

The University of Texas at Dallas

2010-2012 Graduate Catalog

Equal Educational Opportunity Statement

The university is committed to a policy of nondiscrimination on the basis of sex, race, color, religion, age, sexual orientation, national origin, disability, 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.

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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 2010-2012 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.

UTD Correspondence Directory

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Volume 33, Number 1

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Address all correspondence to:
The University of Texas at Dallas
P.O. Box 830688
Richardson, Texas 75083-0688

The physical address of the University is:
800 West Campbell Road
Richardson, Texas 75080

The main entrance to U.T. Dallas is located at 800 West Campbell Road between Floyd Road and Waterview Parkway in Richardson. Additional programs are located at the U.T. Dallas Callier Center for Communication Disorders, 1966 Inwood Drive, Dallas, Texas 75235.

Telephone: (972) 883-2111
Admissions Information: 972-883-2270 or 1-800-889-2443
Fax: (972) 883-6803
World Wide Web: <http://www.utdallas.edu/>

For More Information About:	Contact
Admissions Campus Tours	Comet One Stop interest@utdallas.edu 972-883-2270 http://www.utdallas.edu/enroll/
Career Services Cooperative Education	Career Center careercenter@utdallas.edu 972-883-2943 http://www.utdallas.edu/career/
Counseling	Counseling Center 972-883-2575 http://www.utdallas.edu/counseling/
Disability Services	Disability Services Office disabilityservice@utdallas.edu 972-883-2098 http://www.utdallas.edu/student/slife/hcsvc.html
Financial Aid Scholarships Work-Study Programs	Financial Aid Office 972.883.2941 http://financial-aid.utdallas.edu/
Health Services	Student Health Center studenthealth@utdallas.edu 972.883.2747 http://www.utdallas.edu/healthcenter/
Housing	Director of Residential Life reslife@utdallas.edu 972-883-6391 http://www.utdallas.edu/student/slife/housing/index.html
International Student Services Student Visas	International Student Services Office immigration@utdallas.edu 972.883.4189 http://www.utdallas.edu/student/international/

Registration	University Registrar records@utdallas.edu 972-883-2342 http://www.utdallas.edu/student/registrar/lookup/regprocedures.html
Residency	University Registrar records@utdallas.edu 972-883-2342 http://www.utdallas.edu/student/registrar/TXResidency.html
Student Medical Insurance	Student Health Insurance Officer 972-883-4189 http://www.utdallas.edu/student/international/insurance/
Student Organizations	Student Life 972-883-6551 http://www.utdallas.edu/student/dev/orgguide/
Transcripts	University Registrar transcripts@utdallas.edu 972-883-2342 http://www.utdallas.edu/student/registrar/transcript/
Veteran Affairs	Veteran Affairs Officer 972-883-2941 http://financial-aid.utdallas.edu/veteran/

Accreditation

The University of Texas at Dallas is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools (www.sacscoc.org) to award baccalaureate through doctoral degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097 or call (404) 679-4501 for questions about the accreditation of The University of Texas at Dallas.

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
 Emerging Media and Communication (M.A)
 History (M.A.)
 Latin American Studies (M.A.)
 Arts and Technology (M.A., M.F.A)
 Holocaust Studies (Certificate)

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.)
 Applied Cognition and Neuroscience (M.S.)
 Communication Disorders (M.S.)

Human Development and Early Childhood Disorders (M.S.)
Psychological Sciences (M.S.)
Evaluation Research (Certificate)

School of Economic, Political and Policy Sciences

Criminology (M.S., Ph.D.)
Economics (M.S., Ph.D.)
Geospatial Information Sciences (M.S., Ph.D.)
International Political Economy (M.S.)
Justice Administration and Leadership (M.S.)
Political Science (M.A., Ph.D.)
 Constitutional Law Studies (M.A.)
 Legislative Studies (M.A.)
Public Affairs (MPA, Ph.D.)
Public Policy (M.S.)
Public Policy & Political Economy (Ph.D.)
Applied Sociology (M.S.)
City Planning (Certificate)
Crime & Justice Analysis (Certificate)
Economic & Demographic Data Analysis (Certificate)
Evaluation Research (Certificate)
Homeland Security (Certificate)
Geographic Information Systems (Certificate)
Local Government Management (Certificate)
Non-Profit Management (Certificate)
Remote Sensing (Certificate)

Erik Jonsson School of Engineering and Computer Science

Biomedical Engineering (M.S., Ph.D.)
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
Mechanical Engineering (M.S.)
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 Interdisciplinary 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, initial teaching certification, and certificate endorsements.

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.)
Finance (M.S.)
Information Technology and Management (M.S.)
Innovation and Entrepreneurship (M.S.)
Management and Administrative Sciences (M.S.)
Healthcare Management (M.S.)
Science Innovation and Entrepreneurship (M.S.)
Supply Chain Management (M.S.)
Management Science (Ph.D.)
Business Intelligence and Data Mining (Certificate)
Healthcare Management (Certificate)
Project Management (Certificate)
Global Management (Certificate)
Organizational Behavior and Coaching (Certificate)
Supply Chain Management (Certificate)
Systems Engineering and 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.)
Science Education (M.A.T.)
Science Education (M.A.T. Online)
Applied Physics (M.S.)
Biotechnology (M.S.)
Remote Sensing (Certificate)

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The University

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 Library

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 45,000 current periodical titles, 445,000 electronic books as well as over 2.8 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

Information Resources provides computing facilities for student, faculty, and staff use in instruction and research. General Access computer labs are located on the first and third floor of the

McDermott Library and the ground floor of the Jonsson Building. The Labs provide a modern, networked computing environment with Windows-based and Macintosh computers, scanners and more.

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. The university maintains high bandwidth connections to the commodity internet as well as appropriate research and education networks, such as Internet 2.

Primary remote services access is through the Galaxy portal (<http://galaxy.utdallas.edu>). Additional remote access to the campus network is provided through VPN (Virtual Private Networking) services. The university provides wireless LAN access to the campus community areas across most of the institution. All holders of a UTD NetID may utilize the campus network using devices with the appropriate wireless LAN 802.11b/a/g network interface. Guest wireless access is also provided on request (<http://www.utdallas.edu/ir/>).

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. The latest information regarding computing facilities can be found at the campus web site at <http://www.utdallas.edu/ir/>.

Help Desk and Other Services

The university Help Desk is located in the Jonsson building and offers walk-in, telephone, email and web chat support for a wide range of technology problems. Contact info: 972-883-2911 or assist@utdallas.edu

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 Lipshy Galerstein Women's Center

The Carolyn Lipshy 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.

Media 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.

University Housing Information

The University of Texas at Dallas offers several affordable on campus housing choices for students. On campus housing is reserved for students attending UT Dallas. A variety of floor plans and prices are available to students who are seeking not only the advantage of walking from their residence to class but the more intrinsic benefits of "community" as well.

Graduate students living on-campus must enroll in and complete a minimum of 3 hours each fall and spring semester. For more information please visit www.utdallas.edu/housing Or Contact:

University Village
2800 Waterview Parkway
Suite #200
Richardson, TX 75080
972-792-9100

Waterview Park Apartments
2800 Waterview Parkway
Suite #100
Richardson, TX 75080
972-454-5000

Residential Life

UT Dallas's Residential Life Office works with students to build a community and to provide assistance with concerns or issues related to living on campus at University Village. Residential Life staff members are also available to assist students with personal and academic concerns. For more information please call 972-883-5391 or visit www.utdallas.edu/housing

Admission Requirements for Graduate Study

Each program has specific admission requirements listed at <http://www.utdallas.edu/admissions/graduate/degrees/>

At a minimum, all applicants must provide the following documentation:

Master's Programs

An earned U.T. Dallas baccalaureate degree or its equivalent from an accredited institution with a grade average of B or better is in upper-division (junior and senior level) work in the student's major field and related fields is the minimum requirement for admission to any master's degree program.

Applicants in their final year of undergraduate study may be admitted on the condition that their bachelor's degree is awarded before enrollment at U.T. Dallas.

Doctoral Programs

An appropriate earned U. T. Dallas master's degree or its equivalent, with an average of at least B+ or demonstrated comparable research competence. Applicants currently enrolled in post baccalaureate

study may be admitted on the condition that their master's degree is awarded before enrollment at U.T. Dallas.

Some departments admit directly to the doctoral program from a bachelor's degree for highly qualified candidates.

Non-Degree Students

Must hold a bachelor's degree from a recognized university.

International Students

Applicants educated at non-U.S. institutions should note that their educational background will be assessed for equivalency with a U. T. Dallas degree as described above. Applicants whose primary language is not English and who graduated from a non-U.S. university where the language of instruction and examination was not English, must demonstrate facility in English using one of the following methods:

- Test of English as a Foreign Language (TOEFL)
- International English Language Testing System (IELTS)
- Pearson Test of English (PTE Academic)
- Successful completion ELS level 112

This requirement should be met at the time the admission application is submitted.

Visiting and Exchange students

Applicants wishing to attend U.T. Dallas as a visiting graduate research student or as an exchange student from one of our partner schools should contact the U.T. Dallas Office of International Education at <http://www.utdallas.edu/oie/>.

Application

U.T Dallas uses a web-based application form that can be accessed using the "apply now" link for each degree listing at: <http://www.utdallas.edu/admissions/graduate/degrees/>

There is a \$50.00 nonrefundable application fee.

Applicants are advised to carefully review the program information and the semester specific deadlines for domestic and international applications. Supporting documentation requirements for each of the admissions category are as follows.

Applications submitted using the Statewide Common Application will also be processed.

Specific Admission Documentation Requirements

As a Degree-Seeking Graduate Student

Official Transcripts

Admission to a master's degree requires that an official transcript demonstrating the completion of a bachelor's degree with a grade average of B or better in upper-division (junior and senior level) work in the student's major field and related fields from U.T. Dallas or another, equivalent, recognized university be submitted at the time of enrollment. 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.

An official transcript demonstrating the completion of a master's degree, submitted at the time of enrollment, is required for admission to a doctoral degree. Some departments admit highly qualified candidates directly to the doctoral program from a bachelor's degree.

Test Scores (GMAT, GRE)

Standardized test scores must be official and reported directly by the Educational Testing Service ([ETS](#)) should be sent to The University of Texas at Dallas, Code 6897. The Graduate Management Admissions Test (GMAT) is required if applying to the School of Management and the Graduate Record Examinations General Test (GRE) is required 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 for degree-seeking admission see <http://www.utdallas.edu/admissions/graduate/degrees/>.

English Language Proficiency Test Scores (TOEFL, IELTS, PTE)

International applicants whose first language is not English must submit satisfactory test scores from one of the following testing agencies: the Test of English as a Foreign Language (TOEFL), the academic modules of the International English Language Testing System (IELTS), or the Pearson Test of English Academic (PTE academic). U.T.Dallas will also accept a passing grade in level 112 of English from the ELS Language Centers, www.els.edu.

Applicants with an earned baccalaureate degree from a college or university where the language of instruction and examination was in English are excused from this requirement. Scores must not be more than two years old, and an official copy must be sent from the testing agency to:

Office of Enrollment Services, HH10
The University of Texas at Dallas
800 W Campbell Rd
Richardson, TX 75080-3021

Dallas requires a minimum TOEFL iBT (internet-based test) score of 80, a minimum IELTS score of 6.5 or a minimum PTE score of 67 for automatic regular admission as a degree-seeking student. Higher scores may be required if the applicant is to succeed in the competition for teaching assistant openings.

Narrative

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 (for additional information see <http://www.utdallas.edu/admissions/graduate/degrees/>).

Request for Recommendation Forms

Completed forms from 3 individuals (employers, community leaders, teachers, etc) able to judge your probable success in graduate school. Letters of recommendation may be sent directly to the contact listed for the degree program.

<http://www.utdallas.edu/admissions/graduate/documents/GradReqRecommendation.pdf>

International applicants without Permanent Resident Visas must submit evidence of financial support (financial affidavit and original bank statement) before they can receive the I-20 or other required documents needed for visa application.

In accord with Chapter 51, of the Texas Education Code, decisions on admission to degree-granting graduate programs at U. T. Dallas are based on holistic considerations of all submitted information regarding the academic, career and personal histories of the applicants. Standardized test scores and coursework GPA levels cited in the catalog descriptions of some degree programs are listed for advisory purposes only, to indicate the typical achievement levels of students enrolled and succeeding in the various programs. No single quantitative or qualitative measure; or any specific combination thereof, constitutes a definitive standard for admission. Rather, each application will be considered individually and each applicant's complete profile of strengths and prospects for successful completion of the program will be evaluated by the admissions committee. Applicants are encouraged to contact the graduate advisor in the degree program in which they expect to enroll to discuss specific admission requirements.

Applicants who satisfy all of the above criteria qualify for regular admission to the degree program. Students denied this admission status may qualify for admission under one of the following categories:

As a Conditional 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. The graduate advisor in the academic program will monitor compliance with the admissions conditions. 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.

As a Non-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 condition for admission to a master's degree program at U.T. Dallas, 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 Associate Dean of Graduate Studies in the school. Students admitted as non-degree-seeking may not be eligible for financial aid and should consult the U.T. Dallas Financial Aid office regarding their status 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. A student not officially enrolled in a degree program requires the consent of the graduate advisor to enroll in graduate classes offered by that degree program.

NOTE: A student in the United States on an F1 or J1 Visa may only be admitted to a degree program at U.T. Dallas and is not eligible for Non-Degree-Seeking Student status.

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 leveling courses. The applicant need only provide an official transcript demonstrating the completion of a bachelor's degree level and be in good academic standing. 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. Students restricted to taking undergraduate courses may not take graduate courses in a degree program. Students admitted to take only undergraduate level courses may not be eligible for financial aid and should consult the U.T. Dallas Financial Aid office regarding their status prior to submission of their application for admission.

Application Deadline Dates

Domestic and international applicants are urged to plan ahead and apply as early as possible and to allow adequate time for review by the admissions committees. To ensure consideration for financial assistantships students are urged to submit a completed application nine months prior to anticipated enrollment. Applicants are advised to refer to <http://www.utdallas.edu/admissions/graduate/degrees/> for additional information on specific admission deadlines for each degree program.

Domestic applicants should have all necessary application materials to the Office of Enrollment Services prior to the following dates:

Fall semester	July 1
Spring semester	November 1
Summer semester	April 1

Applicants who are not citizens or permanent US residents should submit all necessary application materials to the Office of Enrollment Services by the following dates:

Fall semester	May 1
Spring semester	September 1

Summer semester March 1

Students seeking appointments as Teaching Assistants or Research Assistants should contact the academic advisor for the degree program and plan for earlier application submissions.

Official Transcripts

The term "Official Transcript" is understood to refer to the official recorded results of the student's academic work in a sealed envelope signed and stamped by the registrar or by an authorized official of the issuing college or university. English translations of transcripts and documents that are in a language other than English are also required and should be sent to:

Office of Enrollment Services, HH10
The University of Texas at Dallas
800 W Campbell Rd
Richardson, TX 75080-3021

A \$50.00 nonrefundable international document evaluation fee applies.

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.

Office of Enrollment Services

The Office of Office of Enrollment Services, located in Hoblitzelle Hall, can assist prospective students in exploring the possibility of graduate study at U.T. Dallas. For detailed admissions or academic advice, please contact the specific academic program

<http://www.utdallas.edu/admissions/graduate/degrees/> .

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 6897.

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, P.O. 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.

English Proficiency Test Scores

Automatic regular admission as a degree-seeking student U.T. Dallas requires a minimum TOEFL iBT (internet-based test) score of 80, a minimum IELTS score of 6.5 or a minimum PTE score of 67. Applicants with lower scores will be considered but are advised to improve their test scores and reapply. U.T.Dallas will also accept a passing grade in level 112 of English from the ELS Language Centers, www.els.edu.

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 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.

Students' 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/ 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

A student must be in good academic standing to change from his/her admitted graduate program to another one within the same graduate department. A student 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. To qualify for transfer of credit the student had to be enrolled in a graduate degree program at an accredited college or university and the grade earned in the course must be a B or better. Grades of B- are not transferrable and the course must not be a correspondence or extension course. Courses delivered in a distance learning format will be considered by the Graduate Dean on a case-by-case basis.

An official transcript and an official explanation of the course numbering system at the school where the credit was earned should accompany the transfer request that must be prepared by the student's Graduate Program and submitted to the Dean of Graduate Studies for approval.

Transfer of credit petitions are subject to the following limitations:

- No more than 25% of the total requirement of a master's degree may be transfer credits. Some degree programs have more restrictive transfer of credit requirements.
- Transfer of master's level credit into a doctoral program is limited to a maximum of 36 hours.
- No more than 15 semester credit hours taken as a non-degree student at U.T. Dallas can be subsequently applied to a degree program at U.T. Dallas.

Exceptions to these transfer policies may be granted only on petition to the Dean of Graduate Studies.

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 the 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.

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, students must maintain a minimum 3.0 grade point average in their degree program's *core courses*. However, individual programs may have more stringent grade point requirements in selected courses, which must be satisfied for graduation.

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.

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. A student is 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, a student 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. A student 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 may 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 votes 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. A student 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

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 and Thesis

Three final, approved hard copies and one disk copy are required. After final, approved hard copies have been bound:

- one hard copy will be available to the public in the university library
- one hard copy will be sent to the Supervising Professor
- one hard copy will be sent to the program office
- one electronic copy will be sent to UMI

UMI will publish and make the dissertation/thesis available to the public for purchase both on the web and in hard copy.

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

A **graduate** student:

- must be registered for any session during which they are taking courses, or taking examinations, required in his/her degree program.
- require guidance in the preparation of a thesis or dissertation must be registered for a minimum of three semester hours in his/her degree program.
- must be enrolled in at least 3 credit hour in the semester in which they graduate.
- must be registered and have paid all required fees in the semester in which he/she plan to graduate.

A **doctoral** student:

- must be enrolled in at least 1 credit hour in the semester in which they graduate.
- enrollment for 1 semester credit hour in the final semester is only allowed once.

A **continuing** student in good academic standing may register in one of three ways:

- online, with the department or program office,
- with the Office of the Registrar during registration.
- early to increase the 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 student confirm with the instructor that his/her registration has been properly recorded within the first week of classes. It is the student's responsibility during his/her enrolled semester that he/she is attending the correct courses for which he/she registered. A student may not attend classes in which he/she is not registered in the above manner unless the student has been approved to audit the course.

Continuous Enrollment Requirement

Unless on an approved leave of absence, a graduate student in a degree program is expected to maintain continuous enrollment during the fall and spring (long session) semesters of each academic year. A student who fails to register in any given long session will be permitted to re-enroll through his/her program office in any two subsequent semesters provided the student was 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

A student who formally requests and is granted a leave of absence will be exempt 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

A student in good academic standing who finds it necessary to suspend his/her 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 Enrollment Services, 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 his/her transcript (see related, nonrefundable fee).

Dates of Early, Regular and Late Registration

Registration dates and procedures are listed in the online Comet Calendar and the Academic 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 a student from information or regulations contained therein. **The University reserves the right to make changes to both calendars at any time.**

Paying Fees as a Part of Registration

A student is not registered or eligible to attend classes until all tuition and fees have been paid in full or until the student has arranged installment payments 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). A student who does not pay in full or arrange for installment payments by the payment deadline in the online Comet Calendar or the Academic Calendar may have his/her registration canceled. A student who has 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
- 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 and Engineering courses, Geoscience courses, Physical Education courses, Foreign Language courses, online courses, and any courses that charge a lab fee may not be audited. Participation and discussion is at the discretion of the instructor. Auditing grants only the privilege of hearing and observing and does not grant credit or access to online course tools.

A student may pick up an Audit Form in the Office of the Registrar beginning the first day of classes through census day. Students may audit courses only by obtaining permission of the instructor and by completing audit registration procedures. Please consult <http://www.utdallas.edu/student/registrar/> for more detailed audit procedures and associated fees.

All applicants for auditing graduate courses should have documentation indicating the completion of a baccalaureate degree. Exceptions to this policy may be granted only upon application to the Dean of Graduate Studies. Under no circumstances will a student be allowed to audit Studio/Ensemble courses.

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 F and J status international students and is strongly recommended for all new students as a means of efficient matriculation into the University. International students with F or J status will not be allowed to register without an authorized International Student Orientation form. All newly appointed TA's are required to attend TA Orientation held immediately prior to the start of the fall and spring semesters.

Undergraduate Registration for Graduate Courses

An advanced undergraduate who is within 30 hours of completing the baccalaureate degree may petition his/her Undergraduate Associate Dean 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 Undergraduate Associate Dean, up to 12 semester hours of graduate work taken as an undergraduate may be used only for completing any baccalaureate degree at UT 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 Undergraduate Associate Dean, how each approved course is to be applied and may not change option once declared.

Graduate Courses for Possible Future Use as Graduate Credit

Pass/fail grading options are not permitted in this category. An undergraduate may take up to 12 semester hours of graduate courses to reserve for possible application toward a graduate degree. To

register, an undergraduate student must obtain permission from the instructor, from the graduate advisor of the program in which the course is offered and from the Dean of Graduate Studies. 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. The student must declare at the time of registration for the course, on a form provided by the Undergraduate Associate Dean, how each approved course is to be applied and may not change option once declared.

Graduate Courses Taken in Fast Track Options

Pass/fail grading options are not permitted in this category. A number of programs at UT 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 UT Dallas who have been admitted to Fast Track programs at UT Dallas leading to baccalaureate/master's degrees may, with the permission of the student's Undergraduate Associate Dean 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. The student must declare at the time of registration for the course, on a form provided by the Undergraduate Associate Dean, how each approved course is to be applied and may not change option once declared. 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 UT 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, including examinations, 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:

Grade	Description	Grade Points per Semester Hour
A		4.00
A ⁻		3.67
B ⁺		3.33
B		3.00
B ⁻		2.67
C ⁺		2.33
C		2.00
F	Failure	0.00
I	Incomplete	*
P		*

*The grades P and I do not produce grade points.

Grade of I: Incomplete

An Incomplete grade of I 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 by both 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 I is not submitted by the specified deadline, the grade of I 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 I 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 I must be converted into a letter grade (A through F or P) by the instructor, head of the department or program, or Graduate Advisor as indicated above.

Grade Changes

After a final grade has been recorded by the Registrar, the grade can be changed only to correct a clerical error or replace a grade of "incomplete". Changing a final grade requires the written approval of the instructor, the department or program head, and the Graduate Dean.

Pass/Fail Grading

The pass/fail option is intended to encourage a student to take courses in topics outside his/her major area where the student 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 and the Academic 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
- elective courses in the student's major area
- more than 20 percent of the hours earned at UT Dallas for any master's degree (excluding casebook, internship, practicum, independent study, research, reading, thesis or dissertation requirements)

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

Final Examinations

If a final examination is given in a course, it must be given at the time scheduled by the Registrar's office during the final examination period. A final examination must not last more than 2 hours and 45 minutes. Students for whom more than three final examinations are scheduled in one day may petition to take the additional final examinations on different days.

Academic Good Standing

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

- Satisfactory progress in meeting admission conditions that were imposed at the time of admission.
- Maintenance of a 3.0 cumulative grade point average in graduate courses in the degree program.
- 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 (I) grades. Failure to achieve this 3.0 cumulative grade point average will result in immediate dismissal from the University.

Course Load

The minimum course load for a graduate student to be considered full time is nine semester credit hours of graduate coursework during each long term and six semester hours in any summer session.

Students who receive a research assistantship or a teaching assistantship must comply with course load requirements determined by the graduate program offering the assistantship.

Schedule Changes: Dropping, Adding and Withdrawing From Courses

Dates and time limits for schedule changes can be found in the online Comet Calendar and the Academic Calendar.

A new student seeking to drop or add courses to his/her schedule must obtain permission from his/her graduate advisor in the degree program. Drop/Add forms may be obtained from advising offices.

Drop/Add 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 and the Academic 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.

A student who habitually withdraws from a significant fraction of his/her 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 Service Activation Interruption of Education

Under certain circumstances, a student who is required to participate in active military services is excused from scheduled classes or other required activities and will be allowed to complete an assignment or exam within a reasonable time after the absence. The excused absence is permitted only if the student will miss not more than 25% of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is enrolled at the beginning of the period of active military service.

A student who withdraws from The University of Texas at Dallas because the student has been called to active military service has three options for the treatment of his/her transcript and tuition and fees. U.S. 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 "withdrawn-military" (WM) on the student's transcript; or
2. the Registrar's office may grant the 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 grade(s) 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 a course if the student has, in the instructor's judgment, successfully completed a substantial amount of course work and demonstrated sufficient mastery of the course material.

Readmission

If otherwise eligible to register for classes at the University, a student called to active duty in the United States Armed Forces or the Texas National Guard (not including routine Texas National Guard training) shall be readmitted without reapplication or payment of additional application fees within one year of the "release from active duty" date on the student's military orders. An eligible student will retain prior academic standing, course credits awarded 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

A student who wishes to repeat a course must submit a Repeated Course Adjustment form to the Graduate Dean.

Up to three graduate courses may be repeated. However, no graduate course may be repeated more than once. When a course is repeated, both grades will remain in the student's record and will be included in any transcript. The higher grade will be used in computing the grade point average or credit hours for purposes of graduation. This policy does not apply to coursework specified in the catalog that can be repeated for credit. Students are advised to check with the Financial Aid office to determine how and if grades earned in repeated coursework impact their financial aid eligibility status.

Change of Address, Email, or Name

For a name change, a student must fill out the name change form in the Office of the Registrar. A student must also bring a copy of his/her driver's license or 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. A student is encouraged to set up a U.T. Dallas email account upon registration in his/her first term, and ensure the U.T. 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:

- relevant Department Head
- Associate Dean
- Director of Graduate Studies
- 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

A student must apply for graduation through his/her Department or Program Office by the date specified in the Comet Calendar and the Academic Calendar in order to graduate at the end of a given semester. The student must complete a separate application for graduation for each semester in which an attempt to graduate is made. A student who expects to receive more than one degree in a single semester must complete a separate application for each degree. A late applicant 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 has not yet submitted final approved copies of thesis, dissertation or other required reports. Such a candidate may, for a nominal fee and with the approval of his/her 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 Census Day 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 long semester.

Purchase of Textbooks

The University of Texas at Dallas advises students that they are not under any obligation to purchase a textbook from a university-affiliated bookstore. The same textbook may also be available from an independent retailer, including an online retailer. (Texas Education Code 51.9705; 19 TAC 4.215)

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, prior to the census day. 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 Assistant Vice President of Academic Records.

In accordance with state laws, a student is not entitled to enter a class or laboratory until 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 University of Texas at Dallas utilizes a consolidated tuition rate, which is capped at 15 semester credit hours for resident graduate students. The consolidated tuition and fee rates cover all academic program costs; including tuition, mandatory fees, and most of the college and course incidental fees. Additional fees that will be charged separately are: field trip fees, supplemental designated tuition fees and distance education fees. The Tuition and Fee Tables can be found on the [Bursar Office website](#).

Beginning fall 2007, The University of Texas at Dallas introduced the Guaranteed Tuition Plan. The Guaranteed Tuition Plan is designed to help new students and their families better plan for the cost of a college education, while allowing the University to maintain the quality of its academic programs. Under the terms of the plan, graduate students enrolling at UT Dallas for the first time for the fall 2010, spring 2011 and summer 2011 semesters are charged for tuition and mandatory fees fixed at the fall 2011 rates for all succeeding semesters through the summer of 2014. The charges per semester credit hour for tuition and mandatory fees at UT Dallas depend on the number of hours for which a student enrolls. Other user fees for courses and services including, for example, parking, and housing fees, are subject to change. More information on the Guaranteed Tuition Plan can be found at <http://www.utdallas.edu/tuition/guarantee/>. Students who enrolled at UT Dallas prior to fall 2007 are charged a different rate than the newly enrolled students. That rate remains subject to increase each year.

Students are not registered or eligible to attend classes until they have paid in full or signed payment arrangements with the Bursar for all tuition and fees. If a student's registration has been canceled for nonpayment, and that student wishes to reinstate registration, a reinstatement fee in addition to any late fees and tuition and fees will be charged. See the online fee schedules at <http://www.utdallas.edu/finance/bursar/schedule-introduction.html> for fees associated with course reinstatement. No student will be reinstated in a closed course.

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.

Students may refer to the Academic Calendar at <http://www.utdallas.edu/student/registrar/calendar/> or the Tuition and Fees Schedule at <http://www.utdallas.edu/finance/bursar/schedule-introduction.html> for information regarding payment and refund deadlines.

Students will be given notice on their tuition bill, tuition receipt or an email in connection with tuition charges, of the amount of his/her tuition payment that is required to be set aside to provide financial assistance for students enrolled at the institution per the *Texas Education Code*, Section 56.014.

Tuition for Excessive Doctoral Hours

For a doctoral student 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

A student 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

A concurrent enrollment agreement is in place between The University of Texas at Dallas, The University of Texas at Arlington, and The University of Texas Southwestern Medical Branch. This agreement allows any student enrolled concurrently between these institutions to receive a waiver of certain fees (Sec. 54.503(g), Texas Education Code). The student must apply for concurrent enrollment with the Office of the Registrar.

Visiting Student Program

The U.T. System Visiting Student Program is designed to allow a graduate or professional student 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. A Visiting student registers and pays tuition and required fees at his/her home institution and is given normal privileges associated with available student services at the exchange institution. A visiting student is 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/>). A student 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 the 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

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 a student who qualifies 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 last year of high school; children of prisoners of war or persons missing in action; certain students who are suffering economic hardship; certain 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; children of POW/MIA, students from other nations of the western hemisphere; blind or deaf students; military personnel and dependents; children of disabled/deceased firefighters and peace officers; fireman enrolled in Fire Science classes, children of Texas veterans; children of professional nursing faculty, preceptors for professional nursing education programs, 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. A dependent child of a member of the Armed Forces, who is a resident of this state or entitled to pay resident tuition, is exempt from the payment of resident tuition for any semester or other academic term during which the member of the Armed Forces is deployed on active duty for the purpose of engaging in a combative military operation outside the United States (section 54.203(b-2), Texas Education Code). Individuals who feel they may qualify under this section are requested to contact the Financial Aid (972) 883 2941.

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

- Prior to the first day of a given semester, 100 percent
- During the first five class days, 80 percent of the applicable portion of the tuition and applicable fees
- During the second five class days, 70 percent

- During the third five class days, 50 percent
- During the fourth five class days, 25 percent
- After the fourth five class days and thereafter, nothing

For the 6- and 8-Week Summer Sessions

- Prior to the first class day of a given session, 100 percent
- During the first, second, and third class day, 80 percent
- During the fourth, fifth, and sixth class day, 50 percent
- 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 address on file after the refund is requested unless the student has opted for direct deposit. Direct deposits are normally available 5 to 6 business days from the day they were requested.

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.

Internship/Cooperative Education Program

For Graduate Students, the Internship/Cooperative Education Program (Internships) provides an opportunity to gain professional work experience related to a particular field of study. An internship is

meant to be educational in nature. Internships can be paid or unpaid, and in many cases can be completed for academic credit to be used toward a degree requirement. Completing an internship to add to a resume is a strong way to improve options for full-time employment after graduation.

The UT Dallas Career Center Internship Program provides students with the information and tools necessary to successfully navigate the internship process, from orientation to the program itself to evaluation at the end of the semester. Internship program staff members provide information about eligibility, preparation, and academic credit options, and assistance with the internship search. Students can also get information about the possibility of completing an internship at their current place of full-time employment.

To get registered with the internship program, a student must:

- register for a UTD CareerWorks account
- attend an Internship or CPT (international students only) Information Session
- schedule an individual appointment with an Internship Coordinator at the Career Center.

The Career Center recommends that a student begin searching for an internship one semester or more in advance of the desired starting semester. The Career Center also recommends that the student take advantage of other services, including resume critiques and mock interviews, to be most successful in the internship search. For more information about the program, contact the Career Center in McDermott Library 1.312. (Phone: 972-883-2943, Web: www.utdallas.edu/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, note taking, 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.

Fee Schedule

Tuition tables for current semesters may be found on the [Bursar Office website](#) or on the [Course Lookup](#) page.

Tuition and fees are subject to change by legislative or regental action. The Texas Legislature does not set the specific amount for any particular fee. The student fees assessed to students 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. Changes in tuition and 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 on the [Bursar Office](#) website. Students taking courses in the School of Behavioral and Brain Sciences may be required to purchase professional liability insurance if they are in certain clinical experiences.

For residents of Oklahoma, tuition is the Texas resident rate shown for "Each Additional Hour" plus thirty dollars (\$30.00) per semester credit hour. Oklahoma residents must apply for this tuition waiver each semester through the Office of Financial Aid.

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 on the [Bursar Office](#) website for each term.

Application Fee: A nonrefundable application fee of \$50.00 is required of all students applying for admission to The University of Texas at Dallas during the regular application period. If a student submits an application after the application deadline but prior to the documentation deadline, the application fee is \$125.00 in order to process the application for decision in time to register for classes. An additional \$50.00 international document evaluation fee is required for those who have educational documents from countries other than the United States. Please refer to the Enrollment Services website for [application deadlines](#).

Audit Fee: Students at The University of Texas at Dallas may, with the approval of the instructor and of the Office of the Registrar, 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 \$100.00 per course. 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 (see "Auditing"), 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.

Change of Major Fee: There is a \$50.00 fee for a student changing majors more than two times in an academic year.

Practical Training Fee: A \$100.00 per semester fee is charged to assist in funding the administrative and clerical expenses required to review records and process the forms required by the United States Citizenship and Immigration Service to certify international students for placement in curricular or optional practical training assignments.

Diploma Replacement or Duplicate Fee: A \$10.00 fee is required to defray the cost of preparing a replacement or duplicate diploma. An additional \$25.00 will be charged to mail a diploma to a foreign address.

Distance Learning Fee: A fee is assessed per semester credit hour to enroll in distance education courses offered over the Internet. A resident or non-resident student taking courses offered by the School of Management is charged \$80.00 per semester credit hour. A student enrolled in Teacher Education TeleCampus courses will be charged \$25.00 per semester credit hour.

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 available to all students and required for all international students (students who are **not US Citizens, US Permanent Residents, Asylees, Refugees or undocumented aliens**).

In Absentia Registration: A student who registers in absentia shall pay a nonrefundable/nontransferable registration fee of \$100.00.

Installment Plan Handling Fee: A \$25.00 fee to cover costs of providing a payment option for a student in full term fall or spring semester courses will be assessed. The plan is also available for a student enrolled in the 12-week summer semester.

Installment Plan Late Fee: A late payment fee of \$30.00 for delinquent payment will be assessed if the second or third tuition installment is not paid by the date it is due.

International Student Special Services Fee: A \$100.00 per semester fee will be assessed for on-going review and certification of a student with non-immigrant visa status in accord with federal regulations.

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

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

Late Registration/Late Payment Fee: A nonrefundable charge of \$100.00 with additional increments of \$50.00 based on the number of days past the regular registration/payment deadline is required to defray costs associated with extending registration times.

Library Fines and Charges: Fines and fees for overdue library items are as follows:

Main Stacks	\$0.50/day	Maximum \$30.00
Reserves	\$0.10/day	Maximum \$50.00
Media	\$1.00/day (1 st 6 days late)	Maximum \$7.00 (for 1 st 6 days late)
	\$25 processing + \$7 late fee + replacement fee (7 th day)	
Computer Passwords for: CD, FD, Community User and Digital Microfilms workstations	\$0.10/minute	Maximum \$50.00
Laptops and Accessories	\$0.10/minute	
Lost items	*replacement cost of the item, a \$25.00 processing fee, and any overdue fines.	

*Copies of the complete 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.

Parking Fees: A parking decal is required to park any motorized vehicle on campus. Any vehicle parked on campus that does not display a current parking decal will be subject to a parking citation. Information regarding parking regulations and purchasing hang tags may be found online at <http://www.utdallas.edu/finance/bursar/parking/>. Decal fees may also be found on the other fees schedule at <http://finance.utdallas.edu/bursar/schedule-introduction.html>. Students may purchase the following hang tags online through the UT Dallas Online Store and mailed to the shipping address provided or purchase them in person at the Bursar Office:

- Remote: Allows students to park in the outer last row of campus green spaces.
- Green: Allows students to park in campus green spaces
- Gold: Allows students to park in campus gold or green spaces
- Evening Orange: Allows students to park in orange marked spaces after 5pm or gold and green spaces anytime.

Resident parking – A parking decal is required for all on campus residents. The following options are available:

- Resident Only: Allows students to park in resident parking ONLY.
- Resident Green: Allows students to park in resident parking or in green campus spaces.
- Resident Gold: Allows students to park in resident parking or in campus gold or green spaces.

Note: Only one hang tag may be sold per student residing on campus.

Parking hang tags are refundable on a prorated basis with the exception of the resident only hang tag. The Dallas Area Rapid Transit System (DART) provides bus service to the campus from the Richardson transfer terminal. Contact DART for schedule information. Students are eligible for free transit passes from DART which are available through the Info Depot, located on the second floor of the Student Union.

Recreational Sports Group Exercise/Non-credit Course Fees: A \$50.00 per course fee will be assessed for each group exercise class or non-credit course a student chooses to participate in.

Recreational Sports Locker Rental Fee: An optional locker rental fee of \$5.00 - \$15.00 (based on the size of the locker rented) per semester is required.

Recreational Sports Towel Service Fee: An optional towel service of \$10.00 per semester is required.

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 may be canceled. If a student requests that the courses be reinstated before Census Day, a \$25.00 reinstatement fee will be charged in addition to a graduated late registration fee. No student will be reinstated into a class that has been closed.

Reinstatement Fee (After Census Day): A \$300.00 fee will be assessed, in addition to tuition and required fees, to enroll a student after Census Day.

Returned Check Fee: A student will be assessed a \$25.00 fee for each returned check unless his/her bank provides written notification it was at fault. If a student writes bad checks to the university for tuition and fees the student's registration will be canceled unless full payment is made by the census day listed in the [Academic Calendar](#) online.

Student Identification Card Replacement Fee: A \$20.00 fee is required to defray the costs of reissuing a student ID card.

Student Teaching Supervisory Fee: A \$250.00 per field experience fee is required to defray costs of providing university supervisors and travel of university supervisors of student teachers.

Supplemental Designated Tuition: A \$40.00 per semester credit hour fee will be assessed for students enrolled in any School of Management undergraduate course, School of Engineering and Computer Science course, School of Arts and Humanities ATEC course or School of Behavioral and Brain Sciences graduate Speech Language or Audiology (COMD or AUD) course. A \$60.00 per semester fee will be assessed for students enrolled in any graduate School of Management course. These fees are assessed to defray the higher costs associated with instruction in these schools.

Universities Center at Dallas Fee: A \$15.00 per semester 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. They may also apply for financial aid and check the status of their application. Students are also strongly encouraged to view the [Financial Aid Office](#) web site for up-to-date information.

