this purpose.

Prior to each travel of other risk-related activity, the administrator of the unit sponsoring the activity must provide the Police Chief with the name of the faculty or staff member in direct charge of the activity, the name of a member of the unit not participating in the activity who can be contacted if needed, and, for travel-related activity, the names of the students and members of the public who are traveling. For the risk-related activities not involving travel, the administrator must notify the Police Chief regarding the site of the activity and the approximate number of participants. The Student/Team/Group/Travel Authorization form (Exhibit B14) and the Student Travel/Off-Campus Activity Checklist (Exhibit B14-A) are used for these notifications.

Incidents of a serious nature should be reported immediately to the administrator in charge of the sponsoring unit.
Safety Issues and Modes of Travel

General

Circumstances such as terrain, road conditions, length of trip, etc., may make it prudent that students and/or members of the public go with available group transportation rather than travel by personal vehicle. In some situations, it may be that travel with the group should be required. The faculty, staff member, and/or supervisor in charge of the travel should consider this issue as he or she would any safety matter. As with all of these issues, the use of caution and common sense are an important part of this process.

In all cases where an adult participant is permitted to choose to drive/ride in private transportation, that circumstance should be described in the Mode of Transportation line on the Release and Indemnification Agreement.

For minor participants, the key issue is giving notice to parents/guardians exactly how their child is to be transported to/from the activity. The Mode of Transportation information should provide notice. It would be best to limit the transportation of minors who are not accompanied by a parent/guardian to UTD owned/leased/rented vehicles, or vehicle driven by UTD employees acting within the scope of their employment. Such a requirement should be stated on the Release and Indemnification Agreement.

All Motor Vehicle Travel

The administrator of the unit sponsoring an activity involving travel for students or members of the public must ensure that the following safety precautions are followed:

- Seat Belts: Occupants of motor vehicles shall use seat belts or other approved safety restraint devices as required by law at all times when the vehicle is in operation.
- Weapons, alcohol, and illegal substances prohibited: Occupants of motor vehicles shall not consume, possess, or transport any weapons, alcoholic beverages, or illegal substances at any time when the vehicle is in operation.
- Passenger Capacity and Hours of Driving: The total number of passengers, including the driver, in any vehicle at any time it is in operation shall not exceed the manufacturer’s recommended capacity.
- The distance to the destination and/or the number of participants needing transportation should determine the type of transportation to be used. On long trips, each vehicle should have a minimum of two drivers certified by the UTD Safety Officer. Drivers should rotate periodically, and no more that 10 hours of driving should be completed during any one day. Trips requiring more that 10 hours driving to reach the destination will require overnight lodging. There should be no driving between the hours of 11:00 p.m. and 6:00 a.m. without prior approval of the appropriate administrative official. Van drivers must take a thirty-minute rest break every four hours.
- For trips scheduled for longer than 2 hours, a navigator must be assigned to assist the driver. The navigator must stay awake while on duty.
- No more than nine (9) people, including the driver plus gear, should be loaded on any one 15- passenger van. The weight of the passengers and their gear should be distributed evenly throughout the van. Luggage should be placed in the rear behind the last seat and is not allowed on the roof when the van is being operated.
- On trips where the number of participants exceeds that which can comfortably fit in two or three vans, a chartered bus should be considered. All vehicles should have access to a cellular phone, and the number should be indicated in the notification to the Police Chief.
- Medical Insurance: Students traveling on a University-sponsored overnight trip must have medical insurance. Student health insurance is available at minimal cost through the Student Insurance Division of UICI, a local company that provides tailored health insurance programs for students enrolled in universities. Contact the representative for UTD at 469-229-6700 for information on insurance for special events such as field trips and off-campus activities. Insurance may be provided by the sponsoring office as part of the cost of the activity, or may be purchased by individual students.
- Driver Authorization: All University employees who drive University owned vehicles or who drive a rental vehicle that is used to transport students must be certified by the UTD Safety Officer as having met the requirements for the authorization of drivers in this policy and The U.T. System Business Procedure Memorandum No. 16-05-02. This does not apply to employees who are driving rental vehicles on University business but are not transporting students. Requirements for being an authorized driver include a 36-month Motor Vehicle Record score of 2 or less, as well as appropriate driver training. Van-specific training, including on-the-road training, is required for drivers of 15-passenger vans.
- Insurance Coverage: The U.T. System Business Procedure Memorandum No. 16-05-02 includes information, policies, and procedures regarding insurance policies covering the authorized use of owned, hired and non-owned vehicles; requirements for the safe use of vehicles; requirements for authorization of drivers; and procedures for reporting vehicle accidents or occurrences which may lead to claims. This Memorandum may be found at http://
Valid Driver’s License: An employee who operates a University-owned, rented, leased, or personal vehicle for official University business at a time when his or her license was suspended or revoked shall be subject to disciplinary action up to and including dismissal.

Emergency Procedures. Important: Copies of participant Medical Information Release forms and the Emergency Procedures Checklist must accompany the responsible faculty or staff member assigned to each vehicle for University-sponsored travel.

For University-Owned or Rental Vehicles:

Accident:
- Notify local authorities @ 911.
- Notify UTD Police @ 972-883-2331 who will notify the Safety Officer, the Risk Manager, and the administrator in charge of the sponsoring unit. The need for follow-up with the participants’ emergency contact persons or others is discussed at this time.
- Leave a cellular phone number with the University Police dispatcher. For rentals, call the 800 number provided by the rental company.
- While at the scene of the accident, authorized drivers must attempt to obtain as much information as possible, including:
  - The license plate number of any vehicles at the scene;
  - The names and telephone numbers of the other parties;
  - Insurance information from the other parties involved in the accident;
  - As soon as possible, the authorized driver will provide this information to the fleet contact at 972-883-2249.
  - Authorized drivers of the University-owned vehicles should advise other parties involved in the accident that the accident will be reported to the University’s insurance company who will be in contact with the claimant.
  - In the case of rental vehicles, the University has an insurance policy that becomes applicable if the cost exceeds what is covered by the rental agency’s insurance policy. Authorized drivers of the University-owned vehicles should advise other parties involved in the accident that the accident will be reported to the rental agency and to the University’s insurance company.
  - Authorized drivers should not make any representations regarding insurance coverage to other parties involved in the accident, because the insurance company’s adjuster will make the determination of coverage available under the insurance policy. Should the other party require some type of insurance information, a copy of UTD’s insurance policy is in the glove compartment (University-owned vehicles only) or they may contact UTD’s fleet contact at 972-883-2249 for assistance.
- Upon returning to campus, the fleet contact will provide you with insurance claim forms to be filled out with all pertinent information about the accident. The fleet contact will then forward the claim form to the insurance company for handling.

Mechanical Breakdown (University-Owned Vehicles):
- Notify the dispatcher in the UTD Police Department @ 972-883-2331 who will the supervisor of the authorized driver.
- Contact some form of roadside assistance (local auto dealer service department, garage, etc.)
- Leave a cellular phone number for someone to call you back.
- Do not attempt to make repairs, including changing a tire. Wait for roadside assistance.

Mechanical Breakdown (Rental Vehicles):
- Call the 800 number provided by the rental company.
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