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, may 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.

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 the age of 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 Loans, Graduate PLUS Loans, and Federal Perkins 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 [online](#). Graduate students wanting to verify their Selective Service registration may do so online by visiting the [Selective Service site](#).

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

To be considered for federal financial aid a graduate student has to be enrolled for a minimum of five semester credit hours of graduate coursework during each long term and a minimum of three semester credit hours of graduate study during any summer session.

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 <http://www.utdallas.edu/student/finaid/SAP.htm>. 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 receipt or anticipation of additional scholarships, loans, or outside funding toward your educational expenses not represented on your award letter must be reported to the Financial Aid Office because compliance with federal regulations may require a reduction or revision of current 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. Texas Public Education Grants may be awarded through the Financial Aid Office depending upon need and availability.

Educational Assistance Grant

Funds through this program are made available through a set-aside of Designated Tuition. Graduate students demonstrating financial need, as determined through a completed FAFSA, will be considered for aid. Amount of award will vary each year based on 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 became totally disabled for purposes of employability as a result of a service related injury or 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. This exemption can be used if a student's federal veterans benefits are less than the hazlewood exemption value, the student may receive a hazlewood exemption that equals the difference between total tuition and fees and the federal veteran benefits for a state funded program. As of the Fall 1995 semester, the maximum number of credit hours (including remedial courses) which a person may receive benefit under the Act is 150 credit hours. Applications are available in the Financial Aid office or online at <http://financial-aid.utdallas.edu>

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. 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 through the Federal Direct Loan Program. There are two types of Stafford Loans: subsidized and unsubsidized. A student must demonstrate financial need, according to the FAFSA, to qualify for the subsidized loan. In this case the government will pay the interest on the loan while the student is in school. Financial need is not a requirement for the unsubsidized loan. This loan accrues interest while the student is in school; a student may choose to pay the accruing interest while in school.

The loans are made at a modest interest rate and there exists a maximum amount which can be borrowed for a given academic year. 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. See <http://www.utdallas.edu/student/finaid/dirlending.htm> for additional information.

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 late fee of \$30.00 per month will be charged, up to a maximum of \$90.00 per loan. 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, visit <http://www.utdallas.edu/career/students/employment/workstudy.php> or 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. Students interested in these positions should contact the Career Center at (972) 883-2943.

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.

Please visit [UT Dallas Scholarships](#) for more information.

Graduate Scholarships Selection Criteria:

- Good academic standing
- Show academic promise
- Full or part-time
- Pursuing a program of study leading to a degree
- May show financial need but not required

Career Center

The Career Center offers services to help students prepare for their careers. The staff assists students with career counseling and editing assistance for all job search documents. In-depth information is available, including webinars and podcasts, on the Career Center's website. The Career Center provides pre-employment preparation assistance through mock interviews and a variety of seminars on such topics as resume writing, business letter writing, identifying marketable skills, interviewing skills, and conducting an effective job search. The Career Center offers a credential file service to assist PhD students applying for academic positions after graduation.

Representatives of business, government, industry, education, and social agencies recruit UT Dallas students and alumni at career expos and on-campus interviews. The Career Center manages the Internship/Cooperative Education program for all majors, except EE/CS majors. On-campus employment is also managed by the Career Center, with the exception of TA and RA positions.

Part-time jobs, both on-campus and off-campus, full-time jobs, and on-campus interview schedules are posted through an online database called UTD *CareerWorks*. All students register for UTD *CareerWorks* by accessing the Career Center website. Students upload a résumé into the system in order to apply for qualified positions or to make it available for employer referrals. Employers may have access to candidate résumés via various web résumé books set up in the UTD *CareerWorks* system.

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

Student Affairs

The Division of Student Affairs, under the direction of the Vice President for Student Affairs, offers a variety of student services and programs to enhance the educational experience of all enrolled students.

Career Center

The Career Center offers services to help students prepare for their careers and internships, including career counseling, career and job search workshops, job and internship fairs and electronic job listings and resume referrals. For additional information call (972) 883-2943 or go to www.utdallas.edu/careers.

Center for Student Involvement

The Center for Student Involvement (CSI) helps UT Dallas students become more connected to campus life. CSI provides programming and services for [student organizations](#) and for students interested in participating in the many activities at UT Dallas. Visit us in the Student Union (SU2.506) or on the web at www.utdallas.edu/csi.

Child Care Center

The Dallas International School (DIS) and UT Dallas jointly provide evening child care. Parents who attend classes are eligible for child care services during their class hours for children ages 4 to 11. Child care hours are from 4:30 p.m. to 10:30 p.m., Monday-Thursday. To register your child/children for the child care program please complete each of the forms in the enrollment packet. Call 972-883-6391 to have a packet sent to you, or pick one up in the [Student Union \(SU\), Room 1.602](#).

Comet Card

The Comet Card is the official University identification card for all students, faculty, and staff. The Comet Card allows the use of campus facilities and services and offers an optional campus account for on-campus purchases and payments. The card can also be linked to a Wells Fargo checking account and used as an ATM/PIN-debit card. Cards are issued through the Comet Center located in the Student Union. Call (972) 883-2495 or go to www.utdallas.edu/cometcard for information.

Comet Center

The Comet Center, located on the second floor of the Student Union, is the UT Dallas information hub. Students can pick up Comet Cards and DART passes or purchase postage stamps and discount tickets to movies, museums and other local attractions. See www.utdallas.edu/cometcenter for more information.

Dean of Students

The Dean of Students provides leadership in the development, overall management and supervision of student services programs and serves as an information/referral source for students needing assistance in any situation. The Dean of Students Office is in the Student Union (SU1.602) and can be contacted at 972-883-6391 or on the web at www.utdallas.edu/deanofstudents.

Disability Services

Disability Services ensures that qualified students with documented disabilities have an equal opportunity to participate in educational, recreational and social opportunities at UT Dallas. Students with disabilities are urged to contact Disability Services as soon as they are admitted to the University. Disability Services is located in the Student Union (SU1.610) and can be contacted at 972-883-2098 or on the web at www.utdallas.edu/disability.

Fraternity and Sorority Life

UT Dallas is home to 15 national Greek fraternities and sororities that provide students with opportunities for friendship, guidance, service and leadership. For more information call 927-883-6158 or go to www.utdallas.edu/gogreek.

Intercollegiate Athletics

UT Dallas is a member of the NCAA Division III American Southwest Conference. The UT Dallas athletic program include men's and women's soccer, golf, basketball, tennis, and cross country, men's baseball, women's softball, and women's volleyball teams. Graduate students are able to participate only if their undergraduate degree is from UT Dallas and they still have NCAA eligibility remaining. Administrative offices are located in the Activity Center. For additional information call (972) 883-4490 or go to cometsports.utdallas.edu.

International Student Services

The International Student Services Office houses the International Student Programs, International Student Advising, and Student Health Insurance services for the international student population at UT Dallas. The Office organizes on- and off-campus programs which allow international students to be a part of a variety of US cultural experiences, as well as educational events for US students wanting to participate in multicultural activities. The ISS Office provides immigration information for F and J students through seminars, individual student appointments, and outreach to provide students with UT Dallas and Immigration Service information affecting their status. The UT Dallas Student Health Insurance Program provides information to international and domestic students on the University approved health insurance plan, and helps students using this plan to effectively navigate the US Health Care system. The International Student Services office may be contacted by calling (972) 883-4189, and more information can be found at <http://www.utdallas.edu/student/international/>.

Judicial Affairs

A part of the Dean of Students Office, the Office of Judicial Affairs promotes academic integrity and is responsible for investigating allegations of scholastic dishonesty and implementing the discipline process. More information can be found at <http://www.utdallas.edu/judicialaffairs>. or by calling 972-883-6333.

Leadership Education and Development

Offered through the Dean of Students Office, non-credit leadership classes help students to develop and enhance competence and self-knowledge as it pertains to leadership in a global society. For more information call 972-883-6391 or go to www.utdallas.edu/leadership.

Living Learning Communities

Living Learning communities allow small groups of select freshmen who share common academic objectives, goals, and interests to develop a support network with other students, peer advisors and faculty/staff members. Communities are built around academic interests with a faculty or staff advisor who facilitates distinctive academic and social opportunities that help students extend their learning beyond the classroom. For more information call 972-883-6395 or go to www.utdallas.edu/livinglearning.

New Student Programs

New Student Programs offers orientations, counseling, peer support and other resources to get new students off to a strong start at UT Dallas. For more information call 972-883-6171 or go to www.utdallas.edu/newstudentprograms.

Parent and Family Association

The Parent and Family Association is an avenue for family members and parents of UT Dallas students to get information about the campus and be involved in their student's campus experience. For more information call 972-883-6171 or go to www.utdallas.edu/pfa.

Recreational Sports

Recreational Sports provides UT Dallas students with diverse recreational programs to enhance their overall educational experience. Recreational facilities include a state-of-the-art fitness center, racquetball courts, squash courts, basketball courts, a multi-purpose room, an indoor swimming pool, sand volleyball courts, soccer fields, tennis courts, softball fields and baseball fields. Recreational Sports offers students opportunity to participate in a variety of intramural and club sports, group exercise and non-credit courses. For additional information call (972) 883-2096 or go to www.utdallas.edu/recsports.

Residential Life

Residential Life and its student-support team of Peer Advisors are committed to seeing that every resident student has a safe, comfortable and welcoming environment in which to live and learn. For more information call 972-883-5361 or go to www.utdallas.edu/housing.

Spirit Squads

Temoc is the official mascot of UT Dallas and works with the UT Dallas cheerleaders and power dancers to build school spirit, promote community and cheer the Comets on to victory (www.utdallas.edu/spirit).

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 (SU1.608). For more information call (972) 883-2575 or go to www.utdallas.edu/counseling.

Student Government

Student Government is the official representative body and voice of UT Dallas students. Students have the opportunity to participate through serving on committees, running for office, or voting in elections. Student Government provides many free services for students, including legal counsel, an online book exchange, and the Comet Discount Program. Further information may be obtained from the Student Government Offices in the Student Union (SU2.604), by calling (972) 883-2284, or by going to www.utdallas.edu/student/sq.

Student Health Center

The Student Health Center offers routine medical treatment to all currently enrolled students who have paid their tuition and are attending classes. Services include diagnosis and treatment of acute illnesses and injuries, general medical problems, gynecological problems, health education and counseling, and limited immunizations. Care providers include Nurse Practitioners and a Staff Physician. 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.

Information about bacterial meningitis is available upon request at the Student Health Center and is also distributed in Orientation packets, on the graduate and undergraduate applications for admission to the University, and in *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. The Student Health Center is located in the Student Union (SU1.606), Call (972)883-2747 for more information or go to www.utdallas.edu/healthcenter.

The Health Education office is also part of the Student Health Center. Health Education programming is presented to students throughout the year on many health topics such as HIV, STD's, nutrition, alcohol/drug abuse. Call (972) 883-4275 or go to www.utdallas.edu/healthed for more information.

Immunization Requirements

We encourage all students to be current on their immunizations. We do not currently have immunization requirements other than mandatory tuberculosis (TB) skin testing for students born outside the United States. This is a pre-matriculation (pre-enrollment) requirement. Students born outside the United States are required to have and present original documentation of a TB skin test or chest x-ray to rule out TB, that has been performed within 3 (three) months of registration, prior to being able to register. A Hepatitis B vaccination is required for students enrolled in a course of study that involves potential exposure to human or animal blood or bodily fluids in accordance with *Texas Education Code, Section 51.933*. For more information, please visit <http://www.utdallas.edu/healthcenter/immunizations.html>

Any student enrolled at the University, including a dual enrollment or transfer student, who has not previously enrolled at a public or private or independent institution of higher education in Texas and plans to reside in University On-Campus Housing must show evidence of vaccination against bacterial meningitis. In accordance with *Texas Education Code, Section 51.9191*, the student must have received the vaccination at least 10 days prior to finalizing move-in and receiving keys to on-campus housing.

To meet this requirement, students may submit the [Bacterial Meningitis Vaccination form](#), signed by a Licensed Care Provider showing proof of this vaccine, to the UT Dallas Housing staff. The form will be available as part of the housing application and located on the UT Dallas website at <http://www.utdallas.edu/housing>.

Student Health Insurance

The University of Texas at Dallas Student Health Insurance Office provides unique and confidential health insurance advising services for UT Dallas students. Health insurance is available to all students at UT Dallas and is required of all international students (students who are **not US Citizens, US Permanent Residents, Asylees, Refugees or undocumented aliens**). Effective Spring 2009, all international students will be assessed the Student Health Insurance (SHI) fee at the time of registration for classes. Contact the International Student Services Office for more information at 972-883-4189 or on the web at www.utdallas.edu/insurance.

Student Media

The award-winning student newspaper of UT Dallas, *The UTD Mercury*, publishes bi-weekly on Mondays throughout the school year. The newspaper offers paid positions for writers, editors, page designers and photographers (mercury.utdallas.edu).

Radio UTD, the student-run internet radio station, features an eclectic and freeform mix of music and original programming including talk, poetry and live coverage of UT Dallas sports. College Music Journal nominated Radio UTD as one of the best internet radio stations in the United States (radio.utdallas.edu).

A Modest Proposal, a student publication that focuses on student life, global politics, arts, events, and social commentary, publishes eight editions during the fall and spring semesters each year (amp.utdallas.edu).

UTD TV, a web-based television station, was launched in 2009. It provides a new medium for broadcasting news, entertainment shows and other content produced by students, staff and faculty (tv.utdallas.edu).

Student Organizations

Registered student organizations provide the major means by which students can contribute to campus 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 current groups and guidelines for forming new organizations are available on the web at www.utdallas.edu/csi, in the Center for Student Involvement in the Student Union (SU2.506), or by calling (972) 883-6223.

Student Union

The Student Union is a place for students to hang out, grab a bite to eat and just relax. Open seven days a week, it includes a TV lounge, study lounges, pool tables, ping-pong tables, a video arcade, the Comet Café, The Pub and a number of meeting rooms that can be reserved for organization meetings (www.utdallas.edu/union).

Student Union and Activities Advisory Board (SUAAB)

SUAAB is a student leadership groups that offers a variety of events including the annual Homecoming Dance, Casino Night, Springapalooza, movies, comedians, concerts, pep rallies and more (<http://www.utdallas.edu/suaab/>).

Student Volunteerism

The Student Volunteerism Program offers students a variety of opportunities to lend their time and talents in service to the communities of UT Dallas, North Central Texas and beyond. Programs include Alternative Spring Break, Service Saturdays and Viva Volunteer among others. The Office of Student Volunteerism is located in the Student Union (SU1.610) and can be contacted at (972) 883-6393 or on the web at www.utdallas.edu/volunteer.

Transfer Student Services

The Transfer Student Services Office provides support to new and returning transfer students to ensure their successful transition into UT Dallas. The Transfer Student Services Office is located in the Student Union (SU1.610) and can be contacted at (972) 883-6204 or on the web at www.utdallas.edu/transferservices.

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.

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).

SCHOOL OF ARTS AND HUMANITIES

The School of Arts and Humanities offers five graduate degree programs: Arts and Technology, Emerging Media and Communication, History, Humanities, and Latin American Studies.

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 Emerging Media and Communications (M.A.)

The interdisciplinary Graduate Program in Emerging Media and Communication focuses on ways in which digital technology is transforming the dissemination of information and art. The program enables students to analyze, employ and produce technologically mediated communication.

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.

Graduate Program in Latin American Studies (M.A.)

The interdisciplinary program in Latin American Studies allows students to acquire expertise in multiple aspects of Latin America. The curriculum connects literary, historical, cultural, and visual studies.

DEGREES OFFERED

Master of Arts in Arts and Technology
Master of Fine Arts in Arts and Technology

Master of Arts in Emerging Media and Communication
Master of Arts in History

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 Latin American Studies
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

Certificate in Holocaust Studies

Graduate Programs in Arts & Humanities

<http://www.utdallas.edu/ah/>

Faculty

Professors: Charles R. Bambach, Richard Brettell, David F. Channell, Milton A. Cohen, Fred Curchack, R. David Edmunds, Ming Dong Gu, Dennis M. Kratz, Thomas Linehan, Enric Madriguera, Adrienne L. McLean, Mihai Nadin, Zsuzsanna Ozsvath, John J. Pomara, Stephen G. Rabe, Tim Redman, R. Clay Reynolds, Thomas Riccio, Robert X. Rodriguez, Rainer Schulte, Theresa M. Towner, Frederick Turner, Marilyn Waligore

Associate Professors: J. Michael Farmer, Pamela Gossin, Midori Kitagawa, Shelley Lane, Patricia Michaelson, Venus O. Reese, Nils Roemer, Erin A. Smith, Dean Terry, Daniel Wickberg, Michael Wilson

Assistant Professors: Matt Bondurant, Susan Briante, Matthew Brown, Sean Cotter, Frank DuFour, Monica Evans, Eric Farrar, Todd Fechter, Jonathan Frome, Shari Goldberg, John Gooch, Charles Hatfield, Jessica Murphy, Cihan Muslu, Michelle Nickerson, Peter Park, David Parry, Monica Rankin, Natalie Ring, Mark Rosen, Eric Schlereth, Charissa Terranova, Marjorie Zielke

Senior Lecturers: Bruce Barnes, Lisa Bell, Kelly P. Durbin, Maria Engen, Kathryn C. Evans, Dianne Goode, Michele Hanlon, Peter Ingrao, Janet Johnson, Thomas Lambert, Kathy Lingo, Mary Medrick, Greg L. Metz, Chris Ryan, Monica M. Saba, Jeffrey Schulze, Betty Wiesepepe, MaryAnn Young

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

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 Emerging Media and Communication, most courses are offered under the rubric of Emerging Media and Communication (EMAC), but the degree plan also includes courses in Arts and Technology (ATEC), 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).

Within the Graduate Program in Latin American Studies, required courses are offered within Latin American Studies (LATS) and elective courses are drawn from Aesthetic Studies (HUAS), History (HIST), History of Ideas (HUHI), 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 page13.

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 Emerging Media and Communication should have a previous academic degree (B.A. or B.S.) in an appropriate field (i.e., Art, Computer Science, Communication), 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, communications, and/or 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).

Normally students applying for admission to the Graduate Program in Latin American Studies should have a previous degree (B.A. or B.S.) in arts and humanities fields, demonstrated interest and experience in Latin American studies and a grade point average of 3.3 (especially in upper-division undergraduate work).

The School of Arts and Humanities does not require 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 20.

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, six centers and institutes that promote interdisciplinary research are located within the School: The Center for Translation Studies; the Ackerman Center for Holocaust Studies; the Confucius Institute; the Institute for Interactive Arts and Engineering; the Center for the Interdisciplinary Study of Museums, and the Center for Values in Medicine, Science and Technology. Since the School combines the Humanities and the Arts, many faculty are engaged in the creation and performance of artistic works in music, drama, literature 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 thinking and theory with practice. Students must complete thirty-six semester hours of course work and an advanced project.

Core Courses (6 hours)

ATEC 6300 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 6332 Design Principles

ATEC 6333 Computational Design

ATEC 6334 Information Design for New Media

ATEC 6335 Research in Sound Design

ATEC 6341 Game Design

ATEC 6342 Game Studies

ATEC 6343 Interactive Environments

ATEC 6345 Game Production Lab

ATEC 6351 Digital Arts

ATEC 6352 Motion Capture

ATEC 6353 Visualization Research

ATEC 6354 Immersive Environments

ATEC 6355 Animation Production Lab

ATEC 6361 Writing for Interactive Media

ATEC 6371 Community Media

ATEC 6374 Digital Textuality

ATEC 6375 Cyberpsychology

ATEC 6376 E-Business Environment Design

ATEC 6V81 Special Topics in Emergent Communication

HUAS 6313 The Business of the Arts

HUAS 6312 Art and Society

HUAS 6330 Studies in Visual Arts

HUAS 6375 Imagery and Iconography

HUAS 6392 Image/Text Workshop

HUAS 6393 Time-Based Arts Workshop

HUSL 6308 Studies in Literary Forms

HUSL 6370 Literature and Ideas

Final Project (3 hours)

ATEC 6V95 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 6349 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 6332 Design Principles

ATEC 6333 Computational Design

ATEC 6334 Information Design for New Media

ATEC 6335 Research in Sound Design

ATEC 6341 Game Design

ATEC 6342 Game Studies

ATEC 6343 Interactive Environments

ATEC 6345 Game Production Lab

ATEC 6351 Digital Arts

ATEC 6352 Motion Capture

ATEC 6353 Visualization Research

ATEC 6354 Immersive Environments

ATEC 6355 Animation Production Lab

ATEC 6361 Writing for Interactive Media

ATEC 6371 Community Media

ATEC 6374 Digital Textuality

ATEC 6375 Cyberpsychology

ATEC 6376 E-Business Environment Design

ATEC 6V81 Special Topics in Emergent Communication

HUAS 6312 Art and Society

HUAS 6313 The Business of the Arts

HUAS 6317 Art and Authorship

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 6354 Creating Short Fictions

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 6V95 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 Emerging Media and Communication

Master of Arts

The program leading to the M.A. in Emerging Media and Communication focuses on ways in which network technologies are transforming the creation and dissemination of information and content. Providing an interdisciplinary education that connects theory with practice, the program combines the creation of digital content for multiple communication platforms with examination of cultural issues created by emerging technology. The program is intended for (a) professionals in fields such as journalism, design, public relations, and advertising that are powerfully affected by emerging communicative technologies, (b) graduates with degrees in computer science or related fields who wish to expand their occupational potential by gaining expertise in communication, (c) graduates of programs in the humanities, communication, and journalism who wish to expand their occupational potential by gaining expertise in emerging media, and (d) teachers in the humanities and other fields that will be profoundly affected by new modes of communication and information transfer. Students must complete 33 semester credit hours of course work and a capstone project.

Core Course (3 hours)

EMAC 6300 Introduction to the Study of Emerging Media and Communication

Required Courses (15 hours)

EMAC 6361 Writing for Interactive Media

EMAC 6372 Approaches to Emerging Media and Communication

EMAC 6373 Emerging Media Studio

EMAC 6374 Digital Textuality

HUHI 6323 Space, Time, and Culture

or

HUSL 6355 Literature, Science, and Culture

Prescribed Electives (12 hours)

Twelve hours chosen from the following courses:

ATEC 6331 Aesthetics of Interactive Media

EMAC 6371 Community Media
EMAC 6383 Emerging Media Studio II
EMAC 6V81 Special Topics in Emerging Media and Communication
HUAS 6330 Studies in the Visual Arts
HUAS 6355 Creating Nonfictions
HUAS 6392 Image/Text Workshop
HUHI 6323 Space, Time, and Culture
HUSL 6355 Literature, Science, and Culture
HUSL 6380 Art & Craft of Translation

Final Project (3 hours)

EMAC 6V91 Advanced Project Workshop

Having completed at least 30 hours of course work, students will complete and present an advanced multi-media project 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 6301 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 6398 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 6301 and normally all in organized HIST and HUIH 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-three semester hours of course work, demonstrate reading proficiency in an approved foreign language, and successfully complete a portfolio.

Core Course (3 hours)

HUMA 6300 Interdisciplinary Approaches to the Arts and Humanities.
Students are expected to complete this course as early as possible in their programs.

Elective Courses (30 hours)

Thirty semester hours, of which at least twenty-seven 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 must be taken in the student's major area of concentration (Aesthetic Studies, History of Ideas, or Studies in Literature), the exception being students pursuing a general Humanities degree. Normally no more than three hours of independent study are applicable to the degree plan. Independent studies do not count toward the 18 hour minimum in the major required for certification to teach at either a two or four year college/university. M.A. students are restricted to courses numbered at the 5000- and 6000-level.

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 6330-6333), 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-three 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 6300 Teaching of the Humanities in the Secondary School
HUMA 6300 Interdisciplinary Approaches to the Arts and Humanities

Specialization (15 hours)

Fifteen hours in organized courses at the 5000- or 6000-level 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 6300. Three hours may be taken as independent study to prepare for the casebook.

Elective Courses (6 hours)

Six hours of electives at the 5000- or 6000-level in any organized courses outside the area of specialization.

Casebook: HUED 6304 (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 UT 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 6300.

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. At least fifteen hours of doctoral coursework must be taken in courses numbered at the 7000-level.

Foreign Language

Students admitted to the Ph.D. program from universities other than UT 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 6380) once, or they may arrange to demonstrate active use of the language as part of an independent study. 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.

Doctoral Field Examinations

After completing all the above requirements, students proceed to the doctoral field examinations, 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.

Certificate in Holocaust Studies

The Ackerman Center for Holocausts Studies

The Certificate in Holocaust Studies (Certificate) is offered to MA, MAT, and PhD students in the School of Arts and Humanities (A & H) from The Ackerman Center for Holocaust Studies (Center) at UT Dallas. Students who wish to pursue the Certificate must do so in coordination with A & H's requirements for graduation from their specified program. Graduates of this 15 credit hours certificate will have a critical understanding of the Holocaust as well as modern Jewish culture, the history of anti-Semitism, and the major contemporary philosophical, aesthetic, and analytical responses to this major event.

In order to begin work toward the Certificate, each student must complete a registration form, and is required to be advised each semester by Professor Zsuzsanna Ozsvath or Professor Nils Roemer. In addition, each semester, Certification students must also meet with their academic counselor provided to them by A & H. Certificates can only be awarded to those students who have their advising forms completed from both the School of Arts and Humanities and the UT Dallas Ackerman Center for Holocaust Studies. The Certificate will be awarded in addition to the diploma earned in the student's chosen field after graduation.

The Requirements:

Each student seeking a Certificate in Holocaust Studies must complete 15 Graduate credit hours (hours) chosen from the "Holocaust Certification Courses" below. Students must take 12 of the 15 required hours in organized classes. The remaining 3 hours of coursework may be completed either in an organized class, or by independent study with the permission of the student's Center Advisor. Independent study courses must focus on topics relating to: German history, philosophy, and literature; Interwar Germany; Jewish Studies; or other Holocaust-related topics. Students may not take "Foundation Courses" by independent study.

NOTE: Students enrolled in the professional option of the MA degree may not take an independent study course.

Special Requirements for MAT Students Enrolled in HUAS Degree Plans

MAT students with a concentration in HUAS must take an additional 6 to 9 hours beyond their required 36 hours for the Holocaust Certification unless they receive prior special permission from the Associate Dean for Graduate Studies.

Holocaust Certification Courses

I. Foundation Courses:

HUHI 6338: The Holocaust

AND

(HUSL 6378: Literature and the Holocaust

(6 hours)

(As new courses are developed, students may substitute a required course with the permission of the Center's Director.)

II. German history, philosophy, and literature:

HUSL 6375: German Literature and ideas 1870-1960 (3 hours)

OR

HUSL 6376: Literature of Weimar Germany (**3 hours**)

(As new courses are developed, students may substitute a required course with the permission of the Center's Director.)

III. Jewish Studies:

HUSL 6374: Modern Jewish Literature Across Cultures

AND

HUHI 6336: Modernity, Culture, and the Jews

(6 hours)

(As new courses are developed, students may substitute a required course with the permission of the Center's Director.)

Students with Existing Course Credit:

Students who have completed a minimum of 9 credit hours, as of the date of application for the Holocaust Certificate, may apply their hours toward the above requirements as long as those classes have been taken within the last 24 credit hours or 12 months of prior coursework. The student, however, must be current in their requirements for graduation, and should be prepared to furnish the Center advisor a completed, up-to-date advising form from their A & H Academic Advisor.

Certificate Registration:

Certificate registration forms are available on the table in front of the Arts and Humanities Office as well as online at www.utdallas.edu/holocaust. Please contact the Center office at 972-883-2100, or by email: holocauststudies@utdallas.edu if you have any questions. Please submit Certification enrollment forms to the Arts and Humanities Office located at JO 4.510.

Graduate Program in Latin American Studies

Master of Arts

The program leading to the M.A. in Latin American Studies allows students to acquire expertise in multiple aspects of Latin America. Building on the unique interdisciplinary structure of the School of Arts and Humanities, the program has an integrated curriculum that connects literary, historical, cultural, and visual studies. Students seeking the M.A. in Latin American Studies have two options, a "research" or a "professional" option. Students with plans for doctoral study should choose the research option.

Students pursuing the research option must complete thirty-six semester hours of course work, demonstrate reading proficiency in an approved foreign language, complete an approved internship or study abroad, and successfully complete a capstone project. Normally no more than six hours of independent study are applicable to the degree plan.

Core Course (3 hours)

LATS 6300: Introduction to Latin American Studies

Students are expected to complete this course as early as possible in their program.

Prescribed Electives (15 hours)

Prescribed electives are selected from the following courses:

HIST 6360: Latin American History

HIST 6365: Mexican History

HUAS 6334: Iberian Culture and Music

HUHI 6315: Thought, Culture, and Society in Latin America

HUSL 6373: Topics in Latin American Literature

HUSL 6380: The Art & Craft of Translation

HUSL 6396: Spanish Language, Literature, and Culture

Free Elective Courses (9 hours)

These three courses may be selected from other courses related to Latin America and/or the students' area of concentration. Students may take approved courses on Latin America topics in the School of Economic, Political, and Policy Sciences and the School of Interdisciplinary Studies.

Free electives must be approved by the Associate Dean for Graduate Studies.

Internship or Study Abroad (3 hours)

Students will also complete a minimum of 3 semester credit hours in an approved study abroad immersion program or a comparable internship program established in partnership with UT Dallas and businesses and/or non-for-profit agencies in the Dallas-Fort Worth area.

LATS 6390: Internship in Latin American Studies

Capstone Project (6 hours)

LATS 6399: Capstone Project in Latin American Studies

Having completed thirty hours of course work, students must write and present a capstone project on a topic of their choice in Latin American Studies, either a research thesis or final project.

Students pursuing the professional option in Latin American Studies must complete thirty-six semester hours of course work, including LATS 6300 and 15 hours of prescribed electives, demonstrate reading proficiency in an approved foreign language, and complete an approved internship or study abroad. They are not required to complete a capstone project and they receive a terminal degree. Normally no more than six hours of independent study are applicable to the degree plan.

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 6300 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. (0-3) Y

Arts and Technology Elective Courses

ATEC 6332 Design Principles (3 semester hours) Exploration of advanced design principles and practices common to most design professions. Topics include the language of design, core design concepts, analysis of design, and specialized design practices. (0-3) Y

ATEC 6333 Computational Design (3 semester hours) Exploration of the computational theory of design and the design of products and processes through digital means, such as computer graphics, animation, visualization, simulation, computer-aided design, and image processing. (0-3) Y

ATEC 6334 Information Design for New Media (3 semester hours) This course explores holistic discovery research and practice in the field of new media studies. Students will learn to uncover insights about user desirability, technological potential and possibility, data evaluation, value measures, and how to select ideas that have the greatest potential to ultimately invest, develop, and build new products and services. (0-3) T

ATEC 6335 Research in Sound Design (3 semester hours) Exploration of the relationship between sound, music, and the visual arts. This course covers the history of art and technology as applied to the domain of sound, with a special focus on interactive applications. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (0-3) T

ATEC 6341 Game Design (3 semester hours) Advanced study of the structure and design of digital, analog, narrative, and social game systems. Course focuses on theory, critical analysis, innovation, and prototype creation. (0-3) Y

ATEC 6342 Game Studies (3 semester hours) Advanced study of the computer game as cultural artifact, procedural system, social space, and artistic medium. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (0-3) T

ATEC 6343 Interactive Environments (3 semester hours) Exploration of design principles and practices for the creation of interactive experiential spaces. Course focuses on atmosphere, flow, interactivity, spatial narrative, and user experience. (May be repeated for credit as topic vary to a maximum of 6 credit hours.) (0-3) T

ATEC 6345 Game Production Lab (3 semester hours) Exploration and application of advanced methods and techniques (literary, artistic, conceptual, and technical) involved in the development of interactive games. Includes participation in development team for creation of a prototype, vertical slice demo, or complete original game. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (0-3) T

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 as topics vary to a maximum of 6 credit hours.) (0-3) Y

ATEC 6352 Motion Capture (3 semester hours) Exploration of advanced methods and techniques in motion capture animation. Course culminates in a professional-quality animation project. (May be repeated to a maximum of 6 credit hours.) (0-3) T

ATEC 6353 Visualization Research (3 semester hours) Exploration and application of advanced techniques in animation, visualization, simulation, and interactivity. (May be repeated for credit as topics

vary to a maximum of 6 credit hours.) (0-3) T

ATEC 6354 Immersive Environments (3 semester hours) Advanced research in the conceptualization, creation, and application of interactive immersive environments, including research in synthetic spaces, interactive game engines, and hybrid physical/virtual worlds. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (0-3) T

ATEC 6355 Animation Production Lab (3 semester hours) Exploration and application of advanced concepts and techniques involved in the development of animated shorts and features. Includes participation in development team for creation of an animated short or feature-length animated film. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (0-3) T

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.) (0-3) 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. (0-3) T

ATEC 6372 Approaches to Emergent Media and Communications (3 semester hours) Focuses on the study of emergent media from a theoretical frame, exploring the political, technological, cultural and historical forces which inform the way media and communication develop. (3-0) T

ATEC 6373 Emerging Media Studio (3 semester hours) This course explores media production across multiple media. Students work in teams to develop meta-media projects in a variety of content delivery environments. Class will require students to develop a range of rhetorical (text, audio) and visual (image, video) strategies appropriate for emerging media. (May be repeated for credit to a maximum of 9 hours) (3-0) T

ATEC 6374 Digital Textuality (3 semester hours) This course will focus on understanding how representation and specifically writing has changed as mediums of writing have changed, paying special attention to the transformation from the analog to the digital. (3-0) T

ATEC 6375 Cyberpsychology(3 semester hours) Exploration of the underlying psychological issues of users that can be taken into account in the design and assessment of interactive technologies, such as online personas, virtual humans and cultures, brain-computer or human-robotic interfaces, virtual workplaces, and e-behavior. (3-0) T

ATEC 6376 E-Business Environment Design (3 semester hours) Students in this course will analyze underlying changes in societal structures fueled by a web-based economic environment, apply the effect of these societal paradigms to marketing, examine the effect of technology-driven societal structures on the workplace, and explore how the optimization of e-marketing and e-business environment designs can be used to reduce energy consumption. (3-0) T

ATEC 6382 Special Topics in Interactive Media (3 semester hours) Students in this course will explore how interactivity defines the degree to which digital artifacts (such as games, multimedia applications, products of all kind) are brought to life by their users. Topics may include interaction design, interface design, and research in anticipatory systems. (May be repeated for credit to a maximum of 6 credit hours.) (0-3) R

ATEC 6383 Special Topics in Sound Design (3 semester hours) Advanced research in digital music and sound design. Topics may include advanced visualization of music and sound, sonification of images, and advanced research in interactive sound applications. (May be repeated for credit to a maximum of 6 credit hours.) (0-3) R

ATEC 6384 Special Topics in Game Studies (3 semester hours) An examination of the links between technology, play, and culture. Topics may include the ethics of game development, serious and persuasive games, simulation and training, interactive education, identity and culture in virtual worlds, multilinear narrative, and philosophical origins of games as a medium. (May be repeated for credit to a maximum of 6 credit hours.) (0-3) R

ATEC 6385 Special Topics in Animation (3 semester hours) Advanced research in animation, including concept development, character development, advanced techniques and methods in 2D animation, and animation production techniques. (May be repeated for credit to a maximum of 6 credit hours.) (0-3) R

ATEC 6390 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 6397 Independent Readings in Arts and Technology (3 semester hours) (May be repeated for credit) (3-0) R

ATEC 6398 Independent Research in Arts and Technology (3 semester hours) (May be repeated for credit.) (3-0) R

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 as topics vary to a maximum of 9 credit hours.) (0-[1-9]) T

ATEC 6V95 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 7331 Research Methodology in Arts and Technology (3 semester hours). This course presents students with a variety of research methods that are appropriate for advanced research in Arts and Technology. Methods will include ethnographic, experimental, descriptive, historical, and philosophical. (3-0) R

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. ([3-6]-0) R

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 as topics vary to a maximum of 9 credit hours.) (0-[1-9]) R

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

Emerging Media and Communication Core Courses

EMAC 6300 Introduction to the Study of Emerging Media and Communication (3 semester hours) Introduction to interdisciplinary study of the implications of interactive technology for the creation, dissemination and impact of communication. Establishes basic theoretical concepts and principles underlying the graduate program in Emerging Media and Communication. (3-0) Y

EMAC 6374 (ATEC 6374) Digital Textuality (3 semester hours) This course will focus on understanding how representation and specifically writing has historically changed, paying special attention to the transformation from the analog to the digital. (3-0) Y

Emerging Media and Communication Elective Courses

EMAC 6361 (ATEC 6341) 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.) (0-3) Y

EMAC 6371 (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. (0-3) T

EMAC 6372 (ATEC 6372) Approaches to Emergent Media and Communication (3 semester hours) Focuses on the study of emergent media from a theoretical frame, exploring the political, technological, cultural, and historical forces which inform the way media and communication develop. (3-0) T

EMAC 6373 (ATEC 6373) Emerging Media Studio I (3 semester hours) Explores media production across multiple media. Students work in teams to develop meta-media projects in a variety of content

delivery environments. Class will require students to develop a range of rhetorical (text, audio) and visual (image, video) strategies appropriate for emerging media. (May be repeated for credit as topics vary to a maximum of 9 hours) (0-3) T

EMAC 6383 Emerging Media Studio II (3 semester hours) Advanced collaborative workshop devoted to the creation of sophisticated communications employing multiple media platforms. (May be repeated for credit to a maximum of 9 credit hours.) (0-3) T

EMAC 6V81 Special Topics in Emergent Communication (1-9 semester hours) A course dedicated to current issues, research problems, and special projects in emerging media and communication. Topics will vary and may include distributed, mobile, time-shifted, interactive and personal media. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (0-[1-9]) T

EMAC 6V91 Advanced Project Workshop (3-6 semester hours) Students propose, develop and execute an advanced creative and/or research project exploring the Emerging Media and Communication. This course is required of all degree candidates in Emerging Media and Communication. ([3-6]-0) Y

History Core Course

HIST 6301 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. Topics may vary. (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. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HIST 6324 Gilded Age & Progressive Era (3 semester hours) The study of social, political, and economic life in the period between 1877 and 1919. Special attention to the relationship between government and society. (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. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HIST 6326 U.S. Foreign Relations (3 semester hours) The study of U.S. diplomatic relations with Asia, Africa, Europe, Latin America, the Middle East, and Soviet Russia in the twentieth and twenty-first centuries. (3-0) T

HIST 6327 U.S. Since 1945 (3 semester hours) The study of the political, economic, social, and cultural development of the United States since the end of World War II. (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. Topics may vary. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HIST 6332 Slavery in America (3 semester hours) The study of the origins, evolution, growth and destruction of racial slavery in America from 1619-1865. (3-0) T

HIST 6333 Rise of the Jim Crow South (3 semester hours) The study of the origins of segregation and disfranchisement in the New South. Explores historiographical debates about the nature and meaning of Jim Crow. (3-0) T

HIST 6335 U.S. Women (3 semester hours) The study of recent historiography, current methods, and major themes in U.S. women's and gender history. (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. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HIST 6350 Asian History (3 semester hours) The study of specific themes and/or periods in the history of Asia. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HIST 6360 Latin American History (3 semester hours) The study of specific themes and/or periods in the history of Latin America. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HIST 6365 Mexican History (3 semester hours) The study of specific themes and/or periods in the history of Mexico. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HIST 6370 Middle Eastern History (3 semester hours) The study of specific themes and/or periods in the history of the Middle East. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HIST 6390 Topics in History (3 semester hours) The study of specific themes and/or periods in history. (May be repeated for credit as topic vary to a maximum of 9 hours.) (3-0) R

HIST 6395 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 6397 Independent Readings in History (3 semester hours) (May be repeated for credit.) (3-0) R

HIST 6398 Independent Research in History (3 semester hours) (May be repeated for credit.) (3-0) R

HIST 6399 Master's Thesis (3 semester hours) (May be repeated for credit but only 6 hours will be counted toward M.A.) (3-0) R

Humanities Core Courses

HUMA 6300 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
[moved to Education & General below]

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. (May be repeated for credit as topics vary 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 6310 Introduction to Film Studies (3 semester hours) Study of the history and formal and stylistic elements of cinema as a medium of expression, as an industry, and as an art form; and an introduction to the tenets and theoretical basis of the academic discipline known as film studies. (3-0) T

HUAS 6312 Art and Society (3 semester hours) Study of 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 as topics vary to a maximum of 9 credit hours.) (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 as topics vary to a maximum of 9 credit hours.) (3-0) Y

HUAS 6317 Art and Authorship (3 semester hours) 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 as topics vary 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 as topics vary to a maximum of 9 credit hours.) (3-0) T

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 as topics vary 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 as topics vary 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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUAS 6333 Advanced Orchestra/Chamber Music Ensemble (3 semester hours) Workshop in which instrumentalists, singers, dancers, actors, composers, lyricists, visual artists and/or video/performance artists create and perform music for small and larger ensembles, plus multi-media and theater works. (May be repeated for credit to a maximum of 9 credit hours.) Permission of instructor required. (3-0) T

HUAS 6334 Iberian Culture and Music (3 semester hours) Study of the transfer of music and culture between Spain, Portugal, and the countries of the Americas which had close connections to the Iberian countries via language, culture, and commerce. (3-0) T

HUAS 6336 Photography Studio/Seminar (3 semester hours) Workshop-based course designed to foster reflection on the relationship between human perception and the photographic mediation of reality. The course may emphasis photographic processes or conceptual frameworks.(May be repeated for credit to a maximum of 9 credit hours.)(3-0) T

HUAS 6337 Digital Photography (3 semester hours) Workshop in which students explore digital photography within the context of contemporary art, emphasizing the relationship between digital imaging processes and color photographic techniques. (May be repeated for credit to a maximum of 6 credit hours.) (3-0) T

HUAS 6339 Painting/Digital Imaging/Video (3 semester hours) Workshop in which students will pursue creative work in a medium of their preference or expertise (can include painting, drawing, digital imaging, video or hybrid forms). (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6340 Studies in Theater and Dance (3 semester hours) An investigation of theater, performance art, inter-media, 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 as topics vary to a maximum of 9 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. Topics may vary. (May be repeated for credit to a maximum of 6 semester hours.) (3-0) T

HUAS 6347 Solo Performance (3 semester hours) Workshop in which students explore aspects of devising, writing and performing solos, with an emphasis on developing work in multiple genres, media, and formats. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6348 Performance Installation (3 semester hours) An exploration of the theory, history, and practice of employing installation and performance art with technology as a means of extending personal artistic practice. Emphasis will be on practical experience in the conceptualization and production of collaborative, experimental, trans-disciplinary artistic expression. (May be repeated for credit to a maximum of 9 credit 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. Topics may vary. (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. Topics may vary. (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. Topics may vary. (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. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6354 Creating Short Fictions (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. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6355 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 6373 Studies in Film, Television, and Digital Media (3 semester hours) Study of aspects of motion picture history, criticism, and aesthetics. Topics may include genre study; documentary practices; national cinemas or movements; theories of reception; or comparisons of these and other art forms. (May be repeated for credit as topics vary 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 as topics vary to a maximum of 6 credit hours.) (3-0) T

HUAS 6377 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 as topics vary to a maximum of 6 credit hours.) (3-0) T

HUAS 6380 Creating Poetry: Intermediate (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 6381 Creating Fiction: Intermediate (3 semester hours) An intensive investigation into the theories, aesthetics, and creation of fiction 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 fictions. The course may emphasize the short story, novel, or novella. Permission of the instructor and previous completion of HUAS 6351 or HUAS 6354 are required. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6383 Creating Scripts: Intermediate (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 HUAS 6352 or HUAS 6353 required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6385 Creating Nonfictions: Intermediate (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 6355 are required. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 6390 Special Topics in Aesthetic and Performance Studies (3 semester hours) Independent studies course that may count toward minimum course requirements for the M.A. degree. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) R

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. Topics may vary. (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. Topics may vary. (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. Topics may vary. (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 playwrighting, adaptation of non-dramatic or oral history sources, or be guided by specific text(s), improvisation, inter-cultural or inter-media explorations. Topics may vary. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) Y

HUAS 6397 Independent Readings in Aesthetic and Performance Studies (3 semester hours) (May be repeated for credit.) (3-0) R

HUAS 6398 Independent Research in Aesthetic and Performance Studies (3 semester hours) (May be repeated for credit.) (3-0) R

HUAS 6399 Music in Historical Context (3 semester hours) Study of music in society: dates, periods, genres, style characteristics, major figures, representative masterworks, political/economical/social climate, corollaries in literature, theatre, visual art. (May be repeated for credit as topics vary 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 6609 Music Performance (6 semester hours) Applied study of instrumental/vocal techniques, interpretation, repertoire building and performance practice. (May be repeated for credit to a maximum of 12 credit hours) (6-0) T

HUAS 7305 Advanced Topics in Art History (3 semester hours) Advanced studies in one or more arts of various places and historical periods. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUAS 7320 Advanced Topics in the Visual Arts (3 semester hours) Advanced explorations in various forms of the visual arts. The course may focus on a specific genre or form or on interrelations among visual forms. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUAS 7330 Advanced Topics in Music (3 semester hours) Advanced studies in forms of musical expression. 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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUAS 7340 Advanced Topics in Theater and Dance (3 semester hours) Advanced investigation of theater, performance art, inter-media, 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 as topics vary for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7350 Advanced Topics in Creative Writing (3 semester hours) Advanced investigation of the theory, history, aesthetics, art, and creation of creative writing in a workshop environment. The course may focus on poetry, short stories, scripts or other genres. (May be repeated as topics vary for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7355 Interdisciplinary Studies in Music (3 semester hours) Study of music in relation to one or more of the other arts/disciplines: literature, theatre, dance, visual art, cinema, history, psychology, technology, etc. (May be repeated for credit as topics vary to a maximum of 9 credit hours) (3-0) T

HUAS 7360 Advanced Topics in Film, Television, and Digital Media (3 semester hours) Advanced study of particular aspects of motion picture history, criticism, and aesthetics. Topics may include genre study; documentary practices; national cinemas or movements; theories of reception; or comparisons of these and other art forms. (May be repeated as topics vary for credit to a maximum of 9 credit hours.) (3-0) T

HUAS 7380 Advanced Topics in Aesthetic Studies (3 semester hours) Advanced study of particular themes, topics, and issues in the various disciplines that constitute aesthetic studies. (May be repeated as topics vary for credit to a maximum of 9 credit hours.) (3-0) R

HUAS 7390 Advanced Special Topics in Aesthetic and Performance Studies (3 semester hours) Independent studies course that may count toward minimum course requirements for the Ph.D. degree. (May be repeated for credit to a maximum of 9 credit hours.) (3-0) R

HUAS 7601 Advanced Music Performance (6 semester hours) Applied study of advanced instrumental/vocal techniques, interpretive insights, repertoire building and historical performance practice. (May be repeated for credit to a maximum of 12 credit hours) (6-0) T

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. (May be repeated for credit as topics vary 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. (May be repeated for credit as topics vary 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 as topics vary 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. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUHI 6315 Thought, Culture, and Society in Latin America (3 semester hours) Themes in the intellectual and cultural life of Latin American societies. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUHI 6320 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. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (3-0) T

HUHI 6323 Space, Time, and Culture (3 semester hours) The 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 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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUHI 6327 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. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (3-0) T

HUHI 6329 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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUHI 6332 European Enlightenment (3 semester hours) The study of the European intellectual movement of the Enlightenment, its precursors and consequences. (3-0) T

HUHI 6334 Exploring Urban Cultures (3 semester hours) The study of the European cities of Berlin, Paris, and London from the mid-nineteenth through the early twentieth century. (3-0) T

HUHI 6335 Modern Jewish Thought (3 semester hours) Study of modern and contemporary Jewish thought, with an emphasis on the relationship between Judaism and philosophy. (3-0) T

HUHI 6336 Modernity, Culture, and the Jews (3 semester hours) The study of the role of Jews in the creation of modern culture, with emphasis on Jewish participation as an area of interaction, exchange, and encounter. (3-0) T

HUHI 6337 Moving Pictures in Jewish Culture and Thought (3 semester hours) The study of the role of Jews in the movie industry from the silent era to contemporary Hollywood production. (3-0) T

HUHI 6338 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. (May be repeated for credit to maximum of 6 credit hours.) (3-0) Y

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 may include studies of myth and symbol. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUHI 6341 American Intellectual History (3 semester hours) The study of American thought from the seventeenth century to the present, with a focus on philosophy, political thought, and social thought. (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 6343 The American Experience in Vietnam (3 semester hours) The study of the reaction and response of American society to the political, military, and cultural turmoil engendered by the Vietnam War. (3-0) T

HUHI 6344 The 1960s (3 semester hours) The study of the "Long Decade" of the 1960s, from Elvis to the fall of Richard Nixon. The course will analyze political, economic, social, and cultural developments. (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 as topics vary to a maximum of 6 credit hours.) (3-0) T

HUHI 6346 New Directions in Southern Studies (3 semester hours) The study of how scholarship on the U.S. South has begun to push the conventional boundaries of the discipline through its focus on the categories of race, gender, sexuality, and transnationalism. (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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUHI 6348 Thought, Culture, and Society in Asia (3 semester hours) Themes in the intellectual and cultural life of Asian societies. (May be repeated for credit as topics vary to a maximum of 9 credit hours) (3-0) T

HUHI 6349 Thought, Culture, and Society in the Middle East (3 semester hours) Themes in the intellectual and cultural life of Middle Eastern societies. (May be repeated for credit as topics vary to a maximum of 9 credit hours) (3-0) T

HUHI 6395 Topics in the History of Ideas (3 semester hours) Topics in philosophy, intellectual and/or cultural history. (May be repeated for credit as topics vary to a maximum of 9 hours.) (3-0) R

HUHI 6396 Historical Inquiry (3 semester hours) A leveling course for graduate students with little background in the field as an advanced introduction to historical study and the history of ideas. (3-0) R

HUHI 6397 Independent Readings in History of Ideas (3 semester hours) (May be repeated for credit.) (3-0) R

HUHI 6398 Independent Research in History of Ideas (3 semester hours) (May be repeated for credit.) (3-0) R

HUHI 6399 Special Topics in the History of Ideas (3 semester hours) Independent studies course that may count toward minimum course requirements for the M.A. degree. (May be repeated for credit as topics vary to a maximum of 9 hours.) (3-0) R

HUHI 7313 Advanced Topics in U.S. Thought, Culture, and Society (3 semester hours) Advanced topics in the intellectual and cultural history of the United States. The course will focus on key thinkers, ideas, schools of thought, or cultural beliefs chosen from different periods and understood within their intellectual and social contexts. (May be repeated for credit as topics vary to a maximum of 9 credit hours) (3-0) T

HUHI 7314 Advanced Topics in European Thought, Culture, and Society (3 semester hours) Advanced topics in the intellectual and cultural life of European societies. (May be repeated for credit as topics vary to a maximum of 9 credit hours) (3-0) T

HUHI 7315 Advanced Topics in Thought, Culture, and Society (3 semester hours) Advanced topics in intellectual and cultural history. The course may focus on different themes, periods, and geographical areas. (May be repeated for credit as topics vary to a maximum of 9 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. (May be repeated for credit as topics vary 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 as topics vary 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 as topics vary to maximum of 6 credit hours.) (3-0) R

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. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) R

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) R

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 as topics vary to a maximum of 6 credit hours.) (3-0) R

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) R

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 as topics vary to a maximum of 6 credit hours.) (3-0) R

HUHI 7399 Advanced Special Topics in the History of Ideas (3 semester hours) Independent studies course that may count toward minimum course requirements for the Ph.D. degree. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

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 as topics vary 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 as topics vary 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 as topics vary to a maximum of 9 credit hours.) (3-0) Y

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. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (3-0) T

HUSL 6312 Major Authors (3 semester hours) Study of one or more major literary figures, such as Dante, Chaucer, Milton, Cervantes, Goethe, Austen, Blake, Balzac, Dostoevsky, Tolstoy, Mann, Eliot, Pound, Woolf, Faulkner, Paz or Borges. (May be repeated for credit as subjects vary to a maximum of 9

credit hours.) (3-0) Y

HUSL 6313 Shakespeare (3 semester hours) Study of the dramatic and/or poetic writings of William Shakespeare. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (3-0) T

HUSL 6314 Jane Austen and Her Time (3 semester hours) Study of the writings of Jane Austen and the ways in which her work engages the political and social issues of her day. (3-0) T

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. (May be repeated for credit as topics vary to a maximum of 6 credit hours.) (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 as topics vary 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 as topics vary to a maximum of 9 hours) (3-0) T

HUSL 6345 Early American Literature (3 semester hours) Study of literary works written in and about America from the early 1500s to 1800. (May be repeated for credit as topics vary to a maximum of 6 credit 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, American, Latin American, or Asian contexts. (May be repeated for credit as topics vary 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 as topics vary 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, American, Latin American, or Asian contexts. (May be repeated for credit as topics vary 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 as topics vary to a maximum of 6 credit hours.) (3-0) T

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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUSL 6373 Topics in Latin American Literature (3 semester hours) Studies in the literatures and cultures of Latin America. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUSL 6374 Modern Jewish Literature Across Cultures (3 semester hours) Study of modern Jewish literatures in multiple national contexts and languages, with emphasis on the interaction between modernity and vision of Jewish identities and traditions. (3-0) T

HUSL 6375 German Literature and Ideas 1870-1960 (3 semester hours) Study of the range and diversity of German-Austrian literature and thought from the end of the nineteenth century through the 1960s. (3-0) T

HUSL 6376 Literature of Weimar Germany (3 semester hours) Study of literature written during the Weimar Republic (1918-1933) with attention to formative influences on and cultural-political forces shaping the artistic imagination. (3-0) T

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 6380 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 6381 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 6383 Teaching First-Year Writing (3 semester hours) Covers both the methods of teaching first-year writing and pedagogical theories of modern composition. Enrollment required for teaching assistants assigned to sections of Rhetoric 1302, but not limited to such students. (May be repeated for credit to a maximum of 6 hours.) (3-0) Y

HUSL 6384 Digital and Visual Rhetorics (3 semester hours) Covers a wide range of topics addressing the study of visual rhetoric as well as rhetoric in digital environments. Course also emphasizes the relationship of digital and visual rhetorics to media ecology/media studies as well as the implications of these rhetorics for composition pedagogy. (3-0) T

HUSL 6385 Rhetorical Theory (3 semester hours) A historical survey of Western rhetorical theory focusing on major figures in rhetoric. (3-0) T

HUSL 6386 Special Topics in Rhetoric (3 semester hours) A seminar in the study 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 as topics vary to a maximum of 9 credit hours.) (3-0) R

HUSL 6388 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) T

HUSL 6389 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) 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 as topics vary to a maximum of 9 credit hours.) (3-0) T

HUSL 6392 Topics in Literary Studies (3 semester hours) The study of themes, genres, authors, and/or movements in literature. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) R

HUSL 6393 Independent Readings in Literary Studies (3 semester hours) (May be repeated for credit.) (3-0) R

HUSL 6394 Independent Research in Literary Studies (3 semester hours) (May be repeated for credit.) (3-0) R

HUSL 6395 Special Topics in Literary Studies (3 semester hours) Independent studies course that 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

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 topics vary to a maximum of 9 credit hours.) (3-0) T

HUSL 6399 Studies in Asian Literature (3 semester hours) Studies in the literature and cultures of Asia. Topics may include Zen/Chan History, Thought, and Poetry; Confucianism; and the *I-Ching* (Book of Changes). (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUSL 7308 Advanced Studies in Literary Forms and Genres (3 semester hours) Advanced studies in various literary genres, either individually or in relation to each other. Topics considered may include the difficulties of defining genres, the nature of specific genres, their historical and aesthetic development, and their artistic possibilities. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) T

HUSL 7309 Advanced Studies in Literary Movements (3 semester hours) Advanced 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 as topics vary to a maximum of 9 credit hours). (3-0) R

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 6380 required. (3-0) R

HUSL 7350 Advanced Studies in Nineteenth Century Literature (3 semester hours) Advanced studies in the literature and culture of the nineteenth century. May focus on British, European, American, Asian, or Latin American contexts. (May be repeated for credit as topics vary to a maximum of 9 hours) (3-0) T

HUSL 7360 Advanced Studies in Twentieth Century Literature (3 semester hours) Advanced studies in the literature and culture of the twentieth century. May focus on British, European, American, Asian, or Latin American contexts. (May be repeated for credit as topics vary to a maximum of 9 hours) (3-0) T

HUSL 7370 Advanced 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 as topics vary to a maximum of 9 credit hours.) (3-0) R

HUSL 7372 Advanced Studies in Literature and Society (3 semester hours) Advanced studies of the values and concerns of various social groups through the analysis of literary texts, including consideration of the role of literature and the writer in given societies. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) R

HUSL 7390 Advanced Special Topics in Literary Studies (3 semester hours) Independent studies course that may count toward minimum course requirements for the 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. (May be repeated for credit as topics vary 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

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

HUED 6304 Master Of Arts In Teaching Casebook (3 semester hours) (May be repeated for credit.) (3-0) R

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 6330-6333 Advanced Workshops in Foreign Languages (3 semester hours) Advanced reading, interpretation, and translation of texts in the languages listed below. Recommended preparation: 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 any 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) R

HUMA 6330 French Workshop

HUMA 6331 Spanish Workshop

HUMA 6333 German Workshop

HUMA 6390 Topics in Arts and Humanities (3 semester hours) Studies of topics that incorporate multiple disciplinary materials and perspectives. (May be repeated for credit as topics vary to a maximum of 9 credit hours.) (3-0) R

HUMA 6393 Independent Readings in Arts and Humanities (3 semester hours) (May be repeated for credit.) (3-0) R

HUMA 6395 Independent Research in Arts and Humanities (3 semester hours) (May be repeated for credit.) (3-0) R

HUMA 6V81 Special Topics in Arts and Humanities (1-9 semester hours) If taken as an independent studies course may count toward minimum course requirements for the M.A. and Ph.D. degree. (May be repeated for credit to a maximum of 9 hours.) ([1-9]-0) R

HUMA 7390 Adv. Topics in Arts and Humanities (3 semester hours) Advanced studies of topics that incorporate multiple disciplinary materials and perspectives. (May be repeated for credit to a maximum of 9 hours.) (3-0) R

HUMA 7V81 Adv. Special Topics in Arts and Humanities (1-9 semester hours) If taken as an independent studies course may count toward minimum course requirements for the Ph.D. degree. May be repeated for credit to a maximum of 9 hours.) ([1-9]-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

HUMA 8V99 Ph.D. Dissertation (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) R

Latin American Studies Courses

LATS 6300 Introduction to Latin American Studies (3 semester hours) An interdisciplinary introduction to the theories, methodologies, topics, and themes relevant to the study of Latin America. Required of all students in the M.A. program in Latin American Studies. (3-0) Y

LATS 6390 Internship in Latin American Studies (3 semester hours) Students will complete an internship established in partnership with UT Dallas and businesses and/or not-for-profit agencies in the Dallas-Fort Worth area. (May be repeated but only 6 credit hours will be counted toward the M.A.) (3-0) R

LATS 6399 Capstone Project in Latin American Studies (3 semester hours) Students produce a capstone project on a topic of their choice in Latin American Studies in the form of either a research thesis or final project. (May be repeated but only 6 credit hours will be counted toward the M.A.) (3-0) R

SCHOOL OF BEHAVIORAL AND BRAIN SCIENCES

The School of Behavioral and Brain Sciences offers graduate preparation at the Master's 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 the Advanced Hearing Research Center, the Center for Brain*Health*, and the Center for Children and Families further enrich the training of students.

The programs in the School include masters training in Applied Cognition and Neuroscience, Communication Disorders, Human Development and Early Childhood Disorders and Psychological Sciences. 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
Master of Science in Psychological Sciences

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

Master of Science 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, William F. Katz, Aage R. Møller, Alice O'Toole
Associate Professors: Marco Atzori, Lawrence J. Cauller, Michael Kilgard, Lucien T. Thompson
Assistant Professors: 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 as well as medical school.

Career Opportunities

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. A few representative career opportunities in the Applied Cognition and Neuroscience Area are listed as follows.

- 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 offered in the *Cognition and Neuroscience specialization area*.
- Medical Health professionals (e.g., Electroneurodiagnostic Technologists, MRI Technicians, Radiologists) who are working in the area of brain imaging technology will find the *Neurological Diagnosis and Monitoring specialization area* 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 the area of artificial intelligence and artificial neural network modeling 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 in the School of Behavioral and Brain Sciences. The Computational Systems Laboratory consists of a network of 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 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. Both GRE math and verbal scores are required to be considered for admission.

Students with strong academic records, who are in the process of completing their undergraduate degree at UTD, may be admitted as *Fast-track Students*. Fast-track students may accelerate completion of the degree requirements of the Master of Science Program in Applied Cognition and Neuroscience at UTD by completing up to 12 credits of specified fast-track graduate coursework at UTD as an undergraduate. Fast-track credit hours may be used to fulfill requirements for the student's undergraduate UTD degree as well as satisfy course requirements for the masters' degree in Applied Cognition and Neuroscience. Applications to the Graduate Program in Applied Cognition and Neuroscience can be submitted as soon as the student is an undergraduate at UTD with no more than 45 credit hours remaining.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 methods 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 methods 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 (6 hours).

ACN 6330 Cognitive Science I
ACN 6395 Cognitive Psychology
ACN 6340 Cellular Neuroscience
ACN 6344 Functional Human Neuroanatomy
ACN 6346 Systems Neuroscience

Select at least one approved quantitative methods course approved by the Program Head or from the following approved list of quantitative methods courses (3 hours).

ACN 6312 Research Methods in Behavioral and Brain Sciences ~ Part I
ACN 6313 Research Methods in Behavioral and Brain Sciences ~ Part II
ACN 6314 Research Methods in Behavioral and Brain Sciences ~ Part III
ACN 6351 Quantitative Methods in Neuroscience
ACN 6348 Neural Net Mathematics
ACN 6347 Intelligent Systems Analysis
ACN 6349 Intelligent Systems Design

Select at least one methods course (3 hours).

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. Advanced elective courses may be taken pass/fail or for a grade.

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 are approved to select any four courses 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 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 additionally take two courses from the Cognition and Neuroscience Specialization Area course selections. 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 pursuing the *computer simulation modeling track* should take four courses from the Cognition and Neuroscience Specialization Area which include at least one of the following courses: ACN 7335 Computational Neuroscience, ACN 7367 Speech Perception Lab, ACN 6322 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 and one additional course from the Cognition and Neuroscience Specialization Area course selection. 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 should take ACN 6344 Functional Human Neuroanatomy and ACN 6346 Systems Neuroscience. Students should also choose at least 2 of the following courses as specialization area electives: ACN 6310 Fundamentals of Functional Brain Imaging, ACN 6373 Intraoperative Monitoring I, 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)

The internship requirement is satisfied by enrolling in 6 credit hours of ACN 7V71 Industry Internship, ACN 7V72 Research Internship, and/or HCS 8V80 Research in HCS. 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.

Course Descriptions

Core Courses

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

ACN 6344 (HCS 6344, PSYC 6344) 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, PSYC 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

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

Methods Courses

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. Emphasizes creative applications of these research methodologies. Prerequisites: Linear Algebra and Computer Programming Experience is recommended but not required. (3-0) T

ACN 6312 (HCS 6312, PSYC 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, PSYC 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: ACN/HCS 6312 or consent of instructor. (3-0) Y

ACN 6316 (HCS 6316, PSYC 6316) 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

ACN 6319 (HCS 6319, PSYC 6319) Scientific Writing (3 semester hours) Scientific writing of articles for publication. (3-0) Y

ACN 6322 (HCS 6322) 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. Emphasizes creative applications of these research methodologies. Prerequisites: Computer Programming Experience is recommended but not required. (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 usability 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 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. Emphasizes creative applications of these research methodologies as well as the development of critical thinking skills in a usability engineering context. (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. Topics include: artificial neural network architectures, Lyapunov stability theory, nonlinear optimization theory, stochastic approximation theory, and the Gibbs Sampler. Emphasizes development of advanced analytic skills and mathematical reasoning abilities. Prerequisites: ACN/HCS 6348 (or equivalent) or consent of instructor. (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. Emphasizes development of advanced analytic skills and mathematical reasoning abilities. Intended to provide mathematics preparation for ACN/HCS 6347 and ACN/HCS 6349. Prerequisites: *Either*: (1) Linear algebra, multivariable calculus, STAT 5351, ACN/HCS 5314, *or* (ii) consent of instructor. (3-0) T

ACN 6349 (HCS 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 Markov Random Field probability representations and asymptotic mathematical statistical theory for parameter estimation, model selection, and hypothesis testing. Prerequisites: ACN/HCS 6347 or consent of instructor. (3-0) T

ACN 6351 (HCS 6351) Quantitative Methods in Neuroscience (3 semester hours) Data analysis techniques relevant to neuroscience. Topics may include: fourier/wavelet analysis, differential equations, and statistical data analysis methods. May be repeated for credit with permission of the instructor. Prerequisite: ACN/HCS 6312 or consent of instructor (3-0) R

ACN 6372 (HCS 6372) The Neuroscience of Pain (3 semester hours) A systems-oriented course covering the anatomical and physiologic basis of pain. The course emphasizes the similarities and differences between the different forms of pain and describes the basic features of neural processing of pain signals in the spinal cord and brain, the anatomy and the function of the descending systems that can control transmission of pain signals, and peripheral and central sensitization. The physiological and molecular basis for treatment of pain is discussed. (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 II (3 semester hours). The use of recordings of neuro-electric brain potentials and their interpretation for diagnostic purposes and for intraoperative monitoring. Prerequisite: One of the following: HCS/ACN 6346 Systems Neuroscience, HCS/ACN 6344 Functional Human Neuroanatomy, or HCS/ACN 6373. (3-0) Y

ACN 6399 (HCS 6399, PSYC 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

ACN 7324 (COMD 7324, AUD 7324) Seminar in Cochlear Implants and Technology for Persons with

Hearing Impairments (3 semester hours) Overview of prosthetic alternatives to conventional amplification for individuals with severe-to-profound hearing loss. Topics include candidacy determination, technology, programming/fitting of devices, aural (re)habilitation, and awareness of controversial areas related to cochlear implantation. (3-0) Y

ACN 7335 (HCS 7333) 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

ACN 7367 (HCS 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

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 6160 Neurobiology (1 semester hour) A self-paced course providing the neurobiological foundation for the study of speech-language pathology. This course may only be taken pass/fail. (Open to COMD students only) (1-0) R

ACN 6310 (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

ACN 6331 (HCS 6331, PSYC 6331) 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

ACN 6332 (HCS 6332, PSYC 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) R

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

ACN 6334 (HCS 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) R

ACN 6339 (HCS 6339, PSYC 6339) 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

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

ACN 6355 (HCS 6355, PSYC 6355) Judgment and Decision Making (3 semester hours) This course examines human inferences, judgments, decisions, and the processes by which we arrive at them. It will focus on the fact that our social judgments are not based on the laws of probability and chance, but on other cognitive processes that may have serious shortcomings in important inferential and decision-making tasks. We will also see that these processes, while ecologically efficient, systematic and often predictable, are imperfect in today's data-rich environment. (3-0) T

ACN 6363 (HCS 6363) 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) T

ACN 6367 (HCS 6367, PSYC 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

ACN 6368 (HCS 6368, PSYC 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

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 7330 (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) R

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: Consent of Instructor or either: ACN/HCS 6340 or ACN/HCS 6346. (3-0) T

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 Program in Communication Disorders

<http://bbs.utdallas.edu/>

Faculty

Professors: Thomas Campbell, Sandra Chapman, Christine Dollaghan, William F. Katz, Robert D. Stillman, Linda Thibodeau, Emily Tobey, Hanna Ulatowska, Anne van Kleeck

Associate Professor: Pamela Rollins

Assistant Professor: Mandy Maguire

Clinical Faculty: Michelle Aldridge, Suzanne Bonifert, Lucinda Dean, Diane Garst, 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 are 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 transcripts, GRE scores, letters of recommendation, and statement of purpose.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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.

Students 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 approved elective courses and practicum/internship totaling 48 credit hours. In addition to the required courses listed above, students must complete a minimum of three courses in the areas of language disorders in children and language disorders in adults. Two courses must be completed in one area and one course in the other. Students enroll in Practicum (HCS 7380) or Internship (COMD 6630) each semester in order to earn the necessary clock hours for certification and licensure. In general, a maximum of 9 semester hours of Practicum/Internship may be counted toward the minimum 48 semester hours required for the degree. Exceptions to the above requirements must be approved by the program head.

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 master's and doctoral courses 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 5340 Articulation Disorders (3 semester hours) Etiology, symptomatology, evaluation, and treatment of articulation disorders. (3-0) Y

COMD 5341 Audiology (3 semester hours) Clinical application and interpretation in audiology. Emphasis on instrumentation and calibration considerations for air and bone conduction test, speech audiometry, cerumen management, infection control and basic masking principles. (3-0) Y

COMD 5344 Anatomy and Physiology of Speech and Hearing (3 semester hours) Study of anatomic and physiologic mechanisms underlying speech: respiration, phonation, and articulation. Overview of the peripheral auditory system. (3-0) Y

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 6240 Professional Issues in Speech/Language Pathology (2 semester hours) Insights into the real-world and a means to master objectives as a professional in the field of speech-language pathology. (2-0) R

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 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 Disorder 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 6377 Neurogenic Communication Disorders I (3 semester hours) Introduction to adult neurogenic communication disorders including neuropathology, assessment and diagnosis of aphasia, traumatic brain injury, right hemispheric impairment, and dementia. (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 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 (6-0) S

COMD 7172 Laryngectomy (1 semester hour) Course will describe the laryngectomy process from surgery to rehabilitation, discuss emotional issues, describe alaryngeal devices and discuss TEP, stoma, trach care, and esophageal speech. (1-0) R

COMD 7173 Methods in Pediatric Aural Habilitation - Part I (1 semester hour) PAH I focuses on the discussion of topics related to the management of children with hearing loss with specific reference to observation experiences. In addition, introduction to audiometric testing, hearing aids, assistive technology, and Deaf Culture is provided. There is also practice of basic sign language as the vocabulary

relates to these topics. (1-0) R

COMD 7174 Methods in Pediatric Aural Habilitation - Part II (1 semester hour) PAH II focuses on speech, language, and learning assessments for students with hearing loss and developing auditory management skills. Troubleshooting with hearing aids, cochlear implants, and assistive technology is reviewed weekly. Development of sign language skills is included through group practice and community service projects. (1-0) R

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 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 swallowing. 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 7309 (HCS 7309) Neural Correlates of Human Cognition: Lesion-Deficit Models (3 semester hours) A framework of how the correlation of brain lesions with behavioral deficits provides a key map associating cognitive functions with specific brain regions in humans. These findings provide a key model to combine with the findings of functional neuroimaging (fMRI, PET) in understanding how humans think. The areas of cognition to be covered include language, episodic memory, semantic memory, working memory, aspects of visuospatial functions, and higher-order motor planning. Cognitive deficits in patients (e.g., amnesia, aphasia, etc.) will be explained within this framework. (3-0)

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, ACN 7324) Seminar in Cochlear Implants and Technology for Persons with Hearing Impairments (3 semester hours) Overview of prosthetic alternatives to conventional amplification for individuals with severe-to-profound hearing loss. Topics include candidacy determination, technology, programming/fitting of devices, aural (re)habilitation, and awareness of controversial areas related to cochlear implantation. (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 7336 (HDCD 6365) Social Communication in Early Childhood Disorders (3 semester hours) Development of infant and toddler social, communication and language skills including major milestones of typical development in the areas of cognitive, social and language development; assessment, and treatment of social communication disorders in the prelinguistic and emerging language stages. (3-0) Y

COMD 7339 (AUD 7339) Evidence-Based Practice in Communication Disorders (3 semester hours) Origins, strengths and limitations of the evidence-based practice paradigm. Methods for finding,

appraising, and incorporating high-quality evidence into clinical decisions about screening, diagnosing and treating speech, language, and hearing disorders. (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 7378 Assessment and Intervention of Language Impairments in Preschool and School-Age Children (3 semester hours) Assessment and intervention for children with diverse language impairments. Theoretical models, characteristics and correlates of pediatric language disorders; and evidence-based approaches to screening, diagnosis, assessment, treatment, and prevention. (3-0) Y

COMD 7379 (HCS 7379) Current Research in Autism (3 semester hours) Exploration of research and theories related to Autism Spectrum Disorders (ASD) and the implications the disability has on an individual's learning, behavior and ability to process information. Topics may include: diagnostic classification, the evaluation process, current theoretical models, intervention models, research on potential causes and treatments, provisions for service delivery and areas of impairment. (3-0) Y

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, discourse-based assessment, and direct and indirect intervention of adults with different dementias such as Alzheimer's disease, frontotemporal dementias, and vascular dementia. (3-0) R

COMD 7392 Language Disorders, Learning Disabilities, and Dyslexia (3 semester hours) Theoretical models and current best evidence concerning the relationships among language disorders, learning disabilities, and dyslexia. Models of typical and atypical language and literacy development, definitional and diagnostic issues, and treatment approaches, with special attention to interventions aimed at improving phonological processing, fluency, comprehension and compensatory strategies. (3-0) Y

COMD 7V19 Birth-to-Three (1-3 semester hours) Assessment and treatment of infants and toddlers with a variety of speech, language, feeding, and oral-motor disorders. ([1-3]-0) Y

COMD 7V56 Bilingual Language (1-3 semester hours) Evaluation procedures and intervention strategies of culturally and linguistically diverse populations. Second language acquisition, acculturation, bilingual education models and differentiating between language difference vs. language disorders will be discussed. ([1-3]-0) T

COMD 7V62 Seminar in Autism (1-3 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. ([1-3]-0) Y

COMD 7V68 Cognitive Rehabilitation (1-3 semester hours) Study of normal and impaired aspects of cognition as it relates to communication, including attention, memory, and executive function with an emphasis on evaluation and treatment theories in the adult rehabilitation setting. ([1-3]-0) R

COMD 7V73 Seminar in Hearing and Speech Science (1-6 semester hours) Current topics in hearing and speech science. (May be repeated for credit.) ([1-6]-0) T

COMD 7V82 Special Topics in Communication Disorders (1-6 semester hours) Selected topics and current research in communication disorders. Topics will vary from semester to semester. (May be repeated for credit.) ([1-6]-0) R

COMD 7V86 Special Topics in Child Language (1-6 semester hours) Current issues in child language emphasizing research on intervention practices. Specific topics vary from semester to semester. (May be repeated for credit.) ([1-6]-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.) ([1-6]-0) R

COMD 7V91 Methods in Communication Disorders (1-6 semester hours) Issues related to methods of assessment and intervention in communication disorders. (May be repeated for credit.) ([1-6]-0) R

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

COMD 8V80 Research in Communication Disorders (1-9 semester hours) Supervised research

experience in Communication Disorders. (May be repeated for credit.) ([1-9]-0) 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, Melanie J. Spence, Robert D. Stillman, Marion K. Underwood, Deborah Wiebe

Associate Professors: Pamela Rollins

Assistant Professors: Shayla Holub, Mandy Maguire, Candice Mills

Clinical Faculty: Cheryl 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 developmental disorders of early childhood. The program 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 provides training to those who desire to work with infants and young children and their families in early childhood intervention programs and other professional settings, including schools, hospitals, and medical/therapy clinics. Classroom training is combined with practical experience in a variety of clinical and educational settings, both on campus and in the community. Students graduating from the program qualify to work as Early Intervention Specialists and Developmental Specialists. They also qualify for Level 2 Infant Mental Health Endorsement by the Texas Association for Infant Mental Health.

Facilities

The principal sites for the academic and research activities of the The Human Development and Early Childhood Disorders program are located at UTD and the Callier Center for Communication Disorders on the main campus in Richardson, and on the campus of the UT Southwestern Medical Center in Dallas. Facilities at the main campus include research and observational laboratories, and laboratories dedicated to infant assessment. On-campus fieldwork opportunities with preschool-age children with special needs are available in the Preschool Language Development Program held at Callier-Richardson. The Callier Center on the UT Southwestern Medical Center campus operates a laboratory preschool, and the Callier Center on both the main campus in Richardson and the medical center campus offer a number of other educational and clinical programs serving young children. These facilities, and various community programs and settings throughout the Metroplex, provide essential educational, clinical, and research environments for training in Human Development and Early Childhood Disorders. Practicum and Internship placements provide supervised on-site and community based fieldwork experiences with young children with special needs and their families.

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, social work, and communication disorders. Students from other disciplines are also encouraged to apply. Those from other fields are generally not required to take leveling courses.

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, relevant experiences, 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 20.

The plan of study includes a set of required foundational courses, elective course options, and supervised practical experience in applied settings designed to prepare students to work with children and their families.

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.

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

Required Core Courses (24 hours)

HDCD 6319 The Developing Child: Infants and Toddlers
HDCD 6312 Atypical Development
HDCD 6315 Assessment Theory
HDCD 6316 Developmental Assessment
HDCD 6335 Intervention Paradigms
HDCD 6310 Parent Education
HDCD 6320 The Developing Child: Preschool Years
HDCD 6370 Intervention with Young Children

Practicum (3 hours)

HDCD 7V20 Practicum in Disorders of Young Children

Internship (6 hours)

HDCD 7V20 Internship in Disorders of Young Children

Electives (15 hours)

HDCD 6325 Service Coordination of Community Resources
HDCD 6395 Medical and Biobehavioral Factors in ECD
HDCD 6330 Families and Culture
HDCD 6385 Child Psychopathology
HDCD 6355 Family Outreach and Assessment
HDCD 6390 Infant Mental Health
HDCD 6V81 Special Topics in Early Childhood Disorders
HDCD 6360 Behavior Management
HCS 6350 Social Development
HCS 6331 Cognitive Development
HCS 7382 Health Psychology
COMD 6307 Language Acquisition or HCS 6368 Language Development
COMD 7V62 Seminar in Autism
HDCD 7V98 Independent Study
HDCD 7V80 Independent Research

Course Descriptions

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 6312 Atypical Development (3 semester hours) Disorders of development from conception to age five, 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 6315 Assessment Theory (3 semester hours) Latest developments in the field of assessment with young children, including behavioral observation, contextual multi-faceted assessment, and inclusion of the family. Training in traditional psychometrics and assessment tools/techniques. Pre- or co requisite: HDCD 6319. (3-0) Y

HDCD 6316 Developmental Assessment (3 semester hours) Play-based and family assessment protocols. Consider diagnostic classification through differential diagnosis decision-making. Emphasis on clinical judgment, interpretation and integration of diagnostic information. Prerequisites: HDCD 6319, 5315. (3-0) Y

HDCD 6319 (HCS 6357, PSYC 6357) 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 6320 (HCS 6359, PSYC 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 6325 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 6330 Families and Culture (3 semester hours) Child growth and development in the context of diverse families and cultures. Respect for cultural variations in family values and practices. Emphasizes the impact of the students' own culture, attitudes, and beliefs in working with families from diverse backgrounds.

HDCD 6335 Intervention Paradigms (3 semester hours) Historical, theoretical, political, and research bases for principles of approaches to early intervention with at-risk and handicapped infants, toddlers, and preschoolers and their families. Emphasis on evidence-based practice and methods of program evaluation. (3-0) Y

HDCD 6355 Advanced Seminar: Family Outreach and Assessment (3 semester hours) This practicum is designed to provide students, as part of a 2-3 person team, supervised experiences with children from diverse backgrounds, at selected off-campus sites. Emphasis is on assessment, professional report writing, the referral process, and working together in 2-3 student teams. Pass/Fail only. (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 6365 (COMD 7336) Social Communication in Early Childhood Disorders (3 semester hours) Development of infant and toddler social, communication and language skills including major milestones of typical development in the areas of cognitive, social and language development; Assessment, and treatment of social communication disorders in the prelinguistic and emerging language stages. (3-0) Y

HDCD 6370 Intervention with Young Children (3 semester hours) Emphasis on methods and procedures for facilitating development of high-risk, delayed or handicapped young children through relationship-based intervention. Reviews the contributions and perspectives of various early intervention disciplines. Students design and implement individualized intervention programs. (3-0) Y

HDCD 6385 (HCS 7376, PSYC 6335) 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) R

HDCD 6390 Infant Mental Health (3 semester hours) Theoretical foundations of infant mental health. The attachment-separation process in healthy development. The impact of illness, disability, maltreatment, deprivation, trauma, foster-care, and adoption on infant mental health. Overview of intervention programs that address relationship disruptions or disorders. (3-0) Y

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 affecting early developmental disorders. 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 Disorders of Young Children (3 or 6 semester hours)(P/F grading) Supervised participation in on-site, early intervention and private therapy settings. Includes 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 7V80 Independent Research (1-6 semester hours) Individualized program of study which includes research and/or other designated activities. ([1-6]-0) S

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

Master of Science Program in Psychological Sciences

<http://bbs.utdallas.edu/>

Faculty

Professors: Hervé Abdi, Peter Assmann, James C. Bartlett, T.G.R. Bower, Duane P. Buhrmester, Thomas Campbell, Sandra Bond Chapman, Christine A. Dollaghan, W. Jay Dowling, Richard M. Golden, John Hart, Susan W. Jerger, Bert S. Moore, Alice O'Toole, Margaret T. Owen, Denise C. Park, Karen J. Prager, John W. Santrock, Melanie J. Spence, Robert D. Stillman, Hanna K. Ulatowska, Marion K.

Underwood, Anne E. Van Kleeck, Deborah Wiebe

Associate Professors: Pamela R. Rollins, Bart Rypma, L. Tres Thompson

Assistant Professors: Shayla C. Holub, Mandy J. Maguire, Christa McIntyre, Candice M. Mills

Objectives

The Master of Science (M.S.) in Psychological Sciences program provides advanced training in psychological sciences. The program is designed for the student scholar who wishes to expand their knowledge of psychology by engaging in advanced coursework, additional research training, and/or applied experience in psychological sciences. The program also offers students the opportunity to gain additional psychology training in preparation for applying to nationally prominent doctoral programs in Clinical and Experimental Psychology. This research-focused program requires students to work with a research mentor from the beginning and to be actively involved in at least one research laboratory throughout training. Students also have the opportunity to gain additional applied experiences through the Internship Program in the School of Behavioral and Brain Sciences. The Master of Psychological Sciences degree does not provide clinical training or lead to licensure as a counselor or psychologist.

Facilities

The principal sites for the academic, applied, and research activities of the Masters Program in Psychological Sciences include faculty labs located on the Richardson Campus and the Callier Center for Communication Disorders. Students also will be exposed to research and applied experiences at vibrant centers within the School of Behavior and Brain Sciences: the Callier Center for Communication Disorders, the Center for BrainHealth, the joint Center for Brain Imaging with UT Southwestern, and the Center for Children and Families. These centers provide 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 Master of Science Program in Psychological Sciences is based on a review of the applicant's GPA, three letters of recommendation, and narrative description of interests and career goals. Both GRE math and verbal scores are required to be considered for admission.

Degree Requirements

The University's general degree requirements are discussed on page 20.

The M.S. in Psychological Sciences curriculum is designed to offer opportunities for specialization in a chosen core field, breadth of training, selection of electives that serve students' individual goals, and research experience. Each student will be assigned to a research mentor at the start of the program and will maintain involvement in a research laboratory throughout the two-year program. Students will also have the opportunity to gain applied experience by participating in the internship program offered by the School of Behavioral and Brain Sciences.

All students in the program are required to regularly review their degree plans with their research mentor. The program requires a minimum of 36 credit hours distributed as follows. Students are required to complete 6 credit hours of major field core courses (two selected from one of the following fields: Developmental, Cognitive, Social and Personality, Neuroscience) , 6 credit hours of additional core courses (two courses from a different area than the major core), 6 credit hours of Research Methods (a two course sequence in statistics and research methods), 12 credit hours of approved advanced elective

courses, and 6 credit hours of Independent Study/Research or Practical Internship courses. A grade of "B" is the required passing grade for coursework used to fulfill the core course and research methods course requirements of the degree. Independent Study/Research or Practical Internship coursework must be taken pass/fail.

Required Core Courses (18 hours)

Major Field Core Courses (12 SCH minimum). Students will declare a major in one of these areas and take two courses from the major area and two courses from a different area than the major core.

1. Developmental Psychology

- PSYC 6350 Social Development
- PSYC 6331 Cognitive Development
- PSYC 6368 Language Development

2. Cognition

- PSYC 6330 Cognitive Science
- PSYC 6395 Cognitive Psychology
- PSYC 6333 Memory

3. Social/Personality Psychology

- PSYC 6376 Social Psychology
- PSYC 6327 Personality

4. Neuroscience

- PSYC 6346 Systems Neuroscience
- PSYC 6344 Functional Human Neuroanatomy

Research Methods (6 SCH minimum)

- Students will complete two 3-hour courses in research methods and design that are approved by the program head and faculty coordinator.

Advanced Electives (12 SCH minimum)

Students will elect 4 courses from master's and doctoral offerings. Any core course (listed above) may count as an advanced elective, though it cannot count both as a core course and as an elective.

Independent Study/Research or Practical Internship (6 SCH)

Students will complete either a Research Project or a Practical Internship to fulfill this requirement. The research requirement will be fulfilled by completion of a focused research project to be submitted and presented in poster format. The Internship requirement will be fulfilled by participating in applied placements through the currently existing School of Behavioral and Brain Sciences internship program for undergraduates.

Master's in Psychological Sciences Course Descriptions

Major Field Core Courses

Developmental Psychology

PSYC 6331 (HCS 6331, ACN 6331) 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

PSYC 6350 (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

PSYC 6368 (HCS 6368, ACN 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

Cognition

PSYC 6330 (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

PSYC 6333 (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

PSYC 6395 (HCS 6395, ACN 6395) Cognitive Psychology (3 semester hours) Theory and research on perception, learning, thinking, psycholinguistics, and memory. Prerequisites: CGS 3361 (PSY 3361) or consent of instructor. (3-0) Y

Social/Personality Psychology

PSYC 6327 (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

PSYC 6376 (HCS 6376) Social Psychology (3 semester hours) Overview of the social bases of behavior. Topics may include social cognition and self justification, biases in judgment, attitudes and persuasion, conformity, compliance, 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. (3-0) Y

Neuroscience

PSYC 6344 (HCS 6344, ACN 6344) 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

PSYC 6346 (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

Research Methods Courses

PSYC 6312 (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 PSYC 6312. (3-0) Y

PSYC 6313 (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: PSYC 6312 or consent of instructor. (3-0) Y

PSYC 6316 (HCS 6316, ACN 6316) 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

PSYC 6319 (HCS 6319, ACN 6319) Scientific Writing (3 semester hours) Scientific writing of articles for publication. (3-0) Y

PSYC 6399 (HCS 6399, ACN 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

Other Courses

PSYC 6320 (HCS 6359, 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: HCDC 5311 or HCS 6357 (3-0) Y

PSYC 6332 (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

PSYC 6335 (HCS 7376, HDCD 6385) 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) R

PSYC 6339 (HCS 6339, ACN 6339) 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

PSYC 6355 (HCS 6355, ACN 6355) Judgment and Decision Making (3 semester hours) This course examines human inferences, judgments, decisions, and the processes by which we arrive at them. It will focus on the fact that our social judgments are not based on the laws of probability and chance, but on other cognitive processes that may have serious shortcomings in important inferential and decision-making tasks. We will also see that these processes, while ecologically efficient, systematic and often predictable, are imperfect in today's data-rich environment. (3-0) T

PSYC 6357 (HCS 6357, HDCD 6319) The Developing Child: Infants and Toddlers (3 semester hours) Relevant developmental theories and processes as well as skills acquired in motor, sensory-perception, cognitive, and social domains from the prenatal period through two years of age. (3-0) Y

PSYC 6367 (HCS 6367, ACN 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

PSYC 7318 Special Topics in Psychological Sciences (3 semester hours) Selected topics of current research in psychological sciences. (May be repeated for credit.) (3-0) R

PSYC 7V50 Internship in Psychological Sciences (1-6 semester hours). Applied placement in community agency or other approved site. (May be repeated for credit) ([1-6]-0) S

PSYC 8V80 Research in Behavioral and Brain Sciences (1-9 semester hours) Supervised research experience. (May be repeated for credit.) ([1-9]-0) S

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

<http://bbs.utdallas.edu/>

Faculty

Professors: Hervé Abdi, Peter F. Assmann, James C. Bartlett, Thomas G.R. Bower, Duane Buhrmester, Thomas Campbell, Sandra Chapman, Christine Dollaghan, W. Jay Dowling, George M. Gerken (emeritus), Richard Golden, John Hart, Susan W. Jerger, William F. Katz, Aage R. Møller, Bert S. Moore, Alice J. O'Toole, Margaret T. Owen, Denise Park, Ross J. Roeser, Allen L. Rupert (emeritus), Bart Rypma, John W. Santrock, Melanie J. Spence, Robert D. Stillman, Linda Thibodeau, Emily Tobey, Hanna Ulatowska, Anne van Kleeck, Marion Underwood, Deborah Wiebe

Associate Professors: Marco Atzori, Lawrence J. Culler, Michael Kilgard, Pamela Rollins, Lucien T. Thompson

Assistant Professors: Shayla Holub, Daniel Krawczyk, Christa McIntyre, Mandy Maguire, Candace Mills, Noah Sasson

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, cognitive neuroscience, and communication sciences and disorders. Students may specialize in these areas or pursue study across areas as in the study of child language, aging, perception, and behavioral and neural plasticity. Core and specialized courses provide the foundation for advanced seminars and a wide spectrum of doctoral research in laboratories, schools, and clinics. Frequent colloquia and informal brown-bag seminars contribute to a stimulating environment for scholarly development.

Cognition and Neuroscience

The flexible, non-traditional doctoral program in Cognition and Neuroscience provides novel opportunities for multidisciplinary and cross-disciplinary studies in the areas of cognition and perception, cellular and systems neuroscience, cognitive neuroscience, neuroimaging, cognitive science, and computational modeling of perceptual and neural processes. Students pursuing research in this program have the option of developing, in consultation with their doctoral advisor, a unique training program tailored to their specific research interests.

Psychological Sciences

The doctoral program in Psychological Sciences provides opportunities for study within the context of a traditional experimental psychology curriculum. The program also offers strong interdisciplinary linkages to other areas within the School of Behavioral and Brain Sciences, including cognitive neuroscience, behavioral neuroscience, and communication sciences and disorders. The primary goal of the program is to prepare research investigators for academic and applied settings either directly or indirectly related to the field of Experimental Psychology. Students work closely with one or more faculty members in a collegial mentoring relationship. Although all students complete a core curriculum comprised of coursework in areas such as Developmental Psychology, Cognition, and Social/Personality Psychology, the program allows students to individually tailor their studies in creative ways.

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 School 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 neuroimaging of language processes, child language, autism, neural 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 the Callier Center for Communication Disorders-Dallas and the Center for BrainHealth, both of which are located adjacent to the campus of the UT Southwestern Medical Center at Dallas. Facilities on the Richardson campus include teaching and research laboratories for neuroscience, a cognitive science, and facilities for the study of child development, including the Center for Children and Families. Callier-Richardson, also located on the Richardson campus, provides a variety of clinical services to the community and serves as a research site for students in Communication Sciences and Disorders and Psychological Sciences.

The Center for BrainHealth is the primary facility for the study of cognitive neuroscience. The Center includes research activities in the areas of aging, developmental disorders, and clinical neuroscience. The Callier Center-Dallas has its primary focus on speech, language, and hearing and includes research laboratories, clinical services, and classroom programs for preschool children. Collaborative arrangements with the U.T. Southwestern Medical School expand student research opportunities including access to its clinical populations and brain imaging facilities.

Admission Requirements

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

Deadline for submission of application materials for fall admission is the preceding February 15. Fall admission is advised due to the coursework schedule and availability of assistantship support. However, applicants wishing consideration for spring semester admission should submit all application materials by September 15.

Admission to a doctoral program is based on a review of the applicant's transcripts, GRE scores, letters of recommendation, and narrative description of research interests and career goals. In addition to

academic requirements, 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.

Some courses in the graduate programs in Audiology, Applied Cognition and Neuroscience, Communication Disorders, Human Development and Early Childhood Disorders, and Psychological Sciences 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 doctoral program head to determine which graduate courses can be applied to the Ph.D.

Combining the M.S. and Ph.D.

Students seeking clinical certification from the American Speech-Language-Hearing Association in Speech-Language Pathology or Audiology, in addition to the Ph.D., may combine the masters program in Communication Disorders or doctoral program in Audiology with the Ph.D. program in Communication Sciences and Disorders. An individualized plan of study leads to both degrees. Students are separately admitted to each program and admission to one program does not assure admission to the other.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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

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 semester credit hour (SCH) core requirement, students 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 dissertation research, additional advanced electives beyond the 9 SCH minimum may be necessary.

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 SCH 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 (9 SCH minimum). After completing the 12 SCH core requirements, students will take an additional 9 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, PSYC 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, PSYC 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 6316 (ACN 6316, PSYC 6316) 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

HCS 6319 (ACN 6319, PSYC 6319) Scientific Writing (3 semester hours) Scientific writing of articles for publication. (3-0) Y

HCS 6399 (ACN 6399, PSYC 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 7310 Advanced Research Methods (3 semester hours) Advanced methods of inquiry and analysis unique to 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: Growth Modeling (3 semester hours) Practical application and interpretation of individual growth modeling, an analytic strategy for analyzing longitudinal data. Introduction of basic concepts underlying the models, describing computer programs for conducting analyses, and interpreting results. Students will be required to complete weekly assignments. Permission of the instructor is required. (3-0) R

HCS 7315 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

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

HCS 6322 (ACN 6322) 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 6330 (ACN 6330, PSYC 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, PSYC 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, PSYC 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) R

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. Prerequisites: Consent of Instructor or two of the following: HCS 6340, HCS 6346, HCS 6344 (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 6343 Neurobiology of Learning and Memory (3 semester hours) Current research and theory on modifications in the central nervous system that contribute to the processes of learning and memory. Includes an overview of different forms of learning as assessed in model systems, with extensive review of anatomical, cellular, and molecular changes underlying neuronal and behavioral plasticity. Prerequisite: HCS 6346 (3-0) T

HCS 6344 (ACN 6344, PSYC 6344) 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

HCS 6346 (ACN 6346, PSYC 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: (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 Markov Random Field probability representations and asymptotic mathematical statistical theory for parameter estimation, model selection, and hypothesis testing. Prerequisites: HCS 6347 or consent of instructor. (3-0) T

HCS 6351 (ACN 6351) Quantitative Methods in Neuroscience (3 semester hours) Data analysis techniques relevant to neuroscience. Topics may include: fourier/wavelet analysis, differential equations, and statistical data analysis methods. May be repeated for credit with permission of the instructor. Prerequisite: ACN/HCS 6312 or consent of instructor (3-0) R

HCS 6355 (ACN 6355, PSYC 6355) Judgment and Decision Making (3 semester hours) This course examines human inferences, judgments, decisions, and the processes by which we arrive at them. It will focus on the fact that our social judgments are not based on the laws of probability and chance, but on other cognitive processes that may have serious shortcomings in important inferential and decision-making tasks. We will also see that these processes, while ecologically efficient, systematic and often predictable, are imperfect in today's data-rich environment. (3-0) T

HCS 6363 (ACN 6363) 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) T

HCS 6372 (ACN 6372) The Neuroscience of Pain (3 semester hours) A systems-oriented course covering the anatomical and physiologic basis of pain. The course emphasizes the similarities and differences between the different forms of pain and describes the basic features of neural processing of pain signals in the spinal cord and brain, the anatomy and the function of the descending systems that can control transmission of pain signals, and peripheral and central sensitization. The physiological and molecular basis for treatment of pain is discussed. (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 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 7309 (COMD 7309) Neural Correlates of Human Cognition: Lesion-Deficit Models (3 semester hours) A framework of how the correlation of brain lesions with behavioral deficits provides a key map associating cognitive functions with specific brain regions in humans. These findings provide a key model to combine with the findings of functional neuroimaging (fMRI, PET) in understanding how humans think. The areas of cognition to be covered include language, episodic memory, semantic memory, working memory, aspects of visuospatial functions, and higher-order motor planning. Cognitive deficits in patients (e.g., amnesia, aphasia, etc.) will be explained within this framework. (3-0)

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 7329 Functional Brain Imaging Practica (3 semester hours) Application of 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; 2) mentored analysis of existing data sets; and 3) experimental design projects with 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) R

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

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 7334 Affective Neuroscience (3 semester hours) The current state of studies and theories of the biological basis of emotion and affective behaviors. The interactions of emotional processes with other brain functions will be discussed. Topics covered may include anxiety, depression, stress, and fear as well as hedonically positive emotional states. Prerequisite: ACN/HCS 6346. (3-0) R

HCS 7337 Advanced Neuroscience Lab Methods (3 semester hours) An intensive hands on focus upon widely used neuroscience laboratory methods, with particular emphases on neurophysiological, neurochemical, and biobehavioral approaches. Prerequisites: HCS 6346 and HCS 7343 or instructor's permission. (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: Consent of Instructor or either: HCS 6340 or HCS 6346. (3-0) T

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 7335 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. May be repeated for credit. (3-0) T

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

Communication Sciences and Disorders

HCS 6339 (ACN 6339, PSYC 6339) 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 6367 (ACN 6367, PSYC 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 (ACN 6368, PSYC 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 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 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, hearing loss, and Autism 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 7379 (COMD 7379) Current Research in Autism (3 semester hours) Exploration of research and theories related to Autism Spectrum Disorders (ASD) and the implications the disability has on an individual's learning, behavior and ability to process information. Topics may include: diagnostic classification, the evaluation process, current theoretical models, intervention models, research on potential causes and treatments, provisions for service delivery and areas of impairment. (3-0) Y

HCS 7V71 Topics 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

Psychological Sciences

HCS 6327 (PSYC 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 (ACN 6331, PSYC 6331) Cognitive Development (3 semester hours) Survey of cognitive development theories and research in a variety of domains including perception, memory, language, and intelligence. (3-0) Y

HCS 6350 (PSYC 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 6357 (PSYC 6357, HDCD 6319) The Developing Child: Infants and Toddlers (3 semester hours) Relevant developmental theories and processes as well as skills acquired in motor, sensory-perception, cognitive, and social domains from the prenatal period through two years of age. (3-0) Y

HCS 6359 (PSYC 6320, 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: HCDC 5311 or HCS 6357 (3-0) Y

HCS 6376 (PSYC 6376) Social Psychology (3 semester hours) Overview of the social bases of behavior. Topics may include social cognition and self justification, biases in judgment, attitudes and persuasion, conformity, compliance, 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. (3-0) Y

HCS 6395 (ACN 6395, PSYC 6395) Cognitive Psychology (3 semester hours) Theory and research on perception, learning, thinking, psycholinguistics, and memory. Prerequisites: CGS 3361 (PSY 3361) or consent of instructor. (3-0) Y

HCS 7311 Family Psychology (3 semester hours) Theory and research on family systems, including topics related to family interactions and relationships within the family. (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.) (3-0) R

HCS 7376 (HDCD 6385, PSYC 6335) 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) R

HCS 7382 Health Psychology (3 semester hours) This course examines current theory and research concerning the social, cognitive, behavioral, and biological processes that shape our experiences of physical health. The importance of these concepts for health behaviors, psychosomatics, and psychological adjustment to illness will be discussed. (3-0) T

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) 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 experience. (May be repeated for credit.) ([1-9]-0) S

HCS 8V99 Dissertation (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

Doctor of Audiology Program

<http://bbs.utdallas.edu/>.

Faculty

Professors: Peter F. Assmann, Aage R. Møller, Ross J. Roeser, Robert D. Stillman, Linda Thibodeau, Emily Tobey

Associate Professors: Michael Kilgard

Assistant Professor: Jeffrey Martin

Clinical Assistant Professors: Jackie Clark, Carol Cokely, Lee Wilson

Distinguished Scholar in Residence: James F. Jerger

Faculty Associates: Beth Dorsey, Amanda Lavue, Elizabeth Gill, Anne Howell, Shari Kwan, Jaime Hampton, Holly Whalen, Chnthia MacArthur, Laura Veazey, Michelle Levin, Beth Bernthal, Jennifer Carlock, Beiseida Northrup, Bejn Rodriguez

Objectives

Doctor of Audiology (Au.D.) The AuD 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 audiology and to the scientific foundations from which clinical approaches are derived. Clinic rotations are provided at the Callier Center and medical and educational settings throughout the Dallas/Ft. Worth Metroplex.

Au.D./Ph.D. degree track. Students who are interested in combining clinical and research training may combine the Au.D. with the Ph.D. in Communication Sciences and Disorders. Students must apply separately to the Ph.D. program to be considered.

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. In addition to the Callier outpatient clinics, the Callier Center houses the Dallas Cochlear Implant Program, the Dallas Regional Day School for the Deaf, Tinnitus and Hyperacusis Clinic, Auditory Processing Clinic, Assistive Devices Center, and Pediatric Hearing Aid Clinic.

Admission Requirements

The University's general admission requirements are discussed here.

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 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 20.

The Doctor of Audiology (Au.D.) degree requires 97 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 (97 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 (25 Semester Hours)

AUD 6352 Medical Audiology
AUD 7182 Topics in Patient Counseling and Student Mentoring
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 7338 Research in Audiology
AUD 7339 Evidence Based Practice in Communication Disorders
AUD 7353 Clinical Electrophysiology

Advanced (21 Semester Hours)

AUD 7310 Professional Issues in Audiology
AUD 7328 Hearing Loss Prevention
AUD 7351 Physiologic Assessment of Vestibular System
AUD 7371 Doctoral Seminar in Audiology/Elective (taken 2 times)

AUD 7340 Auditory Processing Disorders
HCS 6314 Instrumentation

Experiential (26 Semester Hours)

HCS 7380 Practicum in Human Development and Communication Sciences (14 semester hours)
AUD 8V80 Individual Research in Audiology
AUD 8V97 Doctoral Internship in Audiology (9 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 corequisite 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 clinical rotations and externship has additional requirements such as a criminal background check and hepatitis shots. 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 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, limitations and restrictions associated with hearing loss. Emphasis on hearing aid orientation and benefit, counseling, assistive technology, coping skills, communication strategies, speech reading, advocacy for adults with hearing loss, and partnering with community mentors. (3-0) Y

AUD 6318 Pediatric Audiology (3 semester hours) Etiological, medical and genetic considerations relevant to the pediatric population. Emphasis on current diagnostic options with infants and young children, including those having mental retardation or multiple disabilities. (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 6V20 Laboratory Procedures in Audiology and Hearing Science (1-9 semester hours)

Application in structured laboratories of principles taught in diagnostic audiology, rehabilitation audiology, hearing science, amplification, cochlear implant and electrophysiology courses. To be taken with AUD 6303, 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 7182 Topics in Patient Counseling and Professional Mentoring (1 semester hour) Application of counseling and mentoring theories. Counselors and mentors across various disciplines address key

issues regarding collaboration and conflict as they pertain to interactions between clinician and patient within the family structure as well as in the workplace. (1-0) 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 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, ACN 7324) Seminar in Cochlear Implants and Technology for Persons with Hearing Impairments (3 semester hours) Overview of prosthetic alternatives to conventional amplification for individuals with severe-to-profound hearing loss. Topics include candidacy determination, technology, programming/fitting of devices, aural (re)habilitation, and awareness of controversial areas related to cochlear implantation. (3-0) Y

AUD 7325 Intensive Auditory Rehabilitation for Adult Hearing Loss (3 semester hours) Intensive experience with comprehensive rehabilitation of adults and/or teens with a focus on research and clinical techniques to facilitate communication in employment, social, and home situations through the use of communication strategies and advanced assistive technology. (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 Loss Prevention (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, hearing protection, and ototoxicity. (3-0) Y

AUD 7338 Research in Audiology (3 semester hours) Review of statistical principles including the relationship between working hypotheses and methodology and outcomes to prepare individuals to become a critical consumer of research. Scientific writing process is taught including components of journal publication, scientific posters, and writing style. (3-0) Y

AUD 7339 (COMD 7339) Evidence-Based Practice in Communication Disorders (3 semester hours) Origins, strengths and limitations of the evidence-based practice paradigm. Methods for finding, appraising, and incorporating high-quality evidence into clinical decisions about screening, diagnosing and treating speech, language, and hearing disorders. (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 7351 Physiologic Assessment of Vestibular System (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. (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 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 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 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 School 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 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 Sociology, Criminology, Economics, Geospatial Information Sciences (jointly with the School of Natural Sciences and Mathematics), International Political Economy, Public Affairs, Public Policy and Ph.D.s in Criminology, 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 city planning, crime and justice analysis, economic and demographic data analysis, evaluation research, financial economics, geographic information systems, homeland security, local government management, and nonprofit 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 Criminology
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 Arts in Political Science
Master of Arts in Political Science - Constitutional Law Studies
Master of Arts in Political Science - Legislative Studies
Master of Science in Applied Sociology
Master of Science in Criminology
Master of Science in Economics
Master of Science in Geospatial Information Sciences
Master of Science in International Political Economy
Master of Science in Justice Administration and Leadership
Master of Public Affairs
Master of Public Policy

Certificate in City Planning
Certificate in Crime and Justice Analysis
Certificate in Economic and Demographic Data Analysis

Certificate in Evaluation Research
Certificate in Geographic Information Systems
Certificate in Homeland Security
Certificate in Local Government Management
Certificate in Nonprofit Management
Certificate in Remote Sensing

Graduate Programs in Economic, Political and Policy Sciences

<http://epps.utdallas.edu/>

Faculty

Professors: Sheila Amin Gutiérrez De Piñeres, Daniel Arce, Kurt J. Beron, Brian JL Berry (Dean), Thomas Brunell, Anthony M. Champagne, Marie Isabelle Chevrier, Harold D. Clarke, Rachel Croson, Denis Dean, Lloyd J. Dumas, Catherine Eckel, Euel W Elliott (Senior Associate Dean), Daniel Griffith, Edward J. Harpham, Donald A. Hicks, Bruce Jacobs, Paul Jargowsky, L. Douglas Kiel, Murray J. Leaf, Robert Lowry, James Marquart, James Murdoch, Lawrence J. Redlinger, Todd Sandler, Richard K. Scotch, Barry J. Seldon, Marianne C. Stewart, Dongyu Sul, Paul Tracy, Douglas Watson, John Worrall
Associate Professors: Bobby C. Alexander, Philip K. Armour, Nathan Berg, Simon Fass, Jennifer Holmes, Tomislav Kovandzic, Susan McElroy, Fang Qiu, Kevin Siqueira, Sheryl Skaggs, Gregory S. Thielemann, Michael Tiefelsdorf, Lynne Vieraitis

Assistant Professors: Rodney Andrews, Paul Battaglio, Denise Pacquette-Boots, Patrick Brandt, Yongwan Chun, Chetan Dave, Jeremy Hall, Karen Hayslett-McCall, Linda Camp Keith, Brandon Kinne, Youngjoo Lee, Li, Xin (Sherry), Banks Miller, Robert Morris, Clint Peinhardt, Meghna Sabharwal, Sheryl Skaggs

Clinical Professors: Donald Arbuckle, Calvin Jamison, Karen Jarrell, Kristin Klopfenstein, Stuart Murchison, Elmer Polk, Robert Whelan

Clinical Associate Professors: Douglas Dow, Wendy Hassett

Clinical Assistant Professors: Kimberly Aaron, Timothy Bray, Kruti Dholakia, Wenhua Di, Rodolfo Hernandez, Guerrero, Karen Jarrell, Sarah Maxwell, Nicolas Valcik

Research Professors: Tammy Leonard, Sonya Salamon

Professors Emeritus: Ronald Briggs, Irving J. Hoch

Adjunct Associate Professors: Ernan Haruvi (joint appointment with SOM)

Senior Lecturers: Brian Bearry, Teodoro Benavides, Cliff Bowden, Karl Ho, Luba Ketsler, Heja Kim, Meryl Nason, Elmer Polk, Irina Vakulenko, Yuki Watanabe (joint appointment with A&H)

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 Ph.D. 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.

Research

The School of Economic, Political and Policy Sciences offers graduate degrees in seven master's programs and six Ph.D. programs. These programs represent a wide range of both disciplinary as well as interdisciplinary courses of student. Our masters degree offerings include M.S. degrees in Applied Sociology, Criminology, Economics, Geospatial Information Sciences, International Political Economy, Master of Public Affairs and the Master of Public Policy degrees. The Ph.D. programs include programs of study in Criminology, 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 City Planning, Crime and Justice Analysis, Economic and Demographic Data Analysis, Evaluation Research, Geographic Information Sciences, Homeland Security, Local Government Management, and Non-profit Management.

Summary

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

Master's Programs

M.A. in Political Science - Constitutional Law Studies (30 hours)
M.A. in Political Science in Legislative Studies (30 hours)
M.A. in Political Science (30 hours)
M.S. in Applied Sociology (36 hours)
M.S. in Criminology (36 hours)
M.S. in Economics (36 hours)
M.S. in Geospatial Information Sciences (30 hours)

M.S. in International Political Economy (36 hours)
Master of Public Affairs (42 hours)
Master of Public Policy (36 hours)

Ph.D. Programs

Criminology
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.

City Planning
Crime and Justice Analysis
Economic and Demographic Data Analysis
Evaluation Research
Homeland Security
Geographic Information Systems (GIS)
Local Government Management
Non-profit Management
Remote Sensing

Doctor of Philosophy in Criminology

<http://epps.utdallas.edu/crim/phd.html>

Faculty

Professors: James W. Marquart (Director), Bruce Jacobs, John Worrall

Associate Professors: Thomislav Kovandzic, Lynne Vieraitis

Assistant Professors: Denise Paquette-Boots (Graduate Director), Karen Hayslett-McCall, Robert Morris

Clinical Professor: Elmer Polk

Clinical Assistant Professors: Timothy Bray, Sarah Maxwell

Mission

The Mission of the Doctor of Philosophy in Criminology at the University of Texas at Dallas is threefold in nature, in order to:

1. Deliver high-quality education to a diverse body of graduate students regarding the etiology, control, and variation of law-breaking across space and time.

2. Serve local, regional, and national communities through professional development programs, public policy analyses, evaluation research, program and policy design, and a forum for new approaches to the study of crime.
3. Advance the understanding of criminology through a multidisciplinary mix of theoretical and applied research.

Objectives

The Doctor of Philosophy degree in Criminology is an interdisciplinary, research-oriented program that provides students with a coherent and intellectually challenging degree that prepares them for an academic, analytical or administrative appointment as a university professor competent in the oversight of research and development within criminal justice organizations, policy institutions or in the private sector.

Facilities

Students have access to the computing facilities in the School of Economic, Political and Policy Sciences (EPPS) in two computing laboratories which equipped with major social science software packages, including E-Views, R, Rats, PASW, STATA, Lexis Nexis Database, and West Law for student use. The University's Computing Center provides personal computers and UNIX Workstations. Data and reference materials are also available online via the library and UTD's memberships in numerous organizations.

Graduate Assistantships

Criminology Program Funding is limited primarily to doctoral students, with limited opportunities others. Students should note their desire to be considered for graduate student funding as a teaching or research assistant in their letter of intent to the program at the time of. For more specific information, please see our Criminology Graduate Program Handbook located on our website at <http://epps.utdallas.edu/crim/>.

Application and Admission Requirements

The PhD Program in Criminology seeks applicants from a baccalaureate or Masters in Criminology, Sociology, or a relevant discipline. A 3.2 GPA and a GRE score of 1200 are desirable, but students may be admitted at the program's discretion. All transcripts must be submitted, along with three letters of recommendation (preferably academic) and a one-page essay describing their background, education, and professional objectives. For more information please see our Graduate Handbook on our website.

Degree Requirements

On admission to the Ph.D. in Criminology Program, a student must complete a 90 semester credit hours across three tiers of graduate coursework. Additionally, students must fulfill other requirements including comprehensive exams, and two writing requirements as follows:

- Coursework: 90 credit hours of graduate study (minus transferred or masters hours)
- Analytical Paper Writing Requirement
- Comprehensive Examination
- Doctoral Dissertation

A grade of "C+" or worse in any graduate class requires that the class be retaken with only one retake will per course. If the retake results in a final grade of "C+" or worse, the student will be dropped from the program. In addition, all students must meet the University's minimum required GPA of 3.0 or higher. See our Criminology Graduate Program Handbook located on our website for more specific requirements.

Semester Credit Hour Requirements

Coursework Tiers and Credit Hours

Tier I

Required Criminology Core Classes: 15 hours

Electives: 15 hours (9 hours in Criminology/6 graduate hours taken in any other subject)

Writing Requirement for Analytical Paper: 6 hours

Total Tier I Hours: 36

Tier II

Required Criminology Core Classes: 12 hours

Required Additional EPPS Methods/Stats Classes: 6 hours

Criminology Electives: 9 hours

Non-Criminology Electives (in EPPS or any another school): 9 hours

Total Tier II Hours: 36

Tier III

Dissertation/Three-Paper Option Research (minimum of 18 hours)

Total Tier III Hours: 18

Total Program Hours: 90 total credit hours minimum beyond BA/BS

27 Hours Core Criminology Courses

6 Hours Analytical Writing

6 Hours Additional EPPS Methods/Stats Classes

18 Hours Criminology Electives

15 Hours Electives outside CRIM (EPPS or any other School)

18 Hours Dissertation

90 Hours TOTAL

Core Courses

EPPS 6310 Research Design I
CRIM 6300 Proseminar in Criminology
CRIM 6303 Etiology of Crime and Criminality
CRIM 6307 Extent of Crime and Measurement in Criminology
CRIM 6311 Crime and Justice Policy
EPPS 7313 Descriptive and Inferential Statistics
EPPS 7316 Regression and Multivariate Analysis
CRIM 7300 Advances in Criminology Theory
CRIM 7301 Seminar in Criminology Research
CRIM 6V98 Analytical Writing (6 hours)
CRIM 8V99 Dissertation hours (18 hours)

Criminology Electives

CRIM 6305 Law and Social Control
CRIM 6308 Victimology
CRIM 6309 Communities and Crime
CRIM 6310 Delinquency and Juvenile Justice
CRIM 6311 Crime and Justice Policy
CRIM 6313 Corrections
CRIM 6314 Policing
CRIM 6315 Violent Crime
CRIM 6317 Courts
CRIM 6322 Crime Prevention
CRIM 6324 Correlates of Crime and Justice
CRIM 6332 GIS Applications in Criminology
CRIM 6348 Drugs & Crime
CRIM 7342 Qualitative Criminology
CRIM 7351 Advanced Criminological Theory
CRIM 7381 Special Topics in Criminology
CRIM 8V01 Independent Study in Criminology
CRIM 8V92 Independent Advanced Research

Sample of Additional Methods/Stats Classes

EPPS 6342 Research Design II
EPPS 6346 Qualitative Research Methods
EPPS 6352 Evaluation Research Methods
EPPS 7318 Structural Equation and Multilevel (Hierarchical) Modeling
EPPS 7344 Categorical and Limited Dependent Variables
EPPS 7368 Spatial Epidemiology
EPPS 7370 Time Series Analysis
EPPS 7370 Applied Multivariate Analysis
EPPS 7386 Survey Research

Criminology Course Descriptions

CRIM 6300 Proseminar in Criminology. (3 semester hours) Introduction to graduate study in criminology through exposure to issues surrounding concepts of crime, criminals and societal response. Students learn to examine critically the theoretical, methodological and policy issues in criminology and criminal justice. (3-0) Y

CRIM 6303 Etiology of Crime and Criminology. (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. (3-0) Y

CRIM 6305 Law and Social Control. (3 semester hours) Addresses the legal and theoretical basis of social control and the use of criminal sanctions to deter and punish criminal conduct. Students will learn to critically assess alternative punishment and sentencing models. (3-0) Y

CRIM 6307 Extent of Crime and Measurement. (3 semester hours) Problems in Criminology. Examines the major data sources on crimes and criminals and the limitations of such data. Topics also include measurement issues and problems concerning research on the nature and extent of criminal behavior. (3-0) Y

CRIM 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. (3-0) R

CRIM 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. (3-0) R

CRIM 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. (3-0) R

CRIM 6311 Crime and Justice Policy. (3 semester hours) An introduction to crime and the efforts to control crime through public policy. (3-0) Y

CRIM 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. (3-0) R

CRIM 6314 Policing (3 semester hours) Provides historical, social and political analysis of the roles and functions of policing in America. (3-0) R

CRIM 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

CRIM 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. (3-0) R

CRIM 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. (3-0) R

CRIM 6324 Correlates of Crime and Justice. Examines the nature of relationships among attributes and indices at the situational and aggregate levels to various forms of crime and systems of justice. (3-0)

CRIM 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. (3-0) R

CRIM 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

CRIM 6V92 Research Workshop in Applied Criminology (3-9 semester hours) Students join a faculty member in a group research project. May be repeated for credit to a maximum of 9 hours. Permission of instructor required. (9-0) R

CRIM 6V98 Analytical Writing Research (CRIM 7300 Advances in Criminology Theory) (1-9 semester hours) Examines contemporary criminological theories and the degree to which research has provided empirical support for explanations of crime and criminality. (May be repeated for credit.)

CRIM 7301 Seminar in Criminology Research and Analysis. (3 semester hours) Examines a variety of quantitative methods and procedures used in criminological research. Students will plan and execute an independent advanced research project. Need working topic for Dissertation and dataset is preferred.

Must have EPPS 6313 and 6316 or equivalent, plus a good working knowledge of OLS Regression. Instructor permission required. (3-0) Y

CRIM 7342 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

CRIM 7351 Advanced Criminological Theory Seminar (3 semester hours) Topics will vary from semester to semester on various criminological theories. May be repeated for credit up to a maximum of 9 elective hours. Students must complete CRIM 6303 and CRIM 7300 prior to enrolling. Consult with advisor to determine appropriateness for degree plan and specialty areas of study.

CRIM 7381 Special Topics in Criminology (3 semester hours) Topics will vary from semester to semester. May be repeated for credit up to a maximum of 9 elective hours. Consult with advisor to determine appropriateness for degree plan and specialty areas of study.

CRIM 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.) R

CRIM 8V92 Independent Advanced Research (1-9 semester hours) Provides faculty supervision for student's individual study of a topic agreed upon by the student and faculty supervisor. Consent of instructor required. May be repeated for credit up to a maximum of 9 hours. Student performance is assessed by instructor as pass/fail only.

CRIM 8V99 Dissertation (1-9 semester hours). Provides faculty supervision of a student's dissertation research. Prerequisite: Consent of instructor. May be repeated as necessary for credit. ([1-9]-0) Y

Doctor of Philosophy in Economics

<http://www.utdallas.edu/epps/eco/>

Faculty

Professors: Daniel G. Arce M., Kurt J. Beron, Rachel Croson, Catherine Eckel, James Murdoch, Todd Sandler, Barry J. Seldon, Donggyu Sul

Associate Professors: Nathan Berg, Susan Williams McElroy, Kevin Siqueira

Assistant Professors: Rodney Andrews, Chetan Dave, Xin (Sherry) Li

Mission

The mission of the Ph.D. in Economics is to provide a cutting-edge education in economic theory, the development of a rigorous toolkit of mathematical and econometric techniques, and in various research areas in economics. This education allows students to think critically about how to approach the analysis of economic problems and to contribute to the knowledge base of the discipline

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 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 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. A score of at least 4.5 in analytical writing is considered desirable.

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.

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) ECON 3310 Intermediate Microeconomics; (ii) ECON 3311 Intermediate Macroeconomics; (iii) ECON 4351 Mathematical Economics; (iv) EPPS 7316 Advanced Regression Analysis or ECON 4355 Econometrics; (v) EPPS 7313 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, mathematical statistics and real analysis, are useful.

Degree Requirements

The University's general degree requirements are discussed on page 20.

Students seeking the Ph.D. in Economics must complete 75 graduate hours. In addition, they 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⁻ or better); (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:

ECON 6301 Microeconomics Theory I
ECON 7301 Microeconomics Theory II
ECON 8301 Microeconomics Theory III
ECON 6302 Macroeconomics Theory I
ECON 7302 Macroeconomics Theory II
ECON 6305 Mathematical Economics
ECON 6311 Statistics for Econometrics
ECON 6309 Econometrics I

ECON 7309 Econometrics II
ECON 8309 Econometrics III

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

In order to assure that the student progresses satisfactorily, each student is required to consult with the Director of Graduate Studies (DGS) 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 (DGS) of the selection. The DGS will, in conjunction with the Economics Curriculum Committee, advise the student regarding the appropriate certification requirements. The general guidelines for certification consist of (i) making a grade of B or better in three courses within each area; (ii) writing an acceptable research paper in one area.

The submission of an approved dissertation will complete the course of study for the Ph.D. degree in Economics. The procedure for approval of the dissertation is outlined in the U.T.Dallas Graduate Catalog.

M.S. and Ph.D. in Economics Course Descriptions

Graduate Courses in Economics

ECON 5321 Microeconomic Theory for Applications (3 semester hours) For Master of Science 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 ECON should take ECON 6301. (3-0) Y

ECON 5322 Macroeconomic Theory for Applications (3 semester hours) For Master of Science 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 ECON should take ECON 6302. (3-0) Y

ECON 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 ECON 6309, Econometrics I, in the topics covered in econometric data analysis. Corequisite or prerequisite: ECON 6309. (0-1) Y

ECON 6301 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

ECON 6302 Macroeconomics Theory I (3 semester hours) This course is the first in a sequence of core graduate macroeconomic theory courses. The main aim is to introduce students to the methods of deterministic dynamic analyses in economics. The second aim is to employ those methods in understanding aggregate empirical regularities as they pertain to economic growth with standard modern macroeconomic theory. Therefore, primary course aims include a thorough discussion of non-stochastic dynamics and optimization. Next, using these methods, exogenous and endogenous growth applications that illustrate the applied general equilibrium analyses that comprise modern macroeconomic growth theory are discussed. The course concludes with an introduction to non-stochastic overlapping generations models and discusses the role of dynamic efficiency in macroeconomic theory. (3-0) Y

ECON 6305 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

ECON 6306 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, multicollinearity, 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

ECON 6309 Econometrics I (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, Lagrange multiplier, and Hausman-type tests are also discussed. Other topics include model specification and nonlinear estimation issues.. Recommended prerequisite ECON 6311. (3-0) Y

ECON 6311(GISC 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 asymptomatic 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

ECON 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: ECON 6306 or ECON 6309. (3-0) R

ECON 6320 Game Theory for the Social Sciences. (3 semester hours) Non-technical survey of game theory and its applications in the social sciences. Introduction to concepts such as dominant strategies, Nash equilibrium, evolutionary stability, repeated games, and games with incomplete information. Applications include collective action, conflict, bargaining, the evolution of altruism and cooperation, and signaling. (3-0) R

ECON 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) T

ECON 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

ECON 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

ECON 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 I is not a prerequisite for Labor Economics II. (3-0) T

ECON 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

ECON 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. (3-0) R

ECON 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

ECON 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: ECON 5321 or ECON 5301 or POEC 5307 (3-0) T

ECON 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 multinational 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

ECON 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

ECON 6352 (POEC 6360) 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. (3 0) T

ECON 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

ECON 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

ECON 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

ECON 6362 (POEC 6353) 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. (3-0) T

ECON 6363 Public Economics I (3 semester hours) A study of externalities, public goods, club goods and related topics. Prerequisite: ECON 6301 or ECON 5321. Pass/Fail graded only. (3-0) R

ECON 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. (3-0) R

ECON 6372 (PA 6342) 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. (3-0) R

ECON 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: ECON 6301 and ECON 6309, or instructor's permission. (3-0) T

ECON 6V01 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

ECON 7301 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. ECON 6301 recommended. (3-0) Y

ECON 7302 Macroeconomics Theory II (3 semester hours) This course is the second in a sequence of core graduate (doctoral level) macroeconomic theory courses. The main aim is to introduce students to the methods of stochastic dynamic analyses in economics. The second aim is to employ those methods in understanding aggregate empirical regularities, for instance as they pertain to business cycles, with standard modern macroeconomic theory. Therefore, primary course aims include a thorough discussion of stochastic dynamics and optimization. Next, using these methods, applications that illustrate the applied general equilibrium analyses that comprise: modern macroeconomic business cycle theory, consumption, asset pricing and topics in 'behavioral' macroeconomics are discussed. ECON 6302 recommended (3-0) Y

ECON 7309 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 serial correlation, unit roots, cointegration, and dynamic models; panel data; simultaneous equations models; and maximum likelihood and GMM estimation methods. (3-0) Y

ECON 7311 Special Topics in Econometric and Spatial Analysis(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 ECON 7311. (3-0) R

ECON 7316 Game Theory (3 semester hours) Advanced treatment of topics in noncooperative game theory. May also include a brief survey of cooperative game theory. Major topics covered include correlated equilibrium, equilibrium refinements, evolutionary stability and dynamics, multi-level selection, revelation principle, strategic substitutes and complements, uniqueness and comparative statics. Prerequisites: GISC 7310 or EPPS 7316 or ECON 6306 or permission of instructor. (3-0) R

ECON 7321 Special Topics in Labor Economics (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 ECON 7321. (3-0) R

ECON 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 ECON 7331. (3-0) R

ECON 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 ECON 7341. (3-0) R

ECON 7351 Special Topics in Public Economics (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 ECON 7351. (3-0) R

ECON 7363 Public Economics II (3 semester hours) A study of positive and normative theories of

taxation, the effect of taxation on behavior, behavioral public finance and related topics. Pass/Fail graded only. Prerequisite: ECON 6361 or ECON 6363 (3-0) R

ECON 7381 Special Topics in Experimental and Behavioral Economics (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 ECON 7381. (3-0) R

ECON 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

ECON 7V01 Literature Survey/Paper Seminar (3 or 6 semester hours) Students registering for this seminar work towards the completion of their literature survey requirement. Course includes oral presentations and progress reports. [3-6]-0 R

ECON 7V02 Research in Economics (3-6 semester hours) Topics vary from semester to semester. May be repeated for credit. Prerequisite: Consent- of Instructor. [1-9]-0 R

ECON 7V03 Research Paper Seminar (3 or 6 semester hours) Students registering for this seminar work towards the completion of their research paper requirement. Oral presentations and progress reports. [3-6]-0 T

ECON 7303 Microeconomics Theory III. Primarily a course on the role of strategic interdependence in economics using game theory. Topics include noncooperative games, simultaneous-move games and dynamic games with applications from a wide variety of fields in economics. (3-0) Y

ECON 7315 Econometrics III (3 semester hours) This is the third core course in the econometrics sequence of the economics Ph.D. program. The course extends the topics covered in the first two courses and covers topics such as Bayesian, semiparametric and nonparametric estimation approaches; discrete choice models, limited dependent variable models and duration models; and bootstrap and jackknife methods. Prerequisite: ECON 6310 (3-0) Y

ECON 8V01 Dissertation Seminar (3-9) 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. ([3-9]-0)

ECON 8V02 Dissertation (1-9 semester hours) Provides faculty supervision of a student's dissertation research. May be repeated for credit. Prerequisite: Consent of instructor. ([1-9]-0) Y

ECON 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.gis.utdallas.edu>

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), Denis J. Dean (Economic, Political and Policy Sciences), Daniel Griffith (Economic, Political and Policy Sciences), Paul Jargowsky (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), Fang Qiu (Economic, Political and Policy Sciences), Michael Tiefelsdorf (Economic, Political and Policy Sciences)

Assistant Professors: Yongwan Chun (Economic, Political and Policy Sciences), Karen Hayslett-McCall (Economic, Political and Policy Sciences), Weili Wu (Computer Science)

Clinical Assistant Professors: Stuart Murchison (Economic, Political and Policy Science)

Powerful technologies have emerged in recent years to collect, store, manage, analyze, and communicate 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 remote sensing, are used in many ways, including the production of digital maps in vehicles, the management and maintenance of city infrastructure, agriculture and forestry, the policing of communities, and the conduct of modern warfare. The PhD in Geospatial Information Sciences aims 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 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 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). These students may choose to pursue research projects that advance existing geospatial information sciences practices within that application area. Alternatively, students may opt to pursue research that expands the technological or theoretical base of all the geospatial information sciences.

Mission and Objectives

The mission of the Doctor of Philosophy in Geographic Information Sciences program is to cultivate innovative researchers capable of advancing the frontiers of knowledge in the geospatial information sciences through improved theories, new technologies, innovative methodologies, sophisticated quantitative analyses, and integrative applications. UT Dallas Doctoral graduates will find employment in research departments of public and private organizations and in major academic institutions. Specifically, program graduates will:

- demonstrate their knowledge of the fundamental theories and concepts underlying the geospatial sciences.
- master the advanced methodologies and/or quantitative analyses used in at least one of three geospatial specialization areas: [a] computing and information management, spatial analysis and modeling, or [c] remote sensing and satellite technologies.
- produce innovative research that advances theory or methodology in the geospatial sciences.
- participate at academic conferences, publish in peer-reviewed journals and find employment in research departments of public and private organizations and in major academic institutions.

Facilities

Students have access to state-of-the-art GIS computing facilities housed in the School of Economic, Political and Policy Sciences and at 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 computer workstation is available for every student. All major industry-standard GIS and remote sensing software is available. The University is 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. An analytical writing score of at least 4.5 in the GRE is considered 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 6317 *Computer Programming for GIS*, CS 6301 and CS 6311 *Computer Science I & II*, MIS 6322 *Developing Business Applications with Visual Basic*, MIS 6323 *Object Oriented Systems*, or their equivalents, and (iii) at least one course in inferential statistics through to regression analysis equivalent to GISC 6301 *Geospatial Data Analysis Fundamentals*, EPPS 7313 *Descriptive and Inferential Statistics*, or GEOS 6313 *Data Analysis for Geoscientists*. Graduate courses taken at UT Dallas to meet these prerequisites may be counted as electives toward the 75 credit hours required of 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.

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. Students generally will not have a faculty advisor when they first enter the Ph.D. program, but every student is required to select (with consent of the potential advisor) an advisor from the advising faculty before they complete 20 credits after admission.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 75 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)

Students must earn a minimum grade point average (GPA) of 3.0 across the following five courses:

- GISC 6381 GIS Fundamentals
- GISC 6382 Applied GIS
- GISC 6384 Spatial Analysis and Modeling
- GISC 6385 GIS Theories, Models and Issues
- GISC 7310 Regression Analysis with Spatial Applications

Geospatial Specialization Area

Students must select from one of the following, with a minimum of 15 SCH. Courses selected must include at least three at successively advanced levels.

I. Geospatial Computing and Information Management

- CS 6359 Object Oriented Analysis and Design
- CS 6360 Database Design
- CS 6364 Artificial Intelligence
- CS 6366 Computer Graphics
- CS 6375 Neural Nets and Machine Learning
- CS 6378 Advanced Operating Systems
- CS 6V80 Spatial Data Management
- CS 6381 Combinatorics and Graph Algorithms
- CS 6384 Computer Vision
- GISC 6317 Computer Programming for GIS
- GISC 6388 GIS Application Software Development
- GISC 7363 Internet Mapping and Information Management
- *MISC 6326 Database Management Systems

II. Spatial Analysis and Modeling

- CS 6312 Data Structures
- *ECON 6309 Econometrics I
- *ECON 6310 Econometrics II
- *ECON 6314 Structural Equation and Multilevel (Hierarchical) Modeling
- *ECON 6315 (POEC 7370) Time Series Econometrics
- *ECON 6316 Spatial Econometrics
- EPPS 7364 Demographic Analysis and Modeling
- EPPS 7368 Spatial Epidemiology
- *GEOS 6313 Data Analysis for Geoscientists
- *GISC 6311 (ECON 6311) Statistics for Economists
- GISC 7360 GIS Pattern Analysis
- GISC 7361 Spatial Statistics
- *EPPS 7313 Descriptive and Inferential Statistics
- *EPPS 7316 Advanced Regression Analysis

III. Remote Sensing and Satellite Technologies

GEOS 7322 GPS Surveying Techniques
GEOS 7324 3-D GIS Data Capture and Ground Lidar
GISC 6325 (GEOS 6325) Introduction to Remote Sensing
GISC 7366 (GEOS 7366)/ Applied Remote Sensing
GISC/7365 (GEOS 7365) Remote Sensing Digital Image Processing
GISC 7367 (GEOS 7327) Remote Sensing Workshop
EE 6360 Digital Signal Processing
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.

* may not be used in conjunction with certain other courses. Consult GIS Doctoral Program Director

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 master's degree. These hours may be transferred from another institution, or taken at UT Dallas 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 (Variable SCHs)

All students must complete the following two classes as part of the research and dissertation requirement:

GISC 7387 GIS Research Design
GISC 7389 GIS PhD Research Project Qualifier

In addition, students must complete sufficient additional research and dissertation credit hour to bring the total number of SCHs they have earned within the UTDallas doctoral program (or transferred into the UTDallas doctoral program) to 75, the minimum required to earn a doctoral degree. Additional research and dissertation SCHs above and beyond those required to reach the 75 credit hour minimum may be required at the discretion of the student's Ph.D. advisor. Additional research and dissertation SCHs can be earned through any of the following classes:

GEOS 8V29 Research in GIS
GISC 6387 GIS Workshop
GISC 6389 GIS Masters Project
GISC 7367/GEOS 7327 Remote Sensing Workshop
GISC 8V29 Research in GIS
*EPPS 6310 & 6342 Research Design I & II
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 their advisor or the GIS Doctoral Program Director.

Exams and Qualifiers

- **Ph.D. Research Project Qualifying Class**

Doctoral students must complete **GISC 7389 Geospatial Information Sciences PhD Research Project Qualifier** according to uniform guidelines established by the GIS program.

- **Qualifying Examination and Defense of Proposal**

After meeting the Research Project Qualifier, doctoral students 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.

- **Grade Point Qualifier**

Doctoral students must have GPAs 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.

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 6301 Geospatial Data Analysis Fundamentals (3 semester hours) Focuses on data handling techniques and applying basic statistical methodology to spatial research questions. Concepts of statistical data analysis including descriptive statistics, exploratory methods, sampling theory, statistical inference and correlation analysis are reviewed from a Geo-Information Sciences perspective. Regression analysis and basic methods of spatial pattern analysis are introduced. A prior course in statistics (such as SOCS 3405) is strongly recommended. (3-0) Y

GISC 6317 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)Y

GISC 6311 (ECON 6311) Statistics for Geospatial Science (3 semester hours) Introduces calculus-based statistical analysis and probability theory, providing background for econometric and spatial modeling of simple stochastic processes. Covers standard probability distributions including Bernoulli, binomial, negative binomial, hypergeometric, Poisson, normal, gamma, beta, t and F distributions; estimation and hypothesis testing; introductory asymptomatic theory, including the Law(s) of Large Numbers and the Central Limit Theorem; real-world applications of probability theory, as time permits. (3-0) Y

GISC 6325 (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) Y

GISC 6326 Geovisualization (3 semester hours) Examines the theoretical concepts and practical applications of cartographic and geographic visualization. Topics covered in lectures include concepts for geographic data representation, symbolization and map design, and methods for geographic visualization and display. 3D visualization, cartographic animation, and web based mapping may also be included. Lab sessions explore the implementation of cartographic and geographic visualization with industry standard GIS software. Prerequisite: GISC 6381 or equivalent knowledge. (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. (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 6380 Spatial Concepts and Organization (3 semester hours) Examines the recurring patterns of physical and human objects on the Earth's surface, the flows of circulations among them, and the spatial concepts and theories which have been advanced to help understand and explain these spatial arrangements. Provides a fundamental understanding of spatial processes, concepts, and theories. (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 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 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 GIS Theories, Models and Issues (3 semester hours) Provides an understanding of the underlying theories, mathematical and geometric tools, and their computational implementations that establish GIS capabilities to handle and analyze geo-referenced information. Associated issues (such as uncertainty, spatial analysis and spatial data management) highlighted. Prerequisite: GISC 6381 and 6382, or equivalent with instructor's permission. (3-0) Y

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 Software 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 6317, 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 7310 Regression Analysis with Spatial Applications (3 semester hours) The specification, interpretation and properties of the multiple linear regression model including spatial and aspatial regression diagnostics are examined. Extensions to the logistic and Poisson regression models and spatial heterogeneity are provided. A review of the key concepts of matrix algebra and simulation techniques is given. Practical data analysis for large datasets is exercised by coupling statistical software with GIS environments. Prerequisite: GISC 6301 or GISC/ECON 6311 or equivalent. (3-0) Y

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: GISC 6381 or GISC 6311 and GISC 6301 or equivalent. (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: GISC 7310 or EPPS 7316 or equivalent; GISC 7360 recommended . (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 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: EPPS 7313. (3-0) R

GISC 7365 (GEOS 5326) 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. (3-0) Y

GISC 7366 (GEOS 5329) 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, land 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. Prerequisite: GISC 6325/GEOS 5325 (3-0) Y

GISC 7367 (GEOS 7327) 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/GEOS 5326. (3-0) Y

GISC 7387 GI Sciences Research Design (3 semester hours) Examines issues relative to the conduct of effective and valid research in geospatial information sciences and related fields.(3-0) Y

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 immediately 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) Y

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 6V98 Master's Thesis (3-9 semester hours) Provides faculty supervision of a student's master's thesis research. Prerequisite: Consent of GIS Program Head and instructor. (May be repeated for credit.) ([3-9]-0) S

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

GISC 8V99 Dissertation (1-9 semester hours) Provides faculty supervision of a student's dissertation research. Prerequisite: Consent of instructor. (May be repeated for credit.)([1-9]-0) S

Doctor of Philosophy in Political Science

<http://www.utdallas.edu/epps/psci>

Faculty

Professors: Thomas L. Brunell, Anthony M. Champagne, Marie I. Chevrier, Harold D. Clarke, Euel Elliott, Edward J. Harpham, L. Douglas Kiel, Robert Lowry, Marianne C. Stewart

Associate Professors: Jennifer S. Holmes, Linda Camp Keith, Gregory S. Thielemann

Assistant Professors: Patrick Brandt, Brandon Kinne, Banks Miller, Clint Peinhardt

Senior Lecturers: Brian J.L. Berry, Karl Ho

Mission

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.

Objectives

- Students will engage in critical and constructive thinking, effective communication to academic audiences, and rigorous design and execution of research projects.
- Students will describe, classify, and analyze the causes and consequences of the unprecedented unfolding of democracy on a global scale, its successes and failures, and its opportunities and problems during an era of globalization and of ongoing subnational, national, and transnational conflicts and negotiations.

- Students will describe, classify, and analyze the major theories, methods, and findings that are used to explain the participation of individuals in a variety of institutional settings, how institutions can be designed to promote both collective goods and individual gains, and how changes in institutions have consequences for individuals.
- Students will describe and explain the theories, models and practices of group activity, human decision making, management science, organizational design, policy making, and risk assessment involving knowledge producers, private firms, and government agencies and departments.
- Students will acquire the professional socialization necessary to teach and to conduct research in American, comparative, or international government and politics; democratization, globalization and international relations; governmental and political institutions and processes; and public administration, decision making, and risk management.

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 UT Dallas 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 and Electoral Studies.

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. An analytical writing score of at least 4.5 in the GRE is considered desirable. 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.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 examinations in the subjects covered by the core and field courses. Students must receive a grade of B- or better in all core courses and must maintain at least a 3.0 grade point average to graduate.

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 developed 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

Core Courses in Political Science Methodology and Theory 12

Field Proseminars 9

Courses in Major Field 12

Courses in Minor Field 6

Prescribed Elective Credit (Research Seminars or Special Topics) 12

Freely Chosen Elective Credit 9-18

Dissertation or Practicum Research 21-30

Total (Minimum) 90

Core Courses

EPPS 6313 Introduction to Quantitative Methods

EPPS 6316 Applied Regression

PSCI 6300 Proseminar in Democratization, Globalization and International Relations

PSCI 6307 Proseminar in Decision Making and Public Management

PSCI 6313 Proseminar in Public Policymaking and Institutions

PSCI 6350 Logic, Methodology and Scope of Political Science

PSCI 6352 Empirical Democratic Theory

Democratization, Globalization and International Relations

PSCI 6309 International Political Economy and Organizations

PSCI 6310 Political Economy of Multinational Corporations

PSCI 6335 Institutions and Development

PSCI 6337 Comparative Institutions

PSCI 6357 Political Economy of Latin America

PSCI 6362 Political Development

PSCI 6363 Conflict and Development

PSCI 6365 Political Violence and Terrorism

PSCI 7320 International Negotiations

Political and Government Institutions and Processes

PSCI 6314 Policy Processes, Implementation and Evaluation

PSCI 6324 Local and State Government and Politics

PSCI 6331 Executives, Legislatures and Public Policy

PSCI 6333 Political and Civic Organizations

PSCI 6336 Bureaucracy and Public Policy

PSCI 6337 Comparative Institutions

PSCI 6323 Public Choice

PSCI 6339 Election Law and Electoral Systems

PSCI 6343 Law and The Policy Process

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

PA 6311 Public Management

PA 6320 Organizational Theory

PSCI 6323 Public Choice

PSCI 6325 Decision Theory

PA 6326 Decision Tools for Managers

PA 6328 Management Process and Analysis

PA 6329 Quantitative Models of Public Management

PSCI 6343 Law and The Policy Process

PSCI 6353 Mathematical Models in Political and Social Science

PSCI 7352 Theories of Choice and Decision Making

PSCI 7370 Decision Making, Complexity and Risk
PSCI 7372 Game Theory for Political Scientists

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

Political Science Course Descriptions

PSCI 5306 The American Legal System and the Practice of Law (3 semester hours) The American legal system will be examined through seminar presentations by speakers experienced in judging and in legal practice. (3-0) Y

PSCI 5307 Legal Reasoning and Writing (3 semester hours) The process of reaching legal decisions by relying on precedent, history, policy concerns, and tradition will be studied. Additionally, techniques for researching and citing case law and statutes will be examined. (3-0) Y

PSCI 6300 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 6301 Constitutional Law (3 semester hours) This class addresses the evolution of the American Constitution. The course will examine major constitutional concepts that are important to an understanding of American Government. Additionally, major interpretations of the Constitution and the role of courts in the American legal system will be explored. (3-0) Y

PSCI 6304 Internship in Constitutional Law Studies (3 semester hours) Students will gain practical legal experience by working as an intern in a law office, court, or in the office of a legal organization such as a district attorney's or public defender's office. (3-0) Y

PSCI 6305 Workshop in Constitutional Law Studies (3 semester hours) Students will undertake a major research topic on a law-related matter which will develop skills in legal research and writing, quantitative research, or field research. (3-0) Y

PSCI 6306 Human Rights and International Law (3 semester hours) This course explores international agreements and their effects on individual rights in a variety of contexts such as international conflicts, civil wars, and oppressive political regimes. (3-0) R

PSCI 6307 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 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 6310 (POEC 6319) Political Economy of Multinational Corporations (3 semester hours) The Political Economy of Multinational Corporations will approach the rise of international firms and their behavior from a social scientific approach, utilizing research in economics, political science, and other disciplines. In addition to the historical rise of international firms, the course covers the economic theory of the firm, MNCs as political actors, the dynamics of foreign direct investment, and the relationship of MNCs to developing countries. The aim of the course is to understand the causes and effects of the behavior of transnational corporations, particularly in regard to economic policy. (3-0) T

PSCI 6311 Judicial Politics Seminar (3 semester hours) The purpose of this graduate seminar is to survey the different areas of empirical/quantitative research in the subfield of judicial politics. The course

will assess the courts as political institutions and examine the interactions between the judiciary and other institutions. We will address the core theoretical debates and assess key methodological issues concerning judicial decision-making in the U.S. context. We will also place these debates within the growing body of comparative judicial behavior literature. (3-0) Y

PSCI 6312 Comparative Constitutions and Courts (3 semester hours) The purpose of this graduate seminar is to survey the growing body of comparative research on constitutions and courts. The course will examine both qualitative and quantitative research that examines the development of constitutions and courts, particularly in newly independent states or states transitioning from authoritarian regimes. We will address the core theoretical debates and research concerning 1) why states adopt these documents and legal institutions and 2) the role these institutions ultimately play in transitioning states, especially in regard to the rights protection. These examinations will span comparative politics, international relations, and the broader sub-field of public law. (3-0) R

PSCI 6313 (PA 6323 and POEC 6313) 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. (3-0) Y

PSCI 6314 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 6313 or consent of instructor. (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 6307 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 levels 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. (3-0) T

PSCI 6330 Campaigns and Media Relations (3 semester hours) This course surveys the state of the art research on campaigns and elections in American politics with a focus on the relationship between the modern campaign and the modern media. (3-0) T

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. (3-0) T

PSCI 6332 The U.S. Congress (3 semester hours) This course examines the most recent research on the legislative branch of the United States. We examine the role of parties, incumbency, elections, and organized interests on who gets elected to Congress, how Congress organizes itself, and how Congress makes public policy. (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 non-profit 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 (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. (3-0) T

PSCI 6336 (PA 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. (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. (3-0) T

PSCI 6339 Election Law and Electoral Systems (3 semester hours) An examination of election law in America from redistricting to ballot access to campaign finance. We also spend time looking at different electoral systems in the U.S. and around the world. (3-0) R

PSCI 6340 Texas Legislative Affairs Workshop (3 semester hours) The Texas Legislative workshop is a course offered during semesters when the Texas Legislature is in session. This course is designed to afford students the opportunity to explore the working of the Texas Legislature up close with sessions held in both Dallas and Austin. Students enrolled in this course will have the opportunity to interact with members of the Texas Legislature and their staff as they examine the current public policy issues confronting Texas. (3-0) T

PSCI 6341 Texas Legislative Process (3 semester hours) This course examines the legislative process in the Texas Legislature. Students will learn the intricacies of passing legislation by examining the constitutional rules of Texas' lawmaking and the evolution of each chamber's parliamentary rules. This course also offers a practical element as specific case studies are examined to illustrate the importance of legislative process in Texas. (3-0) T

PSCI 6642 Legislative Affairs Internship (6 semester hours) The Legislative internship is a 6-hour course offered during the summer term. Students will work with the professor to identify an internship with a relevant government office approved by the professor. Students will be asked to participate in the daily operations of that office and learn the intricacies of staffing from a first hand perspective. (6-0) T

PSCI 6343 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. (3-0) T

PSCI 6350 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 6352 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 6353 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)

PSCI 6357 (POEC 6357) Political Economy of Latin America (3 semester hours) Addresses historical and contemporary issues in Latin American political economy. Uses case studies and cross-regional comparisons to assess competing explanations. Analyzes the current political and economic situation facing Latin America in its quest for economic growth and development. The emphasis is to understand the broad patterns of development and change in the region and the physical, historical, social and economic constraints which have affected development, broadly understood. (3-0) T

PSCI 6360 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 6361 (POEC 6361) Political Violence and Terrorism (3 semester hours) In this discussion-based seminar, we will cover the topics of terrorism, political violence, and civil war. We will examine concepts, causes, and consequences of different types of political violence. Additionally, we will discuss topics relevant to research, including discussions of different approaches (quantitative, qualitative, and formal) and a perusal of different data sources. We will take advantage of literature from multiple disciplines. (3-0) T

PSCI 6362 (POEC 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. (3-0) T

PSCI 6363 (POEC 6363) Conflict and Development (3 semester hours) This module will explore the nexus between violent intrastate conflict and development. It will examine some of the key conceptual frameworks advanced to understand conflict and will explore specific themes which have preoccupied researchers and policy practitioners in recent years. In addition to assessing the economic costs of the conflicts, this course will also examine the traditional factors that have been purported to explain the prevalence of insurgency. (3-0) T

PSCI 6364 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 7316 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 7320 (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. (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 7360 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 6360 or consent of instructor. (3-0) Y

PSCI 7372 Game Theory for Political Scientists (3 semester hours) An introduction to formal models with more than one decision-maker, this course will cover basic solution concepts in game theory. The course will pay particular attention to applications in political science, rather than the foundational models in economics. (3-0) T

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. (May be repeated for credit.) (3-0) Y

PSCI 8V99 Dissertation or Practicum (1-9 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.) ([1-9]-0) S

Doctor of Philosophy in Public Affairs

<http://www.utdallas.edu/epps/pa/phd/>

Faculty

Professors: Marie Chevrier, Euel Elliott, L. Douglas Kiel, Murray Leaf, Richard Scotch

Associate Professors: Simon Fass

Assistant Professors: Paul Battaglio, Jeremy Hall, Young-joo Lee, Meghna Sabharwal

Clinical Professor: Donald Arbuckle, Robert Whelan

Clinical Assistant Professor: Kimberly Aaron

Mission

The mission of the Ph.D. in Public Affairs program is to prepare students for academic careers or high-level management positions in public and non-profit organizations by assuring that they gain competency at an advanced level in the core subject matters and methodologies that are central to the study of Public Affairs. Through instruction and research, the faculty will help students obtain a firm understanding of the broad intellectual tradition of public administration and related fields. It will integrate both traditional and innovative methods of educational delivery and emphasize the application of theory to practice.

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 PhD program in Public Affairs is a cohort program. The program requires 42 hours of coursework 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 and elective 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.

Faculty Commitments

The faculty of the PhD program in Public Affairs is committed to producing clear and specific results for our students. Thus, the specific objectives for all graduates of the PhD in Public Affairs program are:

1. To Demonstrate Comprehensive and Deep Knowledge: Students will demonstrate their knowledge of the 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.

2. To Understand and Apply Theories and Processes of Knowledge Acquisition: Students, as executive level administrators, will have a solid grounding in theory and in the process of knowledge acquisition through research that is essential for institutional maintenance and renewal.

3. To Produce Scholarly Manuscripts and Publications: Students, as scholars, will have the ability to produce scholarly manuscripts based on extensive practical experience or field-based research that are worthy of publication in the journals of the field.

4. To Develop, Present, and Defend Complex Ideas: Students will have the ability to develop, present, and defend both orally and in writing complex ideas based on in-depth scholarly research.

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 March 1 of that year.. 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 1100 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 March 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 42 hours of course work and twelve hours of dissertation work beyond the master's degree for a total of 90 graduate hours. 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. Students must also complete qualifying examinations and 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. Students lacking a recent graduate level statistics course may be required to complete EPPS 5315 Introduction to Quantitative Methods..

Required Courses (42 hours)

The Program will consist of course work in four substantive knowledge areas. These areas are the public affairs core that includes topics of Governance: Leadership, Change and Conflict Resolution. The three remaining substantive knowledge areas are Social Policy and Development, Decision Analysis and Organizational Management and Analysis

Dissertation Research

During the dissertation research students must also be enrolled in PA 8V99 Dissertation.

Program Course Work

Cohort Mapping of Courses: 42 hours of required coursework through 7 consecutive semesters

YEAR ONE (18 semester credit hours)

Fall

PA 7321 Ethics and Law in Public Affairs
PA 7325 Survey of Public Affairs

Spring

PA 6326 Decision Tools for Managers
PA 7330 Research Design in Public Affairs

Summer

PA 7375 Non-Profit Organizations: Theory and Practice
PA 6320 Organizational Theory

YEAR TWO (18 semester credit hours)

Fall

PA 7322 Negotiations for Effective Management
PA 7338 Seminar in Human Resources

Spring
PA 7305 Leadership of Public and Non-Profit Organizations
SOC 6312 Socio-Economic Theories or SOC 6340 Domestic Social Policy

Summer
PA 7311 Models and Tools of Change Management

EPPS 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences

YEAR THREE (18 semester credit hours)

Fall
PA 8340 Dissertation Seminar
Elective – (any 6000 or 7000 level PA or EPPS course)

Spring
PA 8V99 Dissertation(6 hours)

Summer
PA 8V99 Dissertation(6 hours)

Qualifying Examinations and Assessment of Student Performance

All students must successfully complete qualifying examinations. Students will complete PA 7325 Survey of Public Affairs and PA 7321LEthics and Law in Public Affairs in the first fall semester of enrollment. Students will complete PA 7330 Research Design in Public Affairs and PA 6326 Decision Tools for Managers in the first spring semester of enrollment. The examinations/assessments will cover the material in the four classes noted above. The examinations/assessments will occur immediately after the first spring semester of enrollment.

The examinations/assessments consist of three components. These components are an assessment of the student's portfolio of work in the four courses noted above, a required GPA of 3.25 in the four courses and a written examination covering the material in the four courses. Successful completion of these components leads to continuation in the program. Students who do not successfully complete the examination/assessment process are dropped from the program.

Dissertation

Students must be enrolled in PA 8V99 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.

Ph.D. in Public Affairs Course Descriptions

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. (3-0) Y
PA 6329 Data Analysis for Public Affairs (3 semester hours) This course is an introduction to methods of statistical description and inference that are commonly used in policy analysis, program evaluation, performance assessment, action research, survey work, and related tasks in the public and non-profit

sectors. Coverage includes probability, sampling theory, hypothesis testing, analysis of variance, nonparametric correlation and multivariate regression. Emphasis is on both method and interpretation of results. Solid grounding in college-level algebra is essential. (3-0) Y

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 7320 Economics for Public and Nonprofit Management (3 semester hours) Introduces and applies microeconomic theory to understanding the challenges of decision making in government and nonprofit organizations. Economic concepts include demand and supply, consumer/client choice, production theory and cost minimization, market structure of government and nonprofit sectors, game theory, service differentiation and pricing, and goal maximization. Applications may include infrastructure investment, transportation, recreation, education, social and health services, crime, housing and economic development.(3-0) Y

PA 7321 Ethics and Law in Public Affairs (3 semester hours) This course examines legal and ethical mandates in the public realm, and particularly the application of key legal and ethical concepts to issues of governance and the role of public officials. (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 7326 Normative Theory of Public Affairs (3 semester hours) Addresses the moral dimensions of discretionary judgments made by public managers. Particular emphasis is placed on how the philosophical principles of American constitutional tradition provide guidance for the appropriate exercise of administrative ethics and authority. (3-0) Y

PA 7328 Economic Theory for Public Affairs (3 semester hours) This course examines concepts and analytical tools of economics and demonstrates how these concepts are used in analyzing public policy problems and designing appropriate responses. Following an exposition of the basic theoretical and analytical concepts in a public policy context, the course examines the role and limitations of economics in public policy making. (3-0) Y

PA 7330 Research Design in 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. Prerequisite: EPPS 6313 or equivalent. (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. (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) Y

PA 7381 Special Topics in Public Affairs (3 semester hours) Topics vary semester to semester and are rotated typically among the major fields within the program. May be repeated for credit to a maximum of 9 hours. (3-0) R

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.) ([3-9]-0) T

PA 8340 Dissertation Seminar in Public Affairs (3 semester hours) 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 (3-0) Y

PA 8V01 Independent Study (1- 9 semester hours) Students will work with a faculty member to develop an individualized course of study relevant to public affairs. ([1-9]-0) R

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

Doctor of Philosophy in Public Policy and Political Economy

<http://epps.utdallas.edu/pppe>

Faculty

Professors: Sheila Amin Gutiérrez De Piñeres, Kurt J. Beron, Brian J. L. Berry (Dean), Ronald Briggs, Marie Isabelle Chevrier, Lloyd J. Dumas, Euel Elliott, Donald A. Hicks, Irving J. Hoch (emeritus), Paul Jargowsky, Murray J. Leaf, Lawrence J. Redlinger, Todd J. Sandler, Richard K. Scotch, Paul Tracy

Associate Professors: Bobby C. Alexander, Jennifer Smith Holmes, Simon Fass, Sheryl Skaggs

Clinical Assistant Professors: Kruti Dholakia

Mission Statement

The mission of the Ph.D. program in Public Policy and Political Economy is to prepare our students for professional positions in research, teaching, and practice in fields related to public policy and political economy, and in both academic and nonacademic settings. We prepare students through instruction in social science and public policy concepts, advanced methodological knowledge and applied social research techniques, and professional communication. PPPE students and faculty are encouraged to promote an inclusive and diverse environment that is committed to continued scholarship and service.

Objectives

- Students will demonstrate the ability to apply social science and public policy theories and concepts.
- Students will develop competency in advanced methods of social science and public policy research and analysis.
- Students will develop basic skills in professional communication appropriate to the public policy and political economy research and analysis.

Facilities

Students have access to the computing facilities in the School of Economic, Political and Policy Sciences and University's Computing Center. The School has two computing laboratories which have 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 also available online via the library's and school's memberships in numerous organizations.

Admission Requirements

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. 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

While there are no specific course prerequisites, entering students will benefit from exposure to undergraduate courses in the Economic, Political and Policy Sciences, calculus,, and research design.

Degree Requirements

The PhD in Public Policy and Political Economy requires a minimum of 90 post-baccalaureate graduate credit hours. Full-time students can complete the degree in an average of 5 years.

Students must maintain a 3.0 cumulative GPA in their graduate courses in the degree program, including core courses. If placed on probation, students will have one semester to bring their cumulative grade point average to a 3.0 or greater. Any student who receives two Cs will no longer be allowed to continue in the program.

Students must complete the following:

- 33 hours of core courses
- 12 hours of field courses (six hours in two fields of the student's choice)
 - Criminology
 - Development
 - International Political Economy
 - Social Policy
- 6 hours area of specialization (in one of the fields of the student's choice)
- A qualifying examination in Quantitative Empirical Methods and Research Design
- Portfolio submitted and approved by Portfolio Committee
- Matriculation to the dissertation phase
- Participation in Dissertation Seminar
- Successful completion of 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 6313 Public Policymaking and Institutions
POEC 7318 Ethics, Culture and Responsibility

2. Six hours of Theories of Political Economy

POEC 7317 Economics for Public Policy
POEC 6312 Social Economic Theories

3. Fifteen hours of Empirical Methods

EPPS 7313 Descriptive and Inferential Statistics
EPPS 7316 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 Research Design

EPPS 6310 Research Design I
EPPS 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:

Criminology:

CRIM 6311 Crime and Justice Policy
CRIM 6305 Law and Social Control

Development:

POEC 6354 Theories and Issues of Development (Required), and:

Select **one** of the following:

POEC 6364 Development Economics
POEC 6360 World Political Economy
POEC 6362 Political Development
POEC 6318 Population and Development

International Conflict and Security (Select two of the following):

PA 6351 Introduction to Homeland Security
POEC 6361 Political Violence and Terrorism

POEC 6367 Topical Issues and Conflict Resolution
POEC 6369 National and International Security Strategies and Policies

International Political Economy (Select two of the following):

POEC 6360 World Political Economy
PSCI 6300 Proseminar in Democratization, Globalization and International Relations
PSCI 6309 International Political Economy and Organization

Social Policy

SOC 6350 Social Stratification
SOC 6340 Domestic Social Policy

Students may request that alternative courses be substituted in a particular field with the approval of the program director. Moreover, students may, in consultation with the Program Director, define a new field provided that appropriate coursework is available in a coherent research literature is identified. ***Note:** (1) Students may only count POEC 6360 World Political Economy as a field course for **either** Development or International Political Economy, **not** for both.

III. 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. The student completes a dissertation in one of the two fields (see above) and must successfully defend the dissertation before a duly constituted dissertation committee, in accordance with the requirements of the University and the UT System.

IV. 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 at the end of a full time student's first 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 start of the fall semester of the second year. All students are required to take the methods qualifying exam by the end of their second year to be allowed to continue in the doctoral program.

2) A portfolio consisting of papers written in core and field courses that include the following elements:

- a) Literature reviews written in the field survey courses;
- b) Empirical and/or methodological papers written in the core methods courses
- c) Research design projects

The portfolio committee will review the portfolios, 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 PPPE 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 and on the program's webpage.*

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.

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.

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, Masters in Public Policy, MS in Applied Sociology, MS in Criminology, MS in Economics, MS in Geographic Information Sciences and the MS in International Political Economy. 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 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 6323(PA 6313 and PSCI 6313) 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. (3-0) Y

POEC 6319 (PSCI 6310) Political Economy of MNCs (3 semester hours) The Political Economy of Multinational Corporations will approach the rise of international firms and their behavior from a social scientific approach, utilizing research in economics, political science, and other disciplines. In addition to the historical rise of international firms, the course covers the economic theory of the firm, MNCs as political actors, the dynamics of foreign direct investment, and the relationship of MNCs to developing

countries. The aim of the course is to understand the causes and effects of the behavior of transnational corporations, particularly in regard to economic policy.(3-0) T

POEC 6335 (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.

POEC 6327 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 or equivalent recommended. (3-0) Y

POEC 6353 (ECON 6362) 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. (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 6355 Political Economy of the Middle East (3 semester hours) Analysis of the interplay of cultures and conflicts in the Middle East. The course will examine ancient cultures, Islam and the Ottoman Empire, the Arab-Israeli conflict, the rise of the Oil Kingdoms, the Kurds, the Gulf wars, and terrorism in the name of Islam. The course will also focus on U.S. relations with a number of Middle Eastern countries such as Saudi Arabia, Iran, Iraq, Egypt, and Israel. (3-0) T

POEC 6357 (PSCI 6357) Political Economy of Latin America (3 semester hours) Addresses historical and contemporary issues in Latin American political economy. Uses case studies and cross-regional comparisons to assess competing explanations. Analyzes the current political and economic situation facing Latin America in its quest for economic growth and development. The emphasis is to understand the broad patterns of development and change in the region and the physical, historical, social and economic constraints which have affected development, broadly understood. (3-0) T

POEC 6358 Political Economy of South and Southeast Asia (3 semester hours) Political Economy of South and Southeast Asia. South Asia is the Indian peninsula. Southeast Asia is the great swath of countries from Burma and Thailand through Malaysia to Indonesia and Australia. This is a region of great cultural, political, economic, religious, and historical diversity. This course surveys the political economy of the region by selectively examining key countries and their mutual interactions. The major countries, all of which are rising military and economic powers, are Pakistan, India, Thailand, Indonesia and Australia. Additional countries which will be included according to interest and available material, include Sri Lanka, Nepal, Bhutan, Bangladesh, Burma, Cambodia, Vietnam, Malaysia, Singapore, Papua New Guinea, East Timor and New Zealand. (3-0) T

POEC 6360 (ECON 6352) World Political Economy (3 semester hours) An overview of major social, political, economic, and cultural forces that influence the nature of international political and economic relations. (3-0) T

POEC 6361 (PSCI 6361) Political Violence and Terrorism (3 semester hours) In this discussion-based seminar, we will cover the topics of terrorism, political violence, and civil war. We will examine concepts, causes, and consequences of different types of political violence. Additionally, we will discuss topics relevant to research, including discussions of different approaches (quantitative, qualitative, and formal) and a perusal of different data sources. We will take advantage of literature from multiple disciplines.(3-0)

POEC 6362 (PSCI 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. (3-0) T

POEC 6363 (PSCI 6363) Conflict and Development (3 semester hours) This module will explore the nexus between violent intrastate conflict and development. It will examine some of the key conceptual

frameworks advanced to understand conflict and will explore specific themes which have preoccupied researchers and policy practitioners in recent years. In addition to assessing the economic costs of the conflicts, this course will also examine the traditional factors that have been purported to explain the prevalence of insurgency. (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. (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 6367 Topical Issues in Conflict and Conflict Resolution (3 semester hours) This course will examine in detail three recent international or ethnic conflicts and the national and international efforts to resolve the conflicts and/or mitigate their effects. The course will examine theories of conflict including ethnic conflict and just war theory. It will examine the historical sources of the conflicts, the regional and international dimensions, the precipitating causes and the intensification of the conflicts. Examples of conflicts that could be used include: the former Yugoslavia, India/Pakistan, Iraq and Kuwait, North Korea, Israel/Palestine and Sudan. (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. (3-0) T

POEC 6369 National and International Security Strategies and Policies (3 semester hours) With the end of the decades long Cold War, the U.S. has become the world's only superpower. But the problem of national and international security continue to be a dominant concern of national and international political and economic life, just as it has been for more than sixty years. Many nations continue to maintain high levels of military expenditure as a mainstay of their security policy. Yet, there has been a profound change in the nature of the threats to security since the Cold War. Some, like the threat of intentional full-scale global nuclear war, have receded. Others, like the threat posed by nuclear proliferation and the terrorism of mass destruction, have increased. From acute hot spots to longer term questions of restructuring power and security arrangements in a post Cold War world, understanding the deeper issues of national and international security is critical to understanding what lies behind the headlines -- and what strategies are likely to be effective in achieving real security. Topics include: the nature and meaning of security; security and military force; terrorism, accidents and accidental war; nuclear proliferation; the international arms trade; the experience of war; the economics of security policy; social and psychological factors; strategies for achieving security by nonmilitary means. (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.). ([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 7306 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. (3-0) R

POEC 7317 (PA 7317) 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. (3-0) Y

POEC 7318 (PA 6308) 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. (3-0) Y

POEC 7320 (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.

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)

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. (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). (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. MPA or doctoral students may not take more than 3 hours of the concentration requirement from POEC 7330 and POEC 7326.)

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 7381 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) R

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. ([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.) ([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.) ([3-9]-0) T

POEC 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 up to 6 hours). ([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 (1-9 semester hours) Provides faculty supervision of a student's dissertation research. Prerequisite: Consent of instructor. (May be repeated for credit.) ([1-9]-0) S

Master of Arts in Political Science

Faculty

Professors: Thomas Brunell, Anthony M. Champagne, Marie I. Chevrier, Harold D. Clarke, Euel Elliott, Edward J. Harpham, L. Douglas Kiel, Robert C. Lowry, Marianne C. Stewart

Associate Professors: Jennifer S. Holmes, Linda Camp Keith, Gregory S. Thielemann

Assistant Professors: Patrick Brandt Brandon Kinne, Banks Miller, Clint Peinhardt

Senior Leturers: Brian Bearry, Karl Ho

Mission Statement

The mission of the Master of Arts in Political Science (MAPS) degree is to offer advanced instruction in the social science literature and theories about politics, citizenship and governance. The program serves the interests and needs of talented students who can commit initially to a 30-hour program but may be attracted subsequently to the Ph.D. program, as well as those who can commit initially to the doctoral program but subsequently decide not to complete the program. The Master of Arts in Political Science further can satisfy the interests and talents of students who "fast-track" in the Political Science undergraduate program and who want an additional year of more rigorous, sharply focused graduate coursework in Political Science.

Objectives

Students in the Master of Arts in Political Science program will:

- Demonstrate the ability to apply political science theories and concepts to the study of citizenship, governance and politics.
- Develop a competency in one of the fields of Democratization, Globalization and International Relations; Government and Political Institutions and Processes; or Decision Making and Public Management.
- Develop basic skills in professional communication appropriate to political science research and analysis.
- Develop competency in analysis, evaluation, and research design relevant to political science research and analysis.

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 that 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 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, the Inter University Consortium for Political and Social Research, the Roper Center, and the University Consortium for Geographic Information Systems, and other organizations.

Admissions Requirement

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

The Master of Arts in Political Science seeks applications from students with a baccalaureate degree from an accredited university or college. Although applications will be reviewed holistically, in general, entering students have earned a 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1100 on the Graduate Records Examination (GRE). 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. Applications are reviewed by the Political Science Program Committee in the School of Economic, Political and Policy Sciences.

Undergraduate students who are interested in completing their undergraduate degrees while simultaneously taking graduate courses in the M.A. in Political Science program are expected to meet the School's "fast-tracking" requirements.

Prerequisites

While there are no specific course prerequisites, entering students will benefit from exposure to undergraduate courses in the Economic, Political and Policy Sciences, statistics, and research design. In cases where undergraduate preparation is not adequate, students may be required to take additional course work before starting the master's program.

Transfer Policies

Students who have previous graduate work pertinent to the requirements of a master's program may be given up to 12 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 on page 20.

Students seeking a Master of Arts in Political Science must complete at least 30 semester credit hours of work in the program, must receive a grade of B- or better in all required courses, and must maintain at least a 3.0 grade point average to graduate.

The curriculum has two components:

- (1) Fifteen semester hours of required coursework
- (2) Fifteen semester hours of prescribed electives

Required Courses (15 hours)

All students should complete the core courses as soon as possible.

All of the following:

- EPPS 6313 Introduction to Quantitative Methods
- PSCI 6350 Logic, Scope and Methodology of Political Science
- PSCI 6352 Empirical Democratic Theory

Two of the following:

- PSCI 6300 Proseminar in Democratization, Globalization, and International Relations
- PSCI 6307 Proseminar in Decision Making and Public Management
- PSCI 6313 Proseminar in Institutions and Processes

Prescribed Electives (15 hours)

- a) Two additional courses at the 5000 or 6000 level in the Democratization, Globalization and International Relations field; the Institutions and Processes field; or the Decision Making and Public Management field.
- b) Three additional courses at the 5000 or 6000 level in one of the above fields, or methodology courses such as applied regression (EPPS 6316) or other methods courses offered throughout the School, or up to three credits of optional thesis (independent study).

Master of Arts in Political Science – Constitutional Law Studies

Faculty

Professors: Thomas Brunell, Anthony M. Champagne, Harold D. Clarke, James Marquart, Marianne C. Stewart, Paul Tracy, John Worrell

Associate Professors: Linda Camp Keith

Assistant Professors: Denise Boots, Patrick Brandt, Banks Miller

Mission Statement

The mission of the Master of Arts in Political Science - Constitutional Law Studies degree is to provide students with the reasoning and analytic skills necessary to understand the technical rules of law, legal practices and policies, and law more generally as a social phenomenon. It serves the interests and needs of students who want an intellectually rigorous legal education as preparation for law school, for more advanced graduate learning, or for law-related careers in teaching, journalism, government, policy-making, or the private sector.

Objectives

Students in the Master of Arts in Political Science - Constitutional Law Studies program will:

- Acquire detailed knowledge of the role of the judicial system in the evolution of public policy in the United States.

- Acquire detailed knowledge of the roles played by practicing attorneys in the development and application of public law in the United States.
- Demonstrate basic skills in legal research and writing.
- Develop competency in the application of theories of the evolution of constitutional law to United States Supreme Court decisions
- Demonstrate the ability to conduct original research on law and courts using skills in legal research and writing, quantitative research or field research.

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 that 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 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, the Inter University Consortium for Political and Social Research, the Roper Center, and the University Consortium for Geographic Information Systems, and other organizations.

The Center for American and International Law, an internationally known organization that provides professional development to lawyers, judges, and law enforcement officers, helps to administer the Capstone Seminar in Constitutional Law Studies in which leading lawyers and judges provide lectures on law and the legal process.

Admissions Requirement

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

The Master of Arts in Political Science seeks applications from students with a baccalaureate degree from an accredited university or college. Although applications will be reviewed holistically, in general, entering students have earned a 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1100 on the Graduate Records Examination (GRE). 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. Applications are reviewed by the Political Science Program Committee in the School of Economic, Political and Policy Sciences.

Undergraduate students who are interested in completing their undergraduate degrees while simultaneously taking graduate courses in the M.A. in Political Science - Constitutional Law Studies program are expected to meet the School's "fast-tracking" requirements.

Prerequisites

While there are no specific course prerequisites, entering students will benefit from exposure to undergraduate courses in the Economic, Political and Policy Sciences, statistics, and research design. In cases where undergraduate preparation is not adequate, students may be required to take additional course work before starting the master's program.

Transfer Policies

Students who have previous graduate work pertinent to the requirements of a master's program may be given up to 12 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 20.

Students seeking a Master of Arts in Political Science - Constitutional Law Studies must complete at least 30 semester credit hours of work in the program, must receive a grade of B- or better in all required courses, and must maintain at least a 3.0 grade point average to graduate.

The curriculum has two components:

- (1) Eighteen semester hours of required coursework
- (2) Twelve semester hours of prescribed electives

Required Courses (18 hours)

All students should complete the core courses as soon as possible.

One of the following:

EPPS 6313 Introduction to Quantitative Methods
PSCI 6350 Logic, Scope and Methodology of Political Science

All of the following:

PSCI 5306 The American Legal System and the Practice of Law
PSCI 5307 Legal Reasoning and Writing
PSCI 6301 Constitutional Law
PSCI 6305 Workshop in Constitutional Law Studies
PSCI 6343 Law and the Policy Process

Prescribed Electives (12 hours)

Four of the following:

CRIM 6305 Law and Social Control
CRIM 6311 Criminal Justice Policy
CRIM 6317 The Courts
CRIM 6348 Drugs and Crime
EPPS 6316 Applied Regression
PA 6319 Topics: Administrative Law
PSCI 6306 Human Rights and International Law
PSCI 6311 Judicial Politics Seminar

PSCI 6312 Comparative Constitutions and Courts
PSCI 6331 Executives, Legislatures, and Public Policy
PSCI 6339 Election Law and Electoral Systems
PSCI 7320 International Negotiations

Master of Arts in Political Science – Legislative Studies

Faculty

Professors: Thomas Brunell, Anthony M. Champagne, Marie I. Chevrier, Harold D. Clarke, Euel Elliott, Edward J. Harpham, Robert C. Lowry, Marianne C. Stewart

Associate Professors: Linda Camp Keith, Gregory S. Thielemann

Assistant Professors: Patrick Brandt

Mission Statement

The mission of the Master of Arts in Political Science - Legislative Studies degree is to offer pre-professional instruction for students interested in positions as legislative staff, political consultants, or other careers in professional politics. Students will receive instruction that moves beyond the standard coursework in American and Texas government and politics by advancing their knowledge of legislative processes and the role that legislatures play at the local, state, and national levels of government. Graduates will have the communication, research and project management skills that are necessary for undertaking policy or political analysis in legislative and/or public affairs offices of the state of Texas and elsewhere.

Objectives

Students in the Master of Arts in Political Science - Legislative Studies program will:

- Demonstrate knowledge of subnational political institutions and processes in the United States and their effects on politics and policy.
- Acquire detailed practical knowledge of the workings of the Texas state legislature.
- Acquire detailed knowledge of common campaign practices in the United States, including media relations.
- Develop competency in the design of public opinion surveys.
- Demonstrate the ability to analyze survey data using methods and tools appropriate for the practice of politics.
- Demonstrate proficiency in skills required for at least one position in the practice of politics by successfully completing an internship.

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 that 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 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, the Inter University Consortium for Political and Social Research, the Roper Center, and the University Consortium for Geographic Information Systems, and other organizations.

Students also have access to the non-partisan Center for the Study of Texas Politics. The Center develops opportunities for North Texans to interact with Texas' leading policy-makers while simultaneously enhancing the quality of instruction, research and service that exists in the School of Economic, Political and Policy Sciences.

Admissions Requirement

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

The Master of Arts in Political Science seeks applications from students with a baccalaureate degree from an accredited university or college. Although applications will be reviewed holistically, in general, entering students have earned a 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1100 on the Graduate Records Examination (GRE). 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. Applications are reviewed by the Political Science Program Committee in the School of Economic, Political and Policy Sciences.

Undergraduate students who are interested in completing their undergraduate degrees while simultaneously taking graduate courses in the M.A. in Political Science - Legislative Studies program are expected to meet the School's "fast-tracking" requirements.

Prerequisites

While there are no specific course prerequisites, entering students will benefit from exposure to undergraduate courses in the Economic, Political and Policy Sciences, statistics, and research design. In cases where undergraduate preparation is not adequate, students may be required to take additional course work before starting the master's program.

Transfer Policies

Students who have previous graduate work pertinent to the requirements of a master's program may be given up to 12 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 20.

Students seeking a Master of Arts in Political Science - Legislative Studies must complete at least 30 semester credit hours of work in the program, must receive a grade of B- or better in all required classes, and must maintain at least a 3.0 grade point average to graduate.

The curriculum has three components:

- (1) Fifteen semester hours of required coursework
- (2) Nine semester hours of prescribed electives
- (3) Six semester hours of internship.

Required Courses (15 hours)

All students should complete the core courses as soon as possible.

EPPS 6313 Introduction to Quantitative Methods
PSCI 6324 Local and State Government and Politics
PSCI 6330 Campaigns and Media Relations
PSCI 6364 Public Opinion and Survey Research

One of the following:

PSCI 6340 Texas Legislative Affairs Workshop OR
PSCI 6341 Texas Legislative Process

Prescribed Electives (9 hours)

Three additional courses at the 6000 level on political and civic organizations, bureaucracy and public policy Congress, or executives, legislatures and policy.

Internship (6 hours)

Each student's degree program concludes with a six-credit hour internship over the summer semester. Internships will be done in the state legislature in Austin, in Congress in Washington DC, or at some other state or local agency.

Master of Science in Applied Sociology

<http://epps.utdallas.edu/soc/ms.html>

Faculty

Professors: Paul Jargowsky, Richard K. Scotch, Paul Tracy

Associate Professors: Bobby C. Alexander, Sheryl Skaggs

Program Objectives

With an emphasis on the acquisition of theoretical knowledge and social research skills, the MS degree in Applied Sociology is designed to prepare students for careers in policy analysis, program development and evaluation, and quantitative and qualitative data analysis. As public, private and nonprofit organizations attempt to maximize their human and monetary resources, they often seek professionals with specialized skills to assess program demands and viability, evaluate program success, direct change and inform policy. Graduates of the MSAS program are trained to fill such roles and effectively apply their knowledge and skills in employment areas including healthcare, local, state and national government, nonprofit social services, community activism, marketing research, human resources and business administration.

Although the MA in Applied Sociology is a terminal degree program, a number of our graduates have transitioned into UTD's Doctoral program in Public Policy and Political Economy, as well as external sociology doctoral programs throughout the country. The program is open to full-time and part-time students, with many of our classes offered in the late afternoon and evenings. Students may enter the program in the fall, spring or summer semesters.

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 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 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.

Grading Policy

In order to qualify for graduation, students must maintain a minimum 3.0 grade point average in their degree program's core courses plus an aggregate grade point average of 3.0 for all graduate courses taken in the student's degree program at U.T. Dallas.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 and EPPS, 15 credit hours of Applied Sociology guided electives, and 9 credit hours of Economic, Political and Policy Sciences (EPPS) 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 and EPPS (12 hours):

EPPS 6313 Introduction to Quantitative Methods
SOC 6312 Social-Economic Theories
SOC 6350 Social Stratification
EPPS 6346 Qualitative Research Methods
Or EPPS 6310 Research Design I

Applied Sociology Guided Elective Courses (15 hours):

Any graduate-level courses with a SOC prefix outside of the core may be applied to this requirement. Students may apply other graduate courses from the School of Economic, Political, and Policy Sciences 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 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 6312 Social-Economic Theories (3 semester hours) A critical analysis of early and modern social and economic theories. Select classical works of Smith, Marx, and Weber are explored, as they pertain to Western capitalist development, along with more contemporary perspectives related to the accumulation and exchange value of human, social and cultural capital. Emphasis is placed on understanding how social relations and social institutions influence economic exchanges.(3-0) Y

SOC 6340 Domestic Social Policy (3 semester hours) Overview of governmental and non-governmental 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. (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. (3-0) Y

SOC 6344 Gender and Policy (3 semester hours) Explores issues of gender and public policy in the U.S. Topics include poverty, politics, and workplace and family issues.(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. (3-0) Y

SOC 6353 Immigrants and Immigration in U.S. Society (3 semester hours) The course examines the assimilation into U.S. society and its main public social institutions of immigrants arriving after 1965 with a focus on the two largest groups: Mexicans and Asians, including immigrants from the Middle East. The course considers the effects of the economy and immigration law and policy on assimilation. Other topics include the impact of these "newest" immigrants on the racial and ethnic as well as cultural diversification of the U.S. population, multiculturalism, the second generation, and the future of immigrants and immigration in U.S. society. (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. (3-0) Y

SOC 6370 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 6380 (PA 6380) 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. (3-0) T

SOC 6381 (PA 6382) Non-Profit Management(3 semester hours) This course examines issues, strategies, and techniques related to leadership and management in non-profit organizations. (3-0) R

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. ({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

Master of Science in Criminology

<http://epps.utdallas.edu/crim/ms.html>

Faculty

Professors: James W. Marquart (Director), Bruce Jacobs, John Worrall

Associate Professors: Thomislav Kovandzic, Lynne Vieraitis

Assistant Professors: Denise Boots, Karen Hayslett-McCall, Robert Morris,

Clinical Professors: Elmer Polk

Clinical Assistant Professors: Timothy Bray, Sarah Maxwell

Mission

The Mission of the Master of Science in Criminology program at the University of Texas at Dallas is threefold, to:

1. Deliver high-quality education to a diverse body of students regarding the etiology, control, and variation of law-breaking across space and time.
2. Serve local, regional, and national communities through professional development programs, public policy analyses and evaluation research, program and policy design, and as a forum for new ideas and approaches to the study of crime.
3. Advance the understanding of criminology through a multidisciplinary mix of theoretical and applied research.

Objectives

The Master of Science in Criminology provides students with a coherent and intellectually challenging degree that prepares them to conduct interdisciplinary research on various aspects of criminology and/or criminal justice, depending on their specific areas of specialty. Students will be well prepared for

analytical and administrative posts in international and domestic research and policy institutions, criminal justice organizations, and in the private sector.

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 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 also available online via the library's and School's memberships in numerous organizations.

Prerequisites

For the Master of Science in Criminology, students with an undergraduate degree in Criminology or a related field will have the necessary academic foundation to begin their graduate coursework (See the Graduate Program Handbook which is posted on the EPPS Website for more information on Prerequisites and Transfer Policies at <http://epps.utdallas.edu/crim>).

Program of Studies Policy

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 Criminology per the degree plan for the program. A complete Program of Studies Form will be filed in and approved prior to the student's registration for his/her 19th semester credit hour to be counted toward a master's degree.

Analytical Paper Writing Requirement (MS in Criminology)

All Doctoral track students must complete a writing requirement while enrolled in the MS Program. Student must take a minimum of six enrollment hours of CRIM 6V98, complete an analytical research paper and present their findings in a colloquium setting to be eligible for graduation with the MS.

Non-Writing Requirement for the MS in Criminology

MS students on a terminal track who do not wish to be considered for admission into a doctoral program have the option of taking 6 hours of any graduate classes as electives in lieu of the writing requirement.

Coursework and Credit Hours

15 Hours of required Criminology core classes:

EPPS 6310 Research Design I
EPPS 6313 Descriptive and Inferential Statistics *
CRIM 6300 Proseminar in Criminology
CRIM 6303 Etiology of Crime and Criminality.
CRIM 6311 Crime and Justice Policy

PLUS 15 hours Electives:

9 hours in Elective Criminology graduate courses, and
6 hours in any program or school outside Criminology

AND:

6 hours of CRIM 6V96 Analytical Writing Research (for Ph.D. track students), or
6 hours of graduate-level course electives (for students wishing to terminate at MS)

Total Hours: 36

* Doctoral-track or doctoral students are advised to take EPPS 7313 Descriptive and Inferential Statistics instead of EPPS 6313 and EPPS 7316 Regression and Multivariate Analysis directly following to ensure continuity and success with the increased rigor in the doctoral level statistics/methods sequence.

Master of Science in Economics

<http://www.utdallas.edu/epps/eco/>

Faculty

Professors: Daniel G. Arce M., Kurt J. Beron, Rachel Croson, Catherine Eckel, James Murdoch, Todd Sandler, Barry J. Seldon, Donggyu Sul

Associate Professors: Nathan Berg, Susan Williams McElroy, Kevin Siqueira

Assistant Professors: Rodney Andrews, Chetan Dave, Xin (Sherry) Li

Mission

The mission of the Master of Science in Applied Economics is to provide excellent graduate-level education in economics, with an emphasis on the development of theoretical understanding of economic phenomena, quantitative skills that can be applied to economic problems, and critical thinking to understand how best to apply economic theory and quantitative skills to real-world problems. Graduates of the Economics program will have an educational background that is conducive to employment in banking or financial institutions, insurance, consulting, corporate strategic planning, real estate, journalism, management, marketing, labor arbitration, regulation, environmental and urban and regional planning and quantitative analysis. 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 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 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 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 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 U.T.Dallas or their equivalents at another institution: ECON 3310 Intermediate Microeconomics, ECON 3311 Intermediate Macroeconomics, ECON 4351 Mathematical Economics, ECON 4355 Econometrics, and -EPPS 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.

Degree Requirements

The University's general degree requirements are discussed on page 20.

Students seeking a Master of Science in Economics degree must complete 36 semester credit hours of work in the program. The program has three components: 12 hours (four courses) of Required Core Courses (listed below), 9 hours of Economics Electives and 15 hours of Other Electives. Students must consult with the Director of Graduate Studies of the Economics Program each semester in order to determine the approved Economics Electives and Other Electives each semester. 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):

ECON 5321 Microeconomic Theory for Applications
ECON 5322 Macroeconomic Theory for Applications
ECON 6305 Mathematical Economics
ECON 6306 Applied Econometrics

Advising note: If the student intends to enter the Ph.D. program in Economics upon completion of the M.S. then he or she should consider taking ECON 6301 instead of ECON 5321 and ECON 6302 instead of ECON 5322.

Economics Electives Courses (9 credit hours):

Approved ECON courses numbered 5000 and above.

Other Electives Courses (15 credit hours):

Approved ECON courses numbered 5000 and above or approved graduate courses from other programs.

Advising note: If the student intends to enter the Ph.D. program in Economics upon completion of the M.S. then he or she should consider taking ECON 7301 Microeconomics Theory II and ECON 7302 Macroeconomic Theory II as electives.

Master of Science in Geospatial Information Sciences

<http://www.gis.utdallas.edu>

Faculty

Professors: Carlos Aiken (Geosciences), Brian J. L. Berry (Economic, Political and Policy Sciences), Denis J. Dean (Economic, Political and Policy Sciences), Daniel Griffith (Economic, Political and Policy Sciences), Paul Jargowsky (Economic, Political and Policy Sciences), James Murdoch (Economic, Political and Policy Sciences), Robert Stern (Geosciences)

Associate Professors: Tom Brikowski (Geosciences), John Ferguson (Geosciences), Fang Qiu (Economic, Political and Policy Sciences), Michael Tiefelsdorf (Economic, Political and Policy Sciences)

Assistant Professors: Yongwan Chun (Economic, Political and Policy Sciences), Karen Hayslett-McCall (Economic, Political and Policy Sciences)

Clinical Assistant Professors: Stuart Murchison (Economic, Political and Policy Sciences)

Students may choose between two tracks within the Master of Science in Geospatial Information Sciences program. Both tracks are offered jointly by the School of Economic, Political and Policy Sciences and the School of Natural Sciences and Mathematics. The first track is a professional program that focuses on the use of Geographic Information Systems (GIS) and associated technologies such as remote sensing and global positioning systems for acquiring, managing, analyzing and communicating spatially-referenced information. This program emphasizes coursework, and involves a capstone class where, under the supervision of a faculty member, students prepare and present to the faculty and fellow students a professional GIS project. Students are expected to master 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 can apply their skills in a variety of areas such as public administration and policy analysis; public safety, criminology, emergency preparedness management; environmental management; urban, regional, social service and transportation planning and analysis; marketing, site selection, logistics and real estate; and resource exploration, including petroleum.

The second track of the Master's of Science in Geospatial Information Sciences program is a conventional program that offers a balance between coursework and research, and ultimately leads a student to produce a research-oriented master's thesis. This track is aimed at students who want to hone their research skills, and is the preferred route for students who may want to move to a doctoral program. Graduates can apply their skills to the same areas as graduates from the first track, but also have the option of moving into research-oriented jobs, and maximizing their ability to move into doctoral programs.

Mission and Objectives

The mission of both tracks the Master of Science in Geographic Information Sciences program is to provide students a rigorous understanding of the technologies, quantitative techniques, models and theories used to acquire and manage spatially referenced information, analyze spatial processes, and communicate spatial information. The second track has the additional mission of providing students with a thorough understanding of the scientific research method. U.T.Dallas graduates will have strong analytical and numerical skills, knowledge of empirical and quantitative research methodologies, and employ novel geographic information sciences technologies. They will use these capabilities to support

public and private sector organizations, to address significant societal issues, and to enhance understanding of the human and natural environments. They will successfully compete at the highest level for jobs requiring geospatial skills and for entry into quality doctoral programs in relevant areas. More specifically, graduates of the program will:

- demonstrate their knowledge of the technologies, quantitative techniques, models and theories used to acquire and manage spatially referenced information and to analyze spatial processes.
- have strong analytical and numerical skills, knowledge of empirical and quantitative research methodologies, and be able to employ these skills and methodologies in novel geographic information sciences applications.
- be able to identify and apply appropriate geospatial methodologies to support public and private sector organizations, to address significant societal issues, and to enhance understanding of the human and natural environments.

Facilities

Classes are offered through state-of-the-art GIS computing facilities housed 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 computer workstation is available for every student. All industry-standard GIS and remote sensing software is available. The University is 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 admission to the program, 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 personal statement, approximately one page in length, outlining their background, education and professional objectives.

Prerequisites

Beginning students must have the equivalent of GISC 6381 Geographic Information Systems Fundamentals and GISC 6382 Applied Geographic Information Systems, or they must take these courses at UT Dallas in addition to the 30 credit hours required for the Masters. Additionally, beginning students are expected to have at least one course at the graduate or undergraduate level covering descriptive and inferential statistics (or take EPPS 6313 Descriptive and Inferential Statistics, but this will not count toward the 30 hours needed for the degree), to have completed college mathematics through calculus, and to have at least one programming or computer applications course or possess equivalent knowledge.

Degree Requirements

The University's general degree requirements are discussed on page 20.

To earn the Master of Science in Geospatial Information Sciences, students must complete a minimum of 30 semester credit hours of work beyond the prerequisites mentioned above. Both tracks of the program involve a base requirement of 9 hours (three courses), a core requirement of 9 hours, and prescribed electives for 9 hours. The two tracks differ in their research requirements. 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 – Both Tracks (9 credit hours):

Statistics (1 or 2 courses):

GISC 6301 Geospatial Data Analysis Fundamentals or
GEOS 6313 Data Analysis for Geoscientists or
GISC 6311/ECON 6311 Statistics for Geospatial Scientists
GISC 7310 Regression with Spatial Applications or

Programming (1 or 2 courses):

GEOS 6303 Computing for Geoscientists
GISC 6317 Computer Programming for GIS
GISC 6388 GIS Application Software Development
GISC 7363 Internet Mapping and Information Processing

MIS 6326 Database Management Systems

Core Requirement – Both Tracks (9 credit hours):

Students must earn a minimum grade point average (GPA) of 3.0 in at least three of the following courses:

GISC 6325 (GEOS 7365) Introduction to Remote Sensing
GISC 6384 Spatial Analysis and Modeling
GISC 6387 Geographic Information Systems Workshop
GEOS 7327/GISC 7367 Remote Sensing Workshop

Elective Courses (at least 9 credit hours from the following, not duplicated elsewhere)

CS 6359 Object Oriented Analysis and Design
CS 6360 Database Design
CS 6366 Computer Graphics
CS 6384 Computer Vision
EPPS 7368 Spatial Epidemiology
GEOS 7322 Global Positioning System (GPS) Satellite Surveying Techniques
GEOS 7324 3-D Data Capture and Ground Lidar
GISC 6325 (GEOS 6325) Introduction to Remote Sensing
GISC 6380 Spatial Concepts and Organization
GISC 6383 GIS Management and Implementation
GISC 6385 GIS Theories, Models, and Issues
GISC 6388 GIS Application Development
GISC 7310 Regression Analysis with Spatial Applications
GISC 7360 GIS Pattern Analysis
GISC 7361 Spatial Statistics

GISC 7363 Internet Mapping and Information Processing
GISC 7364 Demographic Analysis and Modeling
GISC 7365 Remote Sensing Digital Image Processing
GISC 7366 Applied Remote Sensing
GISC 7387 GIS Research Design
GISC 8320 Seminar in Spatial Analysis
MIS 6308 Systems Analysis and Project Management
MIS 6324 Decision Support Systems
MIS 6326 Database Management Systems
MIS 6328 Information Strategy Planning
PA 6318 Information Systems in Policy Environments
EPPS 6316 Advanced Regression Analysis

Research Project Requirement – Track One (3 hours):

GISC 6389 GIS Master's Project

Research Project Requirement – Track Two (3 hours):

GISC 8V98 Master's Thesis

Master of Science in International Political Economy

<http://epps.utdallas.edu/pppe/msipe>

Faculty

Professors: Sheila Amin de Gutiérrez de Piñeres, Brian J.L. Berry, Marie I. Chevrier, Lloyd J. Dumas, Euel W. Elliott, Donald A. Hicks, Paul A. Jargowsky, Murray J. Leaf, Todd Sandler, Richard K. Scotch
Associate Professors: Bobby C. Alexander, , Simon M. Fass, Jennifer S. Holmes Sheryl L Skaggs
Assistant Professors: Clint W. Peinhardt

Mission Statement

The mission of the Master of Science in International Political Economy is to offer an experience in interdisciplinary education and policy research through activities in graduate education, scholarly and applied inquiry, and professional service. Today, more careers increasingly require international knowledge and skills that transcend the confines of traditional disciplinary training. We prepare students for careers in research, teaching, and practice in a variety of both academic and non-academic public policy and political economy settings. The Master of Science in International Political Economy will develop students' critical skill sets to meet the needs and demands of the international diplomatic and business sectors. These skills include critical thinking, knowledge of multiple cultures, and cultural contexts, rigorous research skills, and the ability to communicate effectively in an array of environments. Students will be prepared to advance careers in policy and data analysis, and administrative positions in government, the non-profit and private sectors.

Objectives

- Students will demonstrate the ability to apply social science and international political economy theories and concepts.

- Students will develop competency in advanced methods of social science and international political economy research and analysis.
- Students will develop basic skills in professional communication appropriate to international political economy research and analysis.
- Students will develop competency in analysis, evaluation, and research design relevant to social science and international political economy research and analysis

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 that have 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 also available online via the library and school's memberships in numerous organizations.

Admissions Requirement

The master's program in International Political Economy seeks applications from students with a baccalaureate degree from an accredited university or college. Although applications will be reviewed holistically, in general, entering students have earned a 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1100 on the Graduate Records Examination (GRE). 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

While there are no specific course prerequisites, entering students will benefit from exposure to undergraduate courses in the Economic, Political and Policy Sciences, statistics, and research design. Students are strongly encouraged to strengthen their foreign language skills.

Degree Requirements

The University's general degree requirements are discussed on page 20.

Students seeking a Master of Science in International Political Economy must complete at least 36 semester credit hours of work in the program. The program has three components:

1. Eighteen semester hours of required coursework
2. Twelve semester hours of prescribed electives
3. Six hours of free electives.

Students must maintain a 3.0 cumulative GPA in their graduate courses in the degree program, including core courses. If placed on probation, students will have one semester to bring their cumulative grade point average to a 3.0 or greater. Any student who receives two Cs will no longer be allowed to continue in the program.

Required Courses (18 hours)

All students should complete the core courses as soon as possible.

Economic Theory Core

POEC 7317 Economics for Public Policy

Methods Core (Algebra-based or Calculus based)

Algebra-based series

EPPS 6313 Introduction to Quantitative Methods

EPPS 6316 Applied Regression

Calculus based series

EPPS 7313 Descriptive and Inferential Statistics

EPPS 7316 Regression and Multivariate Analysis

One of the following:

POEC 6360 World Political Economy

POEC 6366 International Economics

PSCI 6309 International Political Economy and Organization

One of the following:

POEC 6335 Institutions and Development

POEC 6337 Comparative Institutions

POEC 6362 Political Development

One of the following:

POEC 6V76 Policy Research Workshop in Development Studies

POEC 5310 Research Design I

EPPS 6352 Evaluation Research

Prescribed Electives

Students complete 12 hours of Prescribed Electives. These consist of:

1. An area concentration in which the student completes two courses (six hours) in history, advanced language, or area studies courses that address a single region, including Europe, Latin America, or the Middle East/Greater Asia.
2. A theme concentration in which the student completes two courses (six hours) in Development, International Business and Public Policy, International Negotiations, or International Conflict and Security

Courses in both the area concentrations and theme concentrations must have the approval of the Program Director. Internships and independent studies may count toward either area or theme concentrations, with the permission of the Program Director.

Elective Courses

Students also select, in consultation with the Program Director, an additional six hours of coursework. Students may select courses from those courses not selected under Required Courses.

IPEC Course Descriptions

Graduate courses [This is not a comprehensive list of all possible courses. The list includes only those courses specifically noted in the Program Description. The program director maintains a current list of area and theme concentration classes.]

PSCI 6300 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

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

EPPS 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) R

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

POEC 6312 (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. (3-0) Y

EPPS 6310 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

EPPS 6313 Introduction to Quantitative Methods (3 semester hours) This introductory graduate-level statistics course is geared to the consumption of statistical methods commonly used in social science research. Topics include creating and interpreting graphical and tabular summaries of data, descriptive statistics, basic probability theory, sampling distributions, basic hypothesis testing (t-tests, chi-square tests, and analysis of variance), estimation of population parameters, confidence intervals and correlation. An introduction to regression analysis will also be provided. Topics are supported by computer-supported data analyses. (3 semester hours) (3-0) Y

EPPS 6316 Applied Regression (3 semester hours) This course provides a survey 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. This application-focused course presents examples drawn from economics, political science, public policy and sociology, introduces the basic concepts and interpretation of regression models, and basic methods of inference. Topics are supported by computer-supported data analyses. Prerequisite: EPPS 6313. (3-0) Y

POEC 6319 (PSCI 6310) Political Economy of MNCs (3 semester hours) The Political Economy of Multinational Corporations will approach the rise of international firms and their behavior from a social scientific approach, utilizing research in economics, political science, and other disciplines. In addition to the historical rise of international firms, the course covers the economic theory of the firm, MNCs as political actors, the dynamics of foreign direct investment, and the relationship of MNCs to developing

countries. The aim of the course is to understand the causes and effects of the behavior of transnational corporations, particularly in regard to economic policy.(3-0) T

POEC 6335 (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. (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. (3-0) T

PA 6351 Introduction to Homeland Security (3 semester hours) This course provides a comprehensive overview of the structure of Homeland Security, its origins and developing trends and challenges. Selected material from Congress, FEMA, Department of Justice, local, state, and other government and non-government agencies will be studied. Examines both historical and contemporary Homeland Defense and Security issues. (3-0) Y

EPPS 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 indicators, sampling, data collection, and data analysis. (3-0) T

PA 6371 Pre-emptive Strategies and Tactics (3 semester hours) Provides a comprehensive study of formulating pre-emptive strategies and tactics related to terrorist attacks and certain man-made disasters, such as a chemical plant explosions. This course is a field-based application. Explores current published pre-emptive strategies and tactics, means and methods for improving current plans and explores new pre-emptive strategies and tactics driven by new intelligence assessments. (3-0) Y

PA 6380 (SOC 6380) 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. (3-0) T

PA 6381 (SOC 6381) Non-profit Management (3 semester hours) This course examines issues, strategies, and techniques related to executive leadership and management in non-profit organizations.

EPPS 7313 Descriptive and Inferential Statistics (3 semester hours) This course is designed to prepare students for the advanced quantitative methodology courses required of advanced degree students. The fundamentals of sampling design and measurement will be covered. Students will then develop an understanding of the principles by which a variety of statistical methodologies function, from simple, two-sample tests to more complex non-parametric and asymmetric methods. The course closes with an introduction to multiple regression. While the only pre-requisite is a sound foundation in algebra, some familiarity with the fundamentals of calculus and linear algebra will provide a stronger foundation for learning. Topics are supported by computer-supported data analyses using application-specific software.

EPPS 7316 Regression and Multivariate Analysis (3 semester hours) This course provides a detailed examination of the 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, and fixed effects models. The course ends with an introduction to advanced topics in regression analysis, qualitative response models, and non-OLS approaches to estimation. Topics are supported by computer-supported data analyses using application-specific software. PREREQUISITE: EPPS 7313. (3-0) Y

POEC 7381 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) R

PA 7307 Information Sharing and Communication (3 semester hours) Provides a comprehensive overview of the structure of network, organizational and group information sharing and communication. Focuses include new theories and applications to information sharing and communication and intelligence gathering techniques of state and local fusion centers. (3-0) Y

PA 7308 Social Networks and Intelligence Led Policing (3 semester hours) Provides a comprehensive study of concepts and methods for adopting intelligence as a foundation of law enforcement business operations for sound decision-making. Exploiting social networks is a primary means for preventing terrorism and crime. The course explores how intelligence led policing depends on creating strong community social networks to enhance policing of criminal networks. (3-0) Y

PA 7309 Protecting Critical Resources and Infrastructure (3 semester hours) Includes a comprehensive study of the current plans and policies in place for protecting critical resources and infrastructure, both public and private. The class will consist of a thorough review of the current literature pertaining to critical infrastructure protection policies, methods, plans, and identify new technology driven critical infrastructures. (3-0) Y

POEC 7317 Economics for Public Policy (3 semester hours) Economics for Public Policy is 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 is 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.

EPPS 7318 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. Prerequisite: ECON 5311 or ECON 6309 or POEC 5316 or permission of instructor.

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 6355 Political Economy of the Middle East (3 semester hours) Analysis of the interplay of cultures and conflicts in the Middle East. The course will examine ancient cultures, Islam and the Ottoman Empire, the Arab-Israeli conflict, the rise of the Oil Kingdoms, the Kurds, the Gulf wars, and terrorism in the name of Islam. The course will also focus on U.S. relations with a number of Middle Eastern countries such as Saudi Arabia, Iran, Iraq, Egypt, and Israel. (3-0) T

POEC 6357(PSCI 6357) Political Economy of Latin America (3 semester hours) Addresses historical and contemporary issues in Latin American political economy. Uses case studies and cross-regional comparisons to assess competing explanations. Analyzes the current political and economic situation facing Latin America in its quest for economic growth and development. The emphasis is to understand the broad patterns of development and change in the region and the physical, historical, social and economic constraints which have affected development, broadly understood. (3-0) T

POEC 6358 Political Economy of South and Southeast Asia (3 semester hours) Political Economy of South and Southeast Asia. South Asia is the Indian peninsula. Southeast Asia is the great swath of countries from Burma and Thailand through Malaysia to Indonesia and Australia. This is a region of great cultural, political, economic, religious, and historical diversity. This course surveys the political economy of the region by selectively examining key countries and their mutual interactions. The major countries, all of which are rising military and economic powers, are Pakistan, India, Thailand, Indonesia and Australia. Additional countries which will be included according to interest and available material, include Sri Lanka, Nepal, Bhutan, Bangladesh, Burma, Cambodia, Vietnam, Malaysia, Singapore, Papua New Guinea, East Timor and New Zealand. (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 6361 (PSCI 6361) Political Violence and Terrorism (3 semester hours) In this discussion-based seminar, we will cover the topics of terrorism, political violence, and civil war. We will examine concepts, causes, and consequences of different types of political violence. Additionally, we will discuss topics relevant to research, including discussions of different approaches (quantitative, qualitative, and formal)

and a perusal of different data sources. We will take advantage of literature from multiple disciplines.

POEC 6362 (PSCI 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. (3-0) T

POEC 6363 (PSCI 6363) Conflict and Development (3 semester hours) This module will explore the nexus between violent intrastate conflict and development. It will examine some of the key conceptual frameworks advanced to understand conflict and will explore specific themes which have preoccupied researchers and policy practitioners in recent years. In addition to assessing the economic costs of the conflicts, this course will also examine the traditional factors that have been purported to explain the prevalence of insurgency. (3-0) T

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 6367 Topical Issues in Conflict and Conflict Resolution (3 semester hours) This course will examine in detail three recent international or ethnic conflicts and the national and international efforts to resolve the conflicts and/or mitigate their effects. The course will examine theories of conflict including ethnic conflict and just war theory. It will examine the historical sources of the conflicts, the regional and international dimensions, the precipitating causes and the intensification of the conflicts. Examples of conflicts that could be used include: the former Yugoslavia, India/Pakistan, Iraq and Kuwait, North Korea, Israel/Palestine and Sudan. (3-0) T

POEC 6369 National and International Security Strategies and Policies (3 semester hours) With the end of the decades long Cold War, the U.S. has become the world's only superpower. But the problem of national and international security continue to be a dominant concern of national and international political and economic life, just as it has been for more than sixty years. Many nations continue to maintain high levels of military expenditure as a mainstay of their security policy. Yet, there has been a profound change in the nature of the threats to security since the Cold War. Some, like the threat of intentional full-scale global nuclear war, have receded. Others, like the threat posed by nuclear proliferation and the terrorism of mass destruction, have increased. From acute hot spots to longer term questions of restructuring power and security arrangements in a post Cold War world, understanding the deeper issues of national and international security is critical to understanding what lies behind the headlines -- and what strategies are likely to be effective in achieving real security. Topics include: the nature and meaning of security; security and military force; terrorism, accidents and accidental war; nuclear proliferation; the international arms trade; the experience of war; the economics of security policy; social and psychological factors; strategies for achieving security by nonmilitary means. (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. (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 ([3-9]-0) T

EPPS 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.

POEC 7320 (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.

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)

POEC 7323 (ECON 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: ECON 5321 or ECON 5301 or POEC 5307. (3-0) T

EPPS 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. (3-0) R

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

Master of Science in Justice Administration and Leadership

Faculty

Professors: James W. Marquart, John Worrall

Associate Professors: Tomislav Kovandzic, Lynne Vieraitis

Assistant Professors: Robert Morris, Denise Paquette-Boots

Clinical Assistant Professors: Timothy Bray, Sue Freedman, Robert Hicks, Sarah Maxwell, Elmer Polk, Laurie Ziegler

Mission

The Mission of the Master of Science in Justice Administration and Leadership program at the University of Texas at Dallas is to:

1. Deliver high-quality education to working professionals who in turn will examine the role of leadership within criminal justice organizations.
2. Prepare students to evaluate and apply relevant research findings on leadership and personnel management to lead, influence and manage others in an increasingly diverse workforce and work environment.
3. Advance the understanding of the consequences of change within criminal justice organizations, and lead and manage personnel in periods of organizational change.
4. Prepare students to apply relevant techniques of conflict resolution and negotiation when confronted with conflict in criminal justice and related organizations.

Objectives

The Master of Science in Justice Administration and Leadership and Leadership provides students with a coherent and intellectually challenging degree that prepares a new generation of leaders to manage and administer criminal justice and other social service organizations. The program will deliver an innovative and integrated curriculum that connects such key components of leadership as organizational behavior, organizational change, policy analysis, research design and program evaluation, and conflict resolution to prepare students for leadership positions.

Facilities

Students have access to the computing facilities in the School of Economic, Political and Policy Sciences (or EPPS), the University's Computing Center, and computing facilities in the School of Management (or SOM). EPPS has two computing laboratories which have 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 also available online via the library's and School's memberships in numerous organizations.

Graduate Assistantships

Graduate teaching and research assistantships will not be available.

Admissions Requirement

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

The Master of Science in Justice Administration and Leadership seeks applications from students with a baccalaureate degree from an accredited university or college. Although applications will be reviewed holistically, in general, entering students have earned 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). 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. Applications are reviewed by the Criminology Program Committee in the School of Economic, Political and Policy Sciences and appropriate faculty in the School of Management.

Prerequisites

For the Master of Science in Justice Administration and Leadership, students with a Bachelor of Arts in Criminology, Public Administration, and general business will have the necessary foundation for the master's degree. Students who lack this foundation should complete the following undergraduate courses at U.T. Dallas or their equivalents at another institution: CRIM 3303 Advanced Criminology, CRIM 3303 Advanced Criminal Justice, CRIM 3304 Research Methods in Crime and Justice Studies, SOC 3305 Introduction to Social Statistics. Prospective students with concerns about their preparation for Justice Administration and Leadership program are encouraged to consult with the program coordinator.

Degree Requirements

The University's general degree requirements are discussed on page 20.

Students seeking a Justice Administration and Leadership degree must complete 35 semester credit hours of coursework in the program. The Core curriculum involves 35 hours, including 9 hours of research methods and statistics, 14 hours in organizational dynamics and dispute resolution, and 12 hours of independent research to satisfy a writing requirement. Students must achieve at least an overall grade point average of 3.0 to graduate.

Core Courses

CRIM 5310 Research Design
CRIM 5313 Descriptive and Inferential Statistics
SOC 6352 Evaluation Research Methods
OB 6336 Motivational Leadership in Organizations
OB 6301 Organizational Behavior
OB 6331 Power and Politics in Organizations
OB 6332 Negotiation and Dispute Resolution
OB 6337 Coaching as a Leadership Style: The Science and Practice of Influencing Behavior

Research Project Requirement (12 credit hours)

CRIM6v98 Analytical Writing 1 (the initial 6 hours will involve research problem specification, literature review, and research design)

CRIM6v99 Analytical Writing 2 (the final 6 hours involves data analysis, policy discussion, and presentation)

Master of Public Affairs

<http://www.utdallas.edu/epps/pa/mpa/>

Faculty

Professors: Euel Elliott, L. Douglas Kiel, Richard Scotch

Associate Professors: Simon Fass

Assistant Professors: Paul Battaglio, Jeremy Hall, Young-joo Lee and Meghna Sabharwal

Clinical Professors: Donald Arbuckle, Calvin Jamison, Robert Whelan

Clinical Associate Professor: Wendy Hassett

Clinical Assistant Professor: Kimberly Aaron, Karen Jarrell, Nick Valcik

Senior Lecturers: Ted Benavides

Mission

The mission of the Master of Public Affairs is to educate professionals in public and non-profit management, policy analysis, and applied technology for effective careers in public policy and public management organizational environments. The program serves local, regional, and national communities through professional development programs, public policy, and management analyses, program and policy design, and as a forum for new ideas and approaches to policy and management problems. The curriculum is intended to train students who will ultimately assume senior staff, managerial and leadership roles in public agencies and other organizations.

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, non-profit organizations, consulting firms, and businesses significantly affected by public policies.

The MPA program faculty is committed to producing clear and specific results for our students. Thus, the specific objectives for all graduates of the MPA program are:

- 1.To Demonstrate Knowledge:** Students will demonstrate their knowledge of the theoretical foundations of public management and leadership, non-profit management and leadership, policy analysis, and civic engagement in governance.
- 2.To Learn Specific Skills and Knowledge:** Students will learn specific skills and knowledge that will prepare them for challenging positions of management responsibility and/or policy analysis in the public, private, and non-profit sectors.
- 3.To Develop Research and Writing Skills:** Students will develop their research and writing skills so that they can effectively communicate their ideas based on study and research.
- 4.To Present Complex Ideas and Research Findings Orally:** Students will have the ability to present complex ideas and research findings orally.

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 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 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 for 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. An analytical writing score of at least 4.5 in the GRE is considered desirable. 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.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 three components: a 24 hour core, 15 hours of directed electives within a chosen specialization and 3 hours of internship or policy research workshop.

Grade Point Requirements

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. If a student's GPA does not meet these standards University policy concerning academic probation and removal from the program are in effect.

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 6313 Public Policymaking and Institutions
PA 6317 Economics for Public Policy or PA 6342 Local Economic Development or PA 7317
Microeconomics for Policy
PA 7318 Ethics, Culture and Public Responsibility
EPPS 6313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences
PA 6311 Public Management
PA 6321 Government Financial Management and Budgeting
PA 6320 Organizational Theory
PA 6345 Human Resource Management

Professional Specialization Core Courses (9 hours)

Students who specialize in Public Management take 15 hours from: PA 6300 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 select the Local Government Management Track take 15 hours from: PA 6344 Local Government Management, PA 6345 Human Resources Management, PA 6342 Local Economic Development, SOC 6341 Urban Development and PA 6321 Government Financial Management and Budgeting.

Students who choose Policy Analysis complete 15 hours from: PA 7317 Economics for Public Policy, ECO 6361 Public Sector Economics, EPPS 6316 Advanced Regression Analysis, EPPS 6352 Evaluation Research Methods in the Economic, Political and Policy Sciences, EPPS 7304 Cost-Benefit Analysis.

Students who specialize in Applied Technology take: GISC 6381 Geographic Information Systems Fundamentals (GIS), GISC 6382 Applied Geographic Information Systems (GIS), GISC 6383 GIS Management and Implementation.

Students who wish to focus on the Non-profit Management Track take 15 hours from: PA 6380 Non-profit Organizations, PA 6381 Non-profit Management, PA 6374 Financial Management for Non-profit Organizations, EPPS 6352 Evaluation Research Methods and PA 7V62 Policy Research Workshop in Non-profit 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 (6 hours)

Students must also complete 6 hours of elective coursework within the professional specialization. These courses will be determined in consultation with the MPA advisor. *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. GIS 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.

Master of Public Affairs Course Descriptions

PA 6300 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 6309 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 6311 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. (3-0) Y

PA 6313 (POEC 6323 and PSCI 6313) 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. (3-0) Y

PA 6316 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 6318 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 6319 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 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. (3-0) T

PA 6321 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 6322 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 6324 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 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. (3-0) T

PA 6327 Land Use Law and Ethics (3 semester hours) This course covers two key elements of the planning profession: ethics and law as they relate to plan implementation. Community planning actions and decisions can impact the social and economic welfare of people, neighborhoods, cities, and regions in nontrivial ways. Ethics play an important role in guiding the planner; telling us what we should do (3-0) Y

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. (3-0) T

PA 6329 Quantitative Models of Public Management (3 semester hours) This course addresses models of public management that have been tested with quantitative research. The course will discuss quantitative models of human resource management, budgeting, implementation, and organizational development. In addition to discussing the findings of this research, the class will discuss the foundations of quantitative social science research on public management. (3-0) T

PA 6330 Basics of Land Development (3 semester hours) Land development is the conversion of land from one use to another. This course emphasizes key concepts of land use practices utilized by local governments in the Dallas metroplex. Land use planning includes use for residential, commercial, industrial, as well as recreational, educational, social, and cultural activities. (3-0) Y

PA 6332 Historic Preservation (3 semester hours) The conservation of our physical environment provides a visual glimpse of history, but a meaningful sense of time and place within our communities is a wise use of resources. This course addresses: 1) the planning and development process as it applies to conservation of the built environment, 2) the practice of historic preservation and its relationship to planning for the future of a community, and 3) the legal basis for preparation and implementation of preservation plans and ordinances at the local level. (3-0) Y

PA 6333 Marketing and Communication for Non-profit Organizations (3 semester hours) This course examines the unique dynamics of marketing mission-based organizations and the communication strategies necessary to relate to various stakeholder groups. (3-0) R

PA 6335 Resource Development for Non-profit Organizations (3 semester hours) This course examines sources of revenue for non-profit organizations. Specific topics include fundraising, grant writing, and donor dynamics. The course is designed to prepare the student to work effectively as a member of a fundraising team – either as staff or volunteer board member. (3-0) R

PA 6337 Capital Budgeting (3 semester hours) This course analyzes capital planning and budgeting as central features to economic development, transportation, communication, and to the delivery of other essential services. The course details the steps needed to provide the physical structure of local government, from selecting capital projects to planning how to pay for those projects to structuring and selling debt. (3-0) Y

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. (3-0) R

PA 6342 (ECON 6372) 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. (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 6345 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 6348 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 6351 Introduction to Homeland Security (3 semester hours) This course provides a comprehensive overview of the structure of Homeland Security, its origins and developing trends and challenges. Selected material from Congress, FEMA, Department of Justice, local, state, and other government and non-government agencies will be studied. Examines both historical and contemporary Homeland Defense and Security issues. (3-0) Y

PA 6353 Emergency Management (3 semester hours) This course examines issues related to the management of emergencies including discussion of emergency preparedness, emergency mitigation, and emergency response. The course will also discuss the interplay of local, state, and federal actors in emergency response as well as the role of government, private, and non-profit organizations in emergency response. (3-0) T

PA 6354 Transportation Planning (3 semester hours) Transportation planning is the process of making useful information available to decision-makers at the organizational level to better understand the characteristics and constraints of transportation systems. This class explores transportation planning processes, the characteristics of urban travel, as well as management and analytical techniques that deal with the dynamics of urbanization and land use. (3-0) Y

PA 6370 Project and Contract Management (3 semester hours) This course examines issues related to the management of large projects with particular attention to the management of contracts and grants to third parties. This course will discuss the justifications for contracting out public work, methods of oversight of contracts, and the steps in planning these large projects. The course will also discuss the implications of project planning for grant writing. (3-0) T

PA 6371 Pre-emptive Strategies and Tactics for Homeland Security(3 semester hours) Provides a comprehensive study of formulating pre-emptive strategies and tactics related to terrorist attacks and certain man-made disasters, such as a chemical plant explosions. This course is a field-based application. Explores current published pre-emptive strategies and tactics, means and methods for improving current plans and explores new pre-emptive strategies and tactics driven by new intelligence assessments. (3-0) Y

PA 6374 Financial Management for Non-profit Organizations (3 semester hours) This course introduces the basic concepts of third sector financial literacy. Curriculum includes financial planning and budgeting, monitoring of contracts and grants, and reporting mechanisms. (3-0) R

PA 6375 History and Theories of the American Philanthropic Sector (3 semester hours) This course examines the evolution of non-profit and philanthropic organization and their role in American society. (3-0) R

PA 6376 Assessment and Outcomes for Non-profit Organizations (3 semester hours) Accountability is a pervasive theme for the third sector, especially considering its diverse sources of funding. This course examines qualitative and quantitative measurement tools as well as the sector's most successful practices. (3-0) R

PA 6380 (SOC 6380) 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. (3-0) T

PA 6382 (SOC 6381) Non-profit Management (3 semester hours) This course examines issues, strategies, and techniques related to executive leadership and management in non-profit organizations. (3-0) R

PA 7307 Information Sharing and Communication for Homeland Security(3 semester hours) Provides a comprehensive overview of the structure of network, organizational and group information sharing and communication. Focuses include new theories and applications to information sharing and communication and intelligence gathering techniques of state and local fusion centers. (3-0) Y

PA 7308 Social Networks and Intelligence Led Policing (3 semester hours) Provides a comprehensive study of concepts and methods for adopting intelligence as a foundation of law enforcement business operations for sound decision-making. Exploiting social networks is a primary means for preventing terrorism and crime. The course explores how intelligence led policing depends on creating strong community social networks to enhance policing of criminal networks. (3-0) Y

PA 7309 Protecting Critical Resources and Infrastructure (3 semester hours) Includes a comprehensive study of the current plans and policies in place for protecting critical resources and infrastructure, both public and private. The class will consist of a thorough review of the current literature pertaining to critical infrastructure protection policies, methods, plans, and identify new technology driven critical infrastructures. (3-0) Y

PA 7317 (POEC 7317) 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. (3-0) Y

PA 7318 (POEC 7318) 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. (3-0) Y

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.) ([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 Public Policy

<http://epps.utdallas.edu/pppe/mpp>

Faculty

Professors: Sheila Amin de Gutiérrez de Piñeres, Kurt Beron, Brian J.L. Berry, Marie I. Chevrier, Lloyd Jeff Dumas, Euel Elliott, Donald Hicks, Bruce Jacobs, Paul A. Jargowsky, Murray J. Leaf, Robert Lowry, James Marquart, Richard K. Scotch, Paul Tracy

Associate Professors: Bobby Alexander, Simon Fass, Jennifer Holmes, Susan McElroy, Kevin Siqueira, Sheryl Skaggs, John Worrall

Assistant Professors: Karen Hayslett-McCall, Robert Morris

Mission

The Mission of the Master of Science in Public Policy is to offer students an interdisciplinary graduate education designed to develop skills for careers in which a solid understanding of the public policy process and the analysis and evaluation of public policies are essential. Students will be prepared for analytical and administrative positions and responsibilities in a wide array of professional settings in the public, non-profit, and private sectors as well as advanced study for careers in research. Specific skills include knowledge of the policy process and related ethical concerns, rigorous research skills that provide students with an essential grounding in statistical and data analysis and research design, and effective communication skills.

Objectives

- Students will understand and analyze the principal policy making institutions and the ways in which they formulate, debate and implement public policies at the national, sub-national and local levels. Students will examine legislative, executive, and non-governmental roles in policy formation at different levels of government. They will analyze the ways in which the various institutions interact and set policy priorities. They will study policy implementation and the interrelated functions of levels of governments, non-profit and corporate entities in policy implementation.
- Students will learn and apply quantitative skills and economic theories to measure and evaluate public policies. They will learn when to apply appropriate techniques to complex policies. They will demonstrate an understanding of techniques to examine the preferred outcomes of policy alternatives to advise senior officials. Students will acquire skills in applying statistical measures of projected policy outcomes. Students will learn economic theories and acquire skills in applying those theories appropriately to establish policy objectives and outcomes.
- Students will understand the role of and learn appropriate, rigorous ways to design research to increase knowledge of public policy and citizen welfare. Students will learn ways to quantitatively and qualitatively design research projects that address important public policy questions and concerns.
- Students will learn and understand the unique role of ethical theories and behavior as it applies to the public and non-profit sectors. Students will understand the ethical obligation of elected and appointed governmental officials to the body politic. Students will understand the functions of internal and public oversight of the formation and implementation of public policies.

- Students will develop expertise in a substantive area of public policy and learn how to effectively communicate new findings and innovative policies to senior decision makers and the general public. Students will study one of three major public policy disciplines--social policy, health policy or the business-government relationship. Students will understand the theories and scientific principles that support these substantive policy areas and the ways in which those theories are tested. Students will understand how these policy areas contribute to the well-being of citizens to enhance the quality of life.
- Qualified students are encouraged to consider the Ph.D. in Public Policy and Political Economy (PPPE). Such students should meet with Program Director of PPPE as soon as possible to discuss options.

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 that have 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 also available online via the library and school's memberships in numerous organizations.

Admissions Requirement

The master's program in Public Policy seeks applications from students with a baccalaureate degree from an accredited university or college. Although applications will be reviewed holistically, in general, entering students have earned a 3.0 undergraduate grade point average (on a 4.0 scale), and a combined verbal and quantitative score of at least 1100 on the Graduate Records Examination (GRE). 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

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.

Grading Policy

In order to qualify for graduation, students must maintain a minimum 3.0 grade point average in their degree program's core courses plus an aggregate grade point average of 3.0 for all graduate courses taken in the student's degree program at U.T. Dallas.

Degree Requirements

Students seeking a Masters in Public Policy must complete at least 36 semester credit hours of graduate coursework in the program. The program has three components:

1. Twenty-one semester hours of required coursework
2. Nine semester hours of prescribed electives
3. Six hours of free electives

Students must maintain at least a 3.0 (B) grade point average to graduate.

I. Required Core Courses

1. Policymaking and Institutions (Six hours)

POEC 6313 (PA 6313 and PSCI 6313) Public Policymaking and Institutions
POEC 7318 (PA 7318) Ethics, Culture and Public Responsibility

2. Methodology [Statistics, Research Design, and related – nine hours]

EPPS 6313 Introduction to Quantitative Methods EPPS 6316 Applied
Regression

Students with a concentration in Legal Studies (See prescribed electives)
would substitute POEC/PSCI 6343 Law and The Policy Process for POEC
6316.

Select one of the following:

EPPS 6310 Research Design I EPPS 6352 Evaluation Research Methods in
the Economic, Political and Policy Sciences

PSCI 5307 Legal Reasoning and Writing

3. Economics (Three hours)

4. POEC 7317 Economics for Public Policy Workshop or Prescribed Elective (Three hours)

Select one of the following:

POEC 6V47 (PA 6V47) Policy Research Workshop in Health Care Policy

POEC 6V62 Policy Research Workshop in Social Policy

POEC 6V76 Policy Research Workshop in Development Studies
Other Workshop course, internship or approved elective.

II. Prescribed Electives

Students complete nine hours in ONE area of concentration. All courses must be approved
by the Program Director.

- A. Criminology
- B. Domestic Social Policy
- C. Health Policy
- D. International Conflict and Security
- E. Legal Studies
- F. Other concentration proposed by the student and approved by the Director

Students should consult the graduate catalog, and the Program Director, for additional information regarding those courses that would best satisfy the “Prescribed Electives” requirement.

III. Free Electives

Students may select six hours of 6000 level or higher courses. Students may choose courses that are not selected under “Core Courses” to fulfill this requirement.

Masters in Public Policy (MPP) Course Descriptions

Graduate Courses: This is not a comprehensive list of all possible courses. It includes only those courses specifically noted in the Program Definition. For additional courses please see the course offerings in Political Economy, Political Science, Economics, Political Economy and Public Affairs.

PSCI 5306 The American Legal System and the Practice of Law (3 semester hours) The American legal system will be examined through seminar presentations by speakers experienced in judging and in legal practice. (3-0) Y

PSCI 5307 Legal Reasoning and Writing (3 semester hours) The process of reaching legal decisions by relying on precedent, history, policy concerns, and tradition will be studied. Additionally, techniques for researching and citing case law and statutes will be examined. (3-0) Y

PSCI 6300 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

CRIM 6300 Proseminar in Criminology. (3 semester hours) Introduction to graduate study in criminology through exposure to issues surrounding concepts of crime, criminals and societal response. Students learn to examine critically the theoretical, methodological and policy issues in criminology and criminal justice. (3-0) Y

PSCI 6301 Constitutional Law (3 semester hours) This class addresses the evolution of the American Constitution. The course will examine major constitutional concepts that are important to an understanding of American Government. Additionally, major interpretations of the Constitution and the role of courts in the American legal system will be explored. (3-0) Y

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

CRIM 6305 Law and Social Control. (3 semester hours) Addresses the legal and theoretical basis of social control and the use of criminal sanctions to deter and punish criminal conduct. Students will learn to critically assess alternative punishment and sentencing models. (3-0) Y

PSCI 6305 Workshop in Constitutional Law Studies (3 semester hours) Students will undertake a major research topic on a law-related matter which will develop skills in legal research and writing, quantitative research, or field research. (3-0) Y

PSCI 6306 Human Rights and International Law (3 semester hours) This course explores international agreements and their effects on individual rights in a variety of contexts such as international conflicts, civil wars, and oppressive political regimes. (3-0) R

PSCI 6307 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

CRIM 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. (3-0) R

CRIM 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. (3-0) R

CRIM 6311 Crime and Justice Policy. (3 semester hours) An introduction to crime and the efforts to control crime through public policy. (3-0) Y

POEC 6312 (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. (3-0) Y

POEC 6323 (PA 6313 and PSCI 6313) 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. (3-0) Y

PSCI 6314 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. (3-0) Y

CRIM 6314 Policing (3 semester hours) Provides historical, social and political analysis of the roles and functions of policing in America. (3-0) R

CRIM 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

EPPS 6310 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

EPPS 6313 Introduction to Quantitative Methods (3 semester hours) This introductory graduate-level statistics course is geared to the consumption of statistical methods commonly used in social science research. Topics include creating and interpreting graphical and tabular summaries of data, descriptive statistics, basic probability theory, sampling distributions, basic hypothesis testing (t-tests, chi-square tests, and analysis of variance), estimation of population parameters, confidence intervals and correlation. An introduction to regression analysis will also be provided. Topics are supported by computer-supported data analyses. (3 semester hours) (3-0) Y

EPPS 6316 Applied Regression (3 semester hours) This course provides a survey 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. This application-focused course presents examples drawn from economics, political science, public policy and sociology, introduces the basic concepts and interpretation of regression models, and basic methods of inference. Topics are supported by computer-supported data analyses. Prerequisite: EPPS 6313. (3-0) Y

CRIM 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. (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 levels 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. (3-0) T

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. (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 non-profit 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 6336 (PA 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. (3-0) T

EPPS 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. EPPS 6310, EPPS 6316 or equivalents recommended. (3-0) Y

EPPS 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. (3-0) T

CRIM 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

PA 6351 Introduction to Homeland Security (3 semester hours) This course provides a comprehensive overview of the structure of Homeland Security, its origins and developing trends and challenges. Selected material from Congress, FEMA, Department of Justice, local, state, and other government and non-government agencies will be studied. Examines both historical and contemporary Homeland Defense and Security issues. (3-0) Y

EPPS 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 indicators, sampling, data collection, and data analysis. (3-0) T

POEC 6361 (PSCI 6361) Political Violence and Terrorism (3 semester hours) In this discussion-based seminar, we will cover the topics of terrorism, political violence, and civil war. We will examine concepts, causes, and consequences of different types of political violence. Additionally, we will discuss topics relevant to research, including discussions of different approaches (quantitative, qualitative, and formal) and a perusal of different data sources. We will take advantage of literature from multiple disciplines. (3-0) T

POEC 6363 (PSCI 6363) Conflict and Development (3 semester hours) This module will explore the nexus between violent intrastate conflict and development. It will examine some of the key conceptual frameworks advanced to understand conflict and will explore specific themes which have preoccupied researchers and policy practitioners in recent years. In addition to assessing the economic costs of the conflicts, this course will also examine the traditional factors that have been purported to explain the prevalence of insurgency. (3-0) T

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 6367 Topical Issues in Conflict and Conflict Resolution (3 semester hours) This course will examine in detail three recent international or ethnic conflicts and the national and international efforts to resolve the conflicts and/or mitigate their effects. The course will examine theories of conflict including ethnic conflict and just war theory. It will examine the historical sources of the conflicts, the regional and international dimensions, the precipitating causes and the intensification of the conflicts. Examples of

conflicts that could be used include: the former Yugoslavia , India/Pakistan, Iraq and Kuwait , North Korea, Israel/Palestine and Sudan . (3-0) T

POEC 6369 National and International Security Strategies and Policies (3 semester hours) With the end of the decades long Cold War, the U.S. has become the world's only superpower. But the problem of national and international security continue to be a dominant concern of national and international political and economic life, just as it has been for more than sixty years. Many nations continue to maintain high levels of military expenditure as a mainstay of their security policy. Yet, there has been a profound change in the nature of the threats to security since the Cold War. Some, like the threat of intentional full-scale global nuclear war, have receded. Others, like the threat posed by nuclear proliferation and the terrorism of mass destruction, have increased. From acute hot spots to longer term questions of restructuring power and security arrangements in a post Cold War world, understanding the deeper issues of national and international security is critical to understanding what lies behind the headlines -- and what strategies are likely to be effective in achieving real security. Topics include: the nature and meaning of security; security and military force; terrorism, accidents and accidental war; nuclear proliferation; the international arms trade; the experience of war; the economics of security policy; social and psychological factors; strategies for achieving security by nonmilitary means. (3-0) T

PA 6371 Pre-emptive Strategies and Tactics (3 semester hours) Provides a comprehensive study of formulating pre-emptive strategies and tactics related to terrorist attacks and certain man-made disasters, such as a chemical plant explosions. This course is a field-based application. Explores current published pre-emptive strategies and tactics, means and methods for improving current plans and explores new pre-emptive strategies and tactics driven by new intelligence assessments. (3-0) Y

PA 6380 (SOC 6380) 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. (3-0) T

PA 6381 (SOC 6381) Non-profit Management (3 semester hours) This course examines issues, strategies, and techniques related to executive leadership and management in non-profit organizations. (3-0) R

POEC 6V47 (PA 6V47) 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 6 hours.) ([3-9]-0) T

POEC 6V62 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.) ([3-9]-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. (May be repeated for credit to a maximum of 6 hours.) ([3-9]-0) T

EPPS 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. (3-0) T

PA 7308 Social Networks and Intelligence Led Policing (3 semester hours) Provides a comprehensive study of concepts and methods for adopting intelligence as a foundation of law enforcement business operations for sound decision-making. Exploiting social networks is a primary means for preventing terrorism and crime. The course explores how intelligence led policing depends on creating strong community social networks to enhance policing of criminal networks. (3-0) Y

PA 7309 Protecting Critical Resources and Infrastructure (3 semester hours) Includes a comprehensive study of the current plans and policies in place for protecting critical resources and infrastructure, both public and private. The class will consist of a thorough review of the current literature pertaining to critical infrastructure protection policies, methods, plans, and identify new technology driven critical infrastructures. (3-0) Y

POEC 7317 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 is 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. (3-0) Y

POEC 7318 (PA 7318) 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. (3-0) Y

POEC 7320 (PSCI 7320) International Negotiations (3 semester hours) 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. (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 (ECON 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: ECON 5321 or ECON 5301 or POEC 5307. (3-0) T

EPPS 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. (3-0) R

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

Certificate Programs

The School of Economic, Political and Policy Sciences offers seven graduate 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, Economic and Demographic Data Analysis, Evaluation Research, Financial Economics., Geographic Information Systems (GIS), Local Government Management, and Non-profit Management.

Graduate Certificate in City Planning

The Graduate Certificate in City Planning is a 15 credit hour Master's level certificate. The 15 hours earned in the Certificate program will count toward the Master of Public Affairs (MPA) degree if the student decides to pursue the MPA. The academic focus of the proposed certificate is the basic elements of the body of knowledge of the field of city planning. These elements include the theory and legal elements of planning, developing and implementing plans, land use management, land use law and regulation, and functional topics such as transportation and housing.

The Dallas/Ft. Worth metroplex is the fourth largest metropolitan area in the United States. The scope and growth of this urban area create many demands for professionals whose role is to plan for and

manage this urban complex. The U.S. Bureau of Labor Statistics (BLS) expects the profession of city planning to grow by between 9%-14% by the year 2014. The BLS further notes that, "Most new jobs for urban and regional planners will be in local government, as planners will be needed to address an array of problems associated with population growth, especially in affluent, rapidly expanding communities. For example, new housing developments require roads, sewer systems, fire stations, schools, libraries and recreation facilities that must be planned for in the midst of a consideration of budgetary constraints."

The Certificate is intended for professionals already working in city planning in the public sector, those employed in private for-profit or governmental settings who work with planning and development projects, and students without professional experience who seek to prepare themselves for careers in city planning or local government.

The 15 hours of course offerings noted below incorporate the essential knowledge base of city planning. 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 15 semester credit hours.

PA 6324 - Community Planning
PA 6330 – Basics of Development
PA 6331 – Land Use Law and Development Regulation
PA 6354- Transportation Planning
and either
SOC 6381 – Geographic Information Systems Fundamentals
or
PA 6341 – Urban Development
or
PA 6342 – Local Economic Development

Graduate Certificate in Crime and Justice Analysis

This program introduces students to graduate study in 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 one course within each of the four designated areas plus EPPS 6310 Research Methods (required).

1. Foundation courses (3 hours):

CRIM 6300 Proseminar in Criminology
CRIM 6303 Etiology of Crime and Criminality
CRIM 6311 Crime and Justice Policy

2. Nature and Distribution of Crime courses (3 hours):

CRIM 6307 Extent of Crime and Measurement
CRIM 6308 Victimology

CRIM 6309 Communities and Crime
CRIM 6324 Correlates of Crime and Justice;

3. Criminal Justice and Policy courses (3 hours):

CRIM 6305 Law and Social Control
CRIM 6310 Delinquency and Juvenile Justice
CRIM 6313 Corrections
CRIM 6314 Policing
CRIM 6317 Courts
CRIM 6322 Crime Prevention

4. Choose one Additional Research Methods course (3 hours):

EPPS 6313 Introduction to Quantitative Methods
EPPS 7313 Descriptive and Inferential Statistics
CRIM 7342 Qualitative Criminology
EPPS 6352 Evaluation Research Methods

Students can also receive credit for other courses that are relevant to one of the above substantive areas provided prior approval is obtained from either the Program Head or Graduate Director. Various courses are offered on a periodic basis that could be substituted. Students should consult the coordinator for the Graduate Program for additional information.

Graduate Certificate in Economic and Demographic Data Analysis

The Certificate in Economic and Demographic Data Analysis 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) EPPS 7313 Descriptive and Inferential Statistics and EPPS 7316 Advanced Regression Analysis. (B) Students must choose at least one of the following courses: ECO 6306 Applied Econometrics or EPPS 7318 Structural Equation Modeling or EPPS 7344 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) currently enrolled students may use up to 9 hours of courses required for their degree for the certificate. Non degree seeking students interested in continuing their graduate education must formally apply to the university and their program of interest to be considered for admission.

Graduate 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 EPPS 6313 Descriptive and Inferential Statistics for the Economic, Political and Policy Sciences, EPPS 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.

Graduate Certificate in Geographic Information Science (GIScience)

The School of Economic, Political and Policy Sciences offers a certificate in Geographic Information Systems for both novice and experienced GIScience professionals. The certificate is available to both graduate degree-seeking and non-degree-seeking students. The certificate requires 15 graduate hours (5 classes).

Students seeking the GIS certificate must have completed an undergraduate degree in some area relevant to GIS. Primary admissions requirements are: (1) an application to U.T. Dallas, and (2) an undergraduate transcript. Applicants for the certificate program do not need a GRE (Graduate Record Examination) score. They should apply as "non-degree-seeking" students to the 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 certification.

The Graduate Certificate in Geographic Information Science requires the following three courses. Students must earn an average grade point average (GPA) of 3.0 across these classes.

GISC 6381 Geographic Information Systems Fundamentals
GISC 6382 Applied GIS
GISC 6387 Geographic Information Systems Workshop

In addition, students must take two courses from the following list:

GISC 6301 Geospatial Data Analysis Fundamentals
GISC 6317 Computer Programming for GIS
GISC 6325/GEOS 5325 Introduction to Remote Sensing
GISC 6383 GIS Management and Implementation
GISC 6384 Spatial Analysis and Modeling
GISC 6388 GIS Application Software Development
GISC 7310 Regression Analysis with Spatial Applications
GISC 7360 GIS Pattern Analysis
GISC 7361 Spatial Statistics
GISC 7363 Internet Mapping and Information Processing
GISC 7365/GEOS 5326 Remote Sensing Digital Image Processing

GIS 7366 Applied Remote Sensing
GEOS 5322 Global Positioning System Satellite Surveying Techniques
GEOS 5324 3D Data Capture and Ground Lidar

Other courses in Geosciences, Computer Science, Management, or Economic, Political and Policy Sciences may be applied to the certificate at the discretion of the Director of the Certificate Program. 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.

Graduate Certificate in Homeland Security

The graduate Certificate in Homeland Security is a 15-semester credit hour Master's level certificate. The fifteen (15) semester credit hours in Homeland Security can be applied toward the Master of Public Affairs, the Master's in Criminology or the Master's in International Political Economy degree. Students must complete all requirements for full admission as a graduate student to apply these courses to a Master's degree.

Strengthening the preparedness of the U.S requires a body of trained professionals in homeland security. The relative novelty of homeland security as a field of practice and study further strengthens the need for expanding the training and educational needs of both current homeland security professionals and other professionals with an interest in moving in to a career in homeland security. The certificate is directed to homeland security professionals and those aspiring to such employment in both government and business.

The certificate in Homeland Security emphasizes the strategic dynamics of prevention and response with a special emphasis on intelligence-led policing. This approach requires increased collaboration and information sharing across organizations and jurisdictions. This approach also requires information sharing across both public and private entities to move intelligence to end-user and responders in a rapid manner. Finally, intelligence led policing requires strong analytical tools and effective planning to effect successful security of the nation.

Requirements for admission to the certificate program are the same as for a non-degree seeking graduate student.

Students receiving the certificate may choose to sit for the International Association of Emergency Managers (IAEM) Certificate in Emergency Management. The Homeland Security Certificate is housed in the Public Affairs program within the School of Economic, Political and Policy Sciences.

The five course (15 hour) Homeland Security Certificate requires completion of the following courses.

PA 6353 Introduction to Homeland Security
PA 6371 Pre-emptive Strategies and Tactics
PA 7307 Information Sharing and Communication
PA 7308 Social Networks and Intelligence-Led Policing
PA 7309 Protecting Critical Resources and Infrastructure

Graduate 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 6353 Human Resource Management, PA 6321 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.

Graduate Certificate in Non-profit Management

Non-profit organizations constitute an increasingly significant sector of the American economy as well as an essential element in American civic life. Non-profits 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, non-profit organizations require professional managers with an understanding of both administrative principles and techniques and of the distinctive legal, economic, and social environment within which non-profits operate.

The Certificate in Non-profit Management is designed to provide an overview of the nature and context of non-profit organizations combined with skill-based courses to develop the competencies needed by non-profit managers. The Certificate is intended for professionals already working in the non-profit sector, those working in private for-profit or governmental settings who would like to work or volunteer in the non-profit sector, and students without professional experience who seek to prepare themselves for non-profit careers.

Completion of fifteen (15) semester credit hours are required to attain the Certificate in Non-profit Management. Requirements include three core courses and two guided electives from the list 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. Courses from other institutions may not be applied to the required fifteen semester credit hours.

Core Courses – Nine (9) Hours

PA 6316 Leadership in Public and Non-profit Organizations
PA 6380 Non-profit Organizations
PA 6390 Non-profit Management

Guided Electives – Six (6) Hours from the following:

PA 6311 Public Management
PA 6321 Government Financial Management and Budgeting
PA 6333 Marketing and Communications for Non-profit Organizations
PA 6335 Resource Development for Non-profit Organizations
PA 6374 Financial Management for Non-profit Organizations
PA 6375 History and Theories of the American Philanthropic Sector
PA 6376 Assessment and Outcomes for Non-profit Organizations

Graduate Certificate in Remote Sensing

The Remote Sensing Certificate is administered jointly by the School of Economic, Political and Policy Sciences and the Department of Geosciences. The American Society for Photogrammetry and Remote Sensing (1997) defines 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 representations of energy patterns derived from non-contact sensor systems. Remote sensing involves a powerful set of computerized software and hardware, and sophisticated mathematical, statistical and logical techniques for extraction and presentation of information acquired via non-contact sensors. It provides reliable and cost-effective means of studying the Earth's surface for urban planning, natural resources management and protection, and a wide variety of other fields. Government and non-government organizations continuously seek qualified professionals to use remote sensing for a wide range of applications.

Students seeking the Remote Sensing Certificate must have completed an undergraduate degree in some relevant area. Primary admissions requirements are: (1) an application to U.T. Dallas, and (2) an undergraduate transcript. Applicants for the certificate program do not need a GRE (Graduate Record Examination) score. They should apply as "non-degree-seeking" students to the 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 certification.

The Graduate Certificate in Remote Sensing requires 15 credits earned through the following courses:

GISC 6325/GEOS 5325 Introduction to Remote Sensing
GISC 6381 Introduction to GIS
GISC 7365/GEOS 5326 Remote Sensing Digital Image Processing
GISC 7366 Applied Remote Sensing
GISC 7367/GEOS 7327 Remote Sensing Workshop

EPPS Course Descriptions

EPPS 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) R

EPPS 6310 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

EPPS 6313 Introduction to Quantitative Methods (3 semester hours) This introductory graduate-level statistics course is geared to the consumption of statistical methods commonly used in social science research. Topics include creating and interpreting graphical and tabular summaries of data, descriptive statistics, basic probability theory, sampling distributions, basic hypothesis testing (t-tests, chi-square tests, and analysis of variance), estimation of population parameters, confidence intervals and correlation. An introduction to regression analysis will also be provided. Topics are supported by computer-supported data analyses. (3 semester hours) (3-0) Y

EPPS 6316 Applied Regression (3 semester hours) This course provides a survey 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. This application-focused course presents examples drawn from economics, political science, public policy and sociology, introduces the basic concepts and interpretation of regression models, and basic methods of inference. Topics are supported

by computer-supported data analyses. Prerequisite: EPPS 6313. (3-0) Y

EPPS 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. EPPS 6310, EPPS 6316 or equivalents recommended. (3-0) Y

EPPS 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. (3-0) T

EPPS 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. (3-0) Y

EPPS 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. (3-0) T

EPPS 7313 Descriptive and Inferential Statistics (3 semester hours) This course is designed to prepare students for the advanced quantitative methodology courses required of advanced degree students. The fundamentals of sampling design and measurement will be covered. Students will then develop an understanding of the principles by which a variety of statistical methodologies function, from simple, two-sample tests to more complex non-parametric and asymmetric methods. The course closes with an introduction to multiple regression. While the only pre-requisite is a sound foundation in algebra, some familiarity with the fundamentals of calculus and linear algebra will provide a stronger foundation for learning. Topics are supported by computer-supported data analyses using application-specific software. (3-0) Y

EPPS 7316 Regression and Multivariate Analysis (3 semester hours) This course provides a detailed examination of the 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, and fixed effects models. The course ends with an introduction to advanced topics in regression analysis, qualitative response models, and non-OLS approaches to estimation. Topics are supported by computer-supported data analyses using application-specific software. Prerequisite: EPPS 7313. (3-0) Y

EPPS 7318 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. EPPS 7316 or equivalent recommended. Prerequisite: ECON 6306 or ECON 6309 or EPPS 6316 or permission of instructor. (3-0) R

EPPS 7344 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. EPPS 6316 or the equivalent recommended. (3-0) Y

EPPS 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: EPPS 6313 or equivalent. (3-0) R

EPPS 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. EPPS 7316 or equivalent recommended (3-0) R

EPPS 7380 Applied Multivariate Analysis (3 semester hours) Application of multivariate statistical techniques to spatial and economic data. Covers parametric and non-parametric statistical theory and application including multiple linear and non-linear regression, poisson, and binomial regression, principal components and factor analysis, discriminant function analysis, and canonical correlation. Includes an introduction to SAS computing. Prerequisites: EPPS 6316 or ECON 6306 (3-0) R

EPPS 7386 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. EPPS 6313 or equivalent recommended. (3-0) R

EPPS 7388 Workshop in Teaching Effectiveness (1-3 credit hours) Workshop will focus on preparing students for positions as teaching assistants, lecturers, and those who expect to teach as a career in the Social Sciences. Emphasis will be placed on videotaped student presentations and feedback, guest presentations, student visits to EPPS faculty classes. [(1-3)-0] R.

ERIK JONSSON SCHOOL OF ENGINEERING & COMPUTER SCIENCE

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, Zyvex, Raytheon, EDS, SBC Communications, Tri-Quint Semiconductor, Cisco Systems, Lockheed Martin, Intervice, 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.

The Jonsson School is organized into two departments, Electrical Engineering and Computer Science. The Electrical Engineering Department was founded in 1988 and graduated its first MS student in 1989. It has grown to become the third largest EE program in the State, graduating over 165 students in 1999, and out-producing such well-known schools as the University of Colorado, Iowa State, Michigan State,

and the University of Oklahoma. UTD's Electrical Engineering Program provides high quality education and internationally competitive research to the Dallas-Fort Worth Metroplex and Texas, focusing its efforts on areas of greatest need to North Texas industry. The department features 42 tenured/tenure-track faculty members supported by 9 senior lecturers. The program specializes in the following areas: Communications and Signal Processing, Digital Systems, Microelectronic Circuits and Systems, Optical and Photonic devices, Materials and Systems, and Solid-State Devices and Circuits.

The Computer Science Department was created in 1975 and became a part of the Jonsson School in 1986. Today UTD boasts one of the largest computer science departments in the country, with a talented student body numbering more than 1,500, taught by an internationally recognized group of 42 tenured/tenure-track faculty and 13 experienced senior lecturers. The UTD Department of Computer Science is committed to excellence in three areas: providing the highest quality instruction to undergraduate and graduate students; conducting leading edge research in computer science and engineering; and providing leadership and services to professional communities. The graduate curriculum focuses on preparing students to perform fundamental and development research. Courses and research are offered in a variety of sub-fields of computer science.

DEGREES OFFERED

Master of Science in Biomedical Engineering
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 Mechanical Engineering
Master of Science in Telecommunications Engineering

Doctor of Philosophy in Biomedical 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

Department of Computer Science

<http://www.utdallas.edu/dept/cs/>

Faculty

Professors: Farokh Bastani, R. 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), I-Ling Yen, Kang Zhang, Si Qing Zheng.

Associate Professors: Sergey Bereg, Lawrence Chung, Jorge A. Cobb, Ovidiu Daescu, Galigekere R. Dattatreya, Sanda Harabagiu, Vasileios Hatzivassiloglou, Jason Jue, Latifur Khan, Rym Mili, Neeraj Mittal, Ivor P. Page, B. Prabhakaran, Ravi Prakash, Kamil Sarac, Haim Schweitzer, Subbarayan Venkatesan, Yuke Wang, W. Eric Wong

Assistant Professors: Joao Cangussu, Kendra M.L. Cooper, Jing Dong, Xiaohu Guo, Kevin Hamlen, Murat Kantarcioglu, Yang Liu, Ying Liu, Vincent Ng, Weili Wu

Senior Lecturers: Rekha Bhowmik, Tim Farage, Herman Harrison, Sam Karrah, Lawrence King, Greg Ozbirn, Cort Steinhorst, 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, data & network security, 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 page13.

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 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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 and Bioinformatics Tracks:

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 20.

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 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 6360 Database Design
CS 6363 Design & Analysis of Computer Algorithms
CS 6364 Artificial Intelligence
CS 6375 Machine Learning
CS 6378 Advanced Operating Systems

Bioinformatics Track

CS 6325 Introduction to Bioinformatics
CS 6363 Design & Analysis of Computer Algorithms
CS 6360 Database Design

Two of the following four courses:

CS 6333 Algorithms in Computational Biology
CS 6365 Data and Text Mining for Computational Biology
CS 6383 Computational Systems Biology
CS 6393 Advanced Algorithms in Biology

Major in Software Engineering (M. S. C. S.)

CS/SE 6361 Requirements Engineering
CS/SE 6362 Software Architecture and Design
CS/SE 6367 Software Testing, Validation and Verification

CS/SE 6387 Advanced Software Engineering Project

One of the following four courses:

CS 6353 Compiler Construction
CS/SE 6360 Database Design
CS 6371 Advanced Programming Languages
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.

While the Department of Computer Science offers both the Master of Science in Computer Science and the Master of Science in Computer Science with Major in Software Engineering degrees, students are not permitted to pursue both degrees.

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 20.

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.
 - o 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.
 - o Two CS/SE 7000 and above level courses
- Sufficient CS electives for a total of at least 75 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.

Computer Science Course Descriptions

CS 5301 (EEGR 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) R

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) R

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 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) R

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) Processes and threads. Concurrency issues including semaphores, monitors and deadlocks. Simple memory management. Virtual memory management. CPU scheduling algorithms. I/O management. File management. Introduction to distributed systems. 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 3335. (3-0) S

CS 5390 Computer Networks (3 semester hours) The design and analysis of protocols for computer networking. Topics include: network protocol design and composition via layering, contention resolution in multi-access networks, routing metrics and optimal path searching, traffic management, global network protocols: dealing with heterogeneity and scalability. 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, EEDG 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 4304, 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 6325 Introduction to Bioinformatics (3 semester hours). The course provides a broad overview of the bioinformatics field. Comprehensive introduction to molecular biology and molecular genetics for a program of study in bioinformatics. Discussion of elementary computer algorithms in biology (e.g., sequence alignment and gene finding). Biological databases, data analysis and management. (3-0) T

CS 6333 Algorithms in Computational Biology (3 semester hours). The principles of algorithm design for biological datasets, and analysis of influential problems and techniques. Biological sequence analysis, gene finding, RNA folding, protein folding, sequence alignment, genome assembly, comparative genomics, phylogenetics, clustering algorithms. Prerequisite: CS 6325. (3-0) S

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. 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

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: CE/CS/SE 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: CE/CS/SE 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: CE/CS/SE 5354 and either CS 3335 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) Advanced Requirements Engineering (3 semester hours) Critical issues in requirements engineering. Models of requirements engineering process. Requirements analysis, modeling and specification. Requirements elicitation. Scenario analysis. Enterprise modeling. Functional requirements. Structured analysis. Structural and behavioral requirements. Non-functional requirements. Object-oriented, goal-oriented and agent-oriented methodologies. Formal techniques. Prerequisite: CE/CS/SE 5354. (3-0) S

CS 6362 (SE 6362) Advanced 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. Software modeling techniques. Architecture styles and design patterns. Service-oriented architecture. Transition from requirements to software architecture, design, and to implementation. State of the practice and art. Formal techniques/languages. Prerequisite: CE/CS/SE 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 6365 Data and Text Mining for Computational Biology (3 semester hours). The course introduces data and text mining as practiced currently in the bioinformatics field. Major topics include: sequence alignment for determining similarity between proteins and genes; properties of similarities and distances; genomic, proteomic, and text databases in the real world; finding patterns (motifs) in genes and proteins; differentiating between valid patterns and noise; classification; clustering and its application to phylogenetic trees; and selected topics from text mining. Prerequisite: CS 6325. (3-0) Y

CS 6366 Computer Graphics (3 semester hours) Device and logical coordinate systems. Geometric transformations in two and three dimensions. Algorithms for basic 2-D drawing primitives, such as Bresenham's algorithm for lines and circles, Bezier and B-Spline functions for curves, and line and polygon clipping algorithms. Perspectives in 3-D, and hidden-line and hidden-face elimination, such as Painter's and Z-Buffer algorithms. Fractals and the Mandelbrot set. Prerequisites: CS 5330, CS 5343, and linear algebra. (3-0) Y

CS 6367 (CE 6367 and SE 6367) Software Testing and Verification (3 semester hours) Fundamental concepts of software testing. Functional testing. GUI based testing tools. Control flow based test adequacy criteria. Data flow based test adequacy criteria. White box based testing tools. Mutation testing and testing tools. Relationship between test adequacy criteria. Finite state machine based testing. Static and dynamic program slicing for testing and debugging. Software reliability. Formal verification of program correctness. Prerequisites: CE/CS/SE 5354 or consent of instructor. (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 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 6375 Machine Learning (3 semester hours) Algorithms for training perceptions and multi-layer neural nets: back propagation, Boltzmann machines, self-organizing nets. The ID3 and the Nearest Neighbor algorithms. Formal models for analyzing learnability: exact identification in the limit and probably approximately correct (PAC) identification. Computational limitations of learning machines. Prerequisite: CS 5343. (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 6377 Introduction to Cryptography (3 semester hours). This course covers the basic aspects of modern cryptography, including block ciphers, pseudorandom functions, symmetric encryption, Hash functions, message authentication, number-theoretic primitives, public-key encryption, digital signatures and zero knowledge proofs. Prerequisites: CS5333 and CS5343. (3-0) T

CS 6378 (CE 6378, TE 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 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 6383 Computational Systems Biology (3 semester hours). The course will provide a system-level understanding of biological systems by analyzing biological data using computational techniques. The major topics include: computational inference of biological networks (regulatory, protein interactions, and metabolic) and the effects of biological networks in cellular processes, development, and disease. Prerequisite: CS 6325. (3-0) T

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 Advanced Software Engineering Project (3 semester hours) This course is intended to provide experience in a group project that requires advanced technical solutions, such as distributed multi-tier architectures, component-based technologies, automated software engineering, etc., for developing applications, such as web-based systems, knowledge-based systems, real-time systems, etc. The students will develop and maintain requirements, architecture and detailed design, implementation, and testing and their traceability relationships. Best practices in software engineering will be applied.

Prerequisites: CS/SE 6361, CS/SE 63562. Co-requisite: CS/SE 6367. (3-0)S

CS 6388 (SE 6388) Software Project Planning and Management (3 semester hours) Techniques and disciplines for successful management of software projects. Project planning and contracts. Advanced cost estimation models. Risk management process and activities. Advanced scheduling techniques. Definition, management, and optimization of software engineering processes. Statistical process control. Software configuration management. Capability Maturity Model Integration (CMMI). Prerequisite: CE/CS/SE 3354. (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: CE/CS/SE 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 6391 Optical Networks (3 semester hours) Enabling technologies for optical networks. Wavelength-division multiplexing. Broadcast-and-select optical networks. Wavelength-routed optical networks. Virtual topology design. Routing and wavelength assignment. Network control and management. Protection and restoration. Wavelength conversion. Traffic grooming. Photonic packet switching. Optical burst switching. Survey of recent advances in optical networking. Prerequisite: CS 5390 AND one of CS 6352, CS 6385, CS 6390 (3-0) Y

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 or equivalent. (3-0) Y

CS 6393 Advanced Algorithms in Biology (3 semester hours). Recent advanced topics in algorithms in biology will be discussed. Topics will be chosen from: sorting and transformational operations on strings and permutations, structural analysis of proteins, pooling design and nonadaptive group testing, approximation algorithms, and complexity issues. Prerequisites: CS6363 and CS 6325. (3-0) Y

CS 6394 Digital Telephony (3 semester hours) Introduction and overview emphasizing the advantages of digital voice networks. Voice digitization. Digital transmission, multiplexing, and switching. Rearrangeable switching networks. Digital modulation for radio systems. Network operation issues: synchronization, control; integration of voice and data, packet switching and traffic analysis. (3-0) R

CS 6395 Speech Recognition, Synthesis, and Understanding (3 semester hours). Basic speech processing techniques: isolated word recognition using dynamic time warping, acoustic modeling using hidden Markov models, statistical language modeling, search algorithms in large vocabulary continuous speech recognition, components in text-to-speech systems, architecture and components in spoken dialog systems. Prerequisites: CS5343. (3-0) T

CS 6396 (CE 6308, EEDG 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. Project to specify, analyze, design, implement and test small real-time system. Prerequisite: CS 5348 or equivalent. (3-0) R

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, EEDG 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.

Prerequisites: CS 5343. (3-0) Y

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. May be repeated for credit (9 hours maximum) ([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 (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

Software Engineering Course Descriptions

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 SE 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

SE 6354 (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: CE/CS/SE 5354 (or equivalent) and knowledge of Java (3-0) S

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/SE 5354. (3-0) Y

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/SE 5354. (3-0) Y

SE 6359 (CS 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: CE/CS/SE 5354 and either CS 5335 or CS 5336. (3-0) S

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/SE 5343. (3-0) S

SE 6361 (CS 6361) Advanced 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/SE 5354. (3-0) S

SE 6362 (CS 6362) Advanced 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/SE 5354. (3-0) S

SE 6367 (CE 6367, CS 6367) Software Testing, Validation, and Verification (3 semester hours) Fundamental concepts of software testing. Functional testing. GUI based testing tools. Control flow based test adequacy criteria. Data flow based test adequacy criteria. White box based testing tools. Mutation testing and testing tools. Relationship between test adequacy criteria. Finite state machine based testing. Static and dynamic program slicing for testing and debugging. Software reliability. Formal verification of program correctness. Prerequisites: CE/CS/SE 5354 or consent of instructor. (3-0) Y

CS 6387 Advanced Software Engineering Project (3 semester hours) This course is intended to provide experience in a group project that requires advanced technical solutions, such as distributed multi-tier architectures, component-based technologies, automated software engineering, etc., for developing applications, such as web-based systems, knowledge-based systems, real-time systems, etc. The students will develop and maintain requirements, architecture and detailed design, implementation, and testing and their traceability relationships. Best practices in software engineering will be applied. Prerequisites: CS/SE 6361, CS/SE 63562. Co-requisite: CS/SE 6367. (3-0)S

SE 6388 (CS 6388) Software Project Planning and Management (3 semester hours) Techniques and disciplines for successful management of software projects. Project planning and contracts. Advanced cost estimation models. Risk management process and activities. Advanced scheduling techniques. Definition, management, and optimization of software engineering processes. Statistical process control. Software configuration management. Capability Maturity Model Integration (CMMI). Prerequisite: CS/SE 3354. (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: CE/CS/SE 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. May be repeated for credit (9hours maximum). ([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 (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

Department of Electrical Engineering

<http://www.utdallas.edu/dept/ee>

Faculty

Professors: Naofal Al-Dhahir, Larry P. Ammann, Poras T. Balsara, Andrew J. Blanchard, Cyrus D. Cantrell III, Yves J. Chabal, David E. Daniel, John P. Fonseka, William R. Frensley, Andrea F. Fumagalli, Matthew Goeckner, Bruce E. Gnade, John H. L. Hansen, C. R. Helms, Louis R. Hunt (emeritus), Nasser Kehtarnavaz, Kamran Kiasaleh, Moon J. Kim, Gil S. Lee, Philipos C. Loizou, Duncan L. MacFarlane, Aria Nosratinia, Kenneth O. Raimund J. Ober, Lawrence J. Overzet, William Pervin (emeritus), Mario A. Rotea, Carl Sechen, Mark W. Spong, Don W. Shaw (emeritus), Lakshman S. Tamil, Mathukumalli Vidyasagar, Robert M. Wallace, Dian Zhou

Research Professor: Vojin Oklobdzija

Associate Professors: Dinesh Bhatia, Gerald O. Burnham, Jiyoung Kim, Jeong-Bong Lee, Jin Liu, Hlaing Minn, Won Namgoong, Mehrdad Nourani, Issa Panahi, Robert Rennaker, M. Saquib, Murat Torlak, Eric Vogel

Assistant Professors: Bhaskar Banerjee, Leonidas Bleris, Carlos A. Busso, Nicholas Gans, Rashaunda Henderson, Walter Hu, Roozbeh Jafari, Hoi Lee

Research Assistant Professors: Wooil Kim, Kostas Kokkinakis

Senior Lecturers: Charles P. Bernardin, Nathan B. Dodge, Edward J. Esposito, Muhammad A. Kalam, Jung Lee, Randall E. Lehmann, P. K. Rajasekaran, Ricardo E. Saad, Marco Tacca

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 and the new Natural Science and Engineering Research Laboratory provide extensive facilities for research in microelectronics, telecommunications, and computer science. A Class 10000 microelectronics clean room facility, including e-beam lithography, sputter deposition, PECVD, LPCVD, etch, ash and evaporation, is available for student projects and 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 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 Photonic Testbed 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 Statistical Signal Processing Laboratory is dedicated to research in statistical and acoustic signal processing for biomedical and non-biomedical applications. It is equipped with high-performance computers and powerful textual and graphical software platforms to analyze advanced signal processing methods, develop new algorithms, and perform system designs and simulations. The Acoustic Research Laboratory provides number of test-beds and associated equipment for signal measurements, system modeling, real-time implementation and testing of algorithms related to audio/acoustic/speech signal processing applications such as active noise control, speech enhancement, dereverberation, echo cancellation, sensor arrays, psychoacoustic signal processing, etc.

The Center for Robust Speech Systems (CRSS) is focused on a wide range of research in the area of speech signal processing, speech and speaker recognition, and speech/language technology. CRSS is affiliated with HLTRI in the Erik Jonsson School, and collaborates extensively with faculty and programs across UTD on speech and language research. CRSS supports an extensive network of workstations, as well as a High-Performance Compute Cluster with over 15TB of disk space and 72 CPU ROCS multi-processor cluster. The center also is equipped with several Texas Instruments processors for real-time processing of speech signals, and two ASHA certified sound booths for perceptual/listening based studies and for speech data collection. CRSS supports mobile speech interactive systems through the UTDrive program for in-vehicle driver-behavior systems, and multi-modal based interaction systems via image-video-speech research.

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 Wireless Information Systems (WISLAB) and Antenna Measurement Laboratories have wireless experimental equipment with a unique multiple antenna testbed to integrate and to demonstrate radio functions (i.e. WiFi and WiMAX) under different frequency usage characteristics. With the aid of the Antenna Measurement Lab located in the Waterview Science and Technology Center (WSTC), the researchers can design, build, and test many types of antennas.

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 scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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 20.

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; RF and Microwave Engineering, Biomedical Applications of Electrical Engineering, 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. With the prior approval of an academic advisor, non-thesis students may count no more than 6 semester-hours of research or individual instruction courses towards the 33-hour degree requirement.

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. One of the six concentrations listed below, subject to approval by a graduate adviser, should be used to fulfill the requirements of this program. Students must achieve an overall GPA of 3.0 or better, a GPA of 3.0 or better in their core MSEE classes, and a grade of B- or better in all their core MSEE classes in order to satisfy their degree requirements.

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 EESC 6349, EESC 6352, and EESC 6360, and one of the following: EESC 6331, EESC 6340, EESC 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 EEDG 6301 and EEDG 6304. The remaining two must be selected from EEDG 6302, EECT 6325, and EEDG 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 five concentrations: Circuits and Systems; Solid State Devices and Micro Systems Fabrication; Optical Devices, Materials and Systems, RF and Microwave Engineering, and Biomedical Applications of Electrical Engineering.

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 five required courses: Two of the courses are: EECT 6325 and EECT 6326. The remaining three must be selected from EEDG 6301, EEDG 6303, EEDG 6306, EEDG 6375, EECT 7325, EECT 7326, EECT 6378 and EERF 6330 (15 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: EEGR 6316, EEMF 6319 and at least two of the following four courses: EEMF 6320, EEMF 6321, EEMF 6322 and EEMF 6382

Additional standard electives include but are not limited to: EEMF 5383/EEMF 5283, EEMF 6324, EECT 6325, EEMF 6372, EEMF 6383/EEMF 6283, EEMF 6382, EEMF 7320, EECT 7325.

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, materials and systems.

Each student electing this concentration must take the following four required courses: EEOP 6314, EEGR 6316, EEOP 6317, and at least one of the following two courses: EEOP 6310 and EEOP 6329. (12 hours).

Approved electives must be taken to make a total of 33 hours.

RF and Microwave Engineering

This curriculum is focused on the application and theory of modern electronic devices, circuits and systems in the radiofrequency and microwave regime.

Each student electing this concentration must take the following four required courses: EERF 6311, EEGR 6316, EERF 6355, and EERF 6395. (12 hours).

Approved electives must be taken to make a total of 33 hours.

Biomedical Applications of Electrical Engineering

This curriculum provides a graduate-level introduction to advanced methods and biomedical applications of electrical engineering.

Each student electing this concentration must take EEBM 6371, EEBM 6373, EEBM 6374, and two core courses from any one other concentration. (15 hours).

Approved electives must be taken to make a total of 33 hours.

Graduate Certificate in Infrared Technology

Admission Requirements

Students seeking the Graduate Certificate in IR technology may be admitted in either degree-seeking or non-degree-seeking status. The University's requirements for admission as a non-degree-seeking graduate student are discussed on page 13. Up to 15 semester credit hours earned in non-degree-seeking status may be transferred for degree credit when a student is admitted to degree-seeking status. Students seeking the Infrared Technology Certificate should have an undergraduate preparation equivalent to a Bachelor of Science in Electrical Engineering or Physics. Students who lack the undergraduate prerequisites for the courses required for the Infrared Technology Certificate must complete these prerequisites or receive approval from the graduate adviser and the course instructor.

Each student electing the Graduate Certificate in IR Technology must take the following five courses: EEGR 6316, EEOP 6317, EEOP 6309, EEOP 6315, and EEOP 6335.

At the time of completion of the course requirements for the Infrared Technology Certificate, each student must have a grade point average of at least 3.00 and must meet all other requirements for good academic standing.

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 scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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 page20.

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 75 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. All PhD students must demonstrate competence in the Master's level core courses in their research area. All students must have an academic advisor and an approved plan of study.

Also required are:

- A research oriented oral qualifying examination (QE) demonstrating competence in the Ph.D. candidate's research area. A student must make an oral presentation based on a review of 2 to 4 papers followed by a question-answer session. Admission to Ph.D. candidacy is based on two criteria: Graded performance in the QE and GPA in graduate level organized courses. A student entering the Ph.D. program with a M.S.E.E. must pass this exam within 3 long semesters, and a student entering without an M.S.E.E. must pass this exam within 4 long semesters. A student has at most two attempts at the QE. The QE will be given during the fall and spring semesters.
- A comprehensive examination consisting of: a written dissertation proposal, a public seminar, and a private oral examination conducted by the Ph.D. candidate'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 Micro Systems Fabrication. Besides courses required for each concentration, a comprehensive set of electives is available in each area.

Doctoral level research opportunities include: VLSI design and test, computer architecture, embedded systems, computer aided design (CAD), ASIC design methodologies, high speed system-on chip design and test, reconfigurable computing, network processor design, interconnection networks, nonlinear signal-processing, smart antennas and array processing, statistical and adaptive signal processing,

multimedia signal processing, image processing, real-time imaging, medical image analysis, pattern recognition, speech processing, control theory, digital communications, modulation and coding, electromagnetic-wave propagation, diffractive structures, fiber and integrated optics, nonlinear optics, optical transmission systems, all-optical networks, optical investigation of material properties (reflectometry and ellipsometry), optical metrology, lasers, quantum-well optical devices, theory and experiments in semiconductor-heterostructure devices, plasma deposition and etching, nanoelectronics, wireless communication, network protocols and evaluation, mobile computing and networking, and optical networking.

Interdisciplinary Opportunities: Continuing with the established tradition of research at U. T. Dallas, the Electrical Engineering Program encourages students to interact with researchers in the strong basic sciences and mathematics. Cross disciplinary collaborations have been established with the Chemistry, Mathematics, and Physics programs of the School of Natural Sciences and with faculty in the School of Brain and Behavioral Science.

Electrical Engineering Course Descriptions

EEMF 5283 Plasma Technology Laboratory (2 semester hours) Laboratory will provide a hands-on experience to accompany EE 5383. Topics to include: Vacuum technology [pumps, gauges, gas feed], plasma uses [etch, deposition, lighting and plasma thrusters] and introductory diagnostics. Co-requisite: EEMF 5383. Recommended Co-requisite: EEMF 7171. (0-2) R

EEGR 5300 Advanced Engineering Mathematics (3 semester hours) Advanced mathematical topics needed in the study of engineering. Topics may include advanced differential equations, linear algebra, vector calculus, complex analysis, and numerical methods. Credit does not apply to the 33 hour M.S.E.E. requirement. (3-0) R

EEGR 5301 (CS 5301) Professional and Technical Communication (3 semester hours) EEGR 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

EERF 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 and impedance matching. Fundamentals of antennas and propagation. Prerequisite: EE 4301 or equivalent. (3-0) Y

EEMF 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) R

EECT 5321 Introduction to Circuits and Systems (3 semester hours) Continuation of EEMF 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) R

EEDG 5325 (CE 5325) Hardware Modeling Using HDL (3 semester hours) This course introduces students to hardware description languages (HDL) 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 HDL that may be used for synthesis of custom logic. HDL simulation and synthesis labs and projects are performed using commercial and/or academic VLSI CAD tools. Prerequisite: EE 3320 or equivalent. (3-0) T

EESC 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 performance of binary as well as M-ary modulated digital communication systems are introduced. Overall design considerations and performance evaluation of various digital communication systems are discussed. Prerequisite: EEGR 3300 or equivalent. (3-0) R

EEESC 5360 Introduction to Communications and Signal Processing (3 semester hours) This course is designed to provide the necessary background for someone with a technical degree to enter the M.S.E.E. program in the Communications and Signal Processing concentration. It will focus on linear systems theory, to include Fourier series, Fourier and Laplace transforms, transfer functions, frequency response, and convolution. It will also include introductions to the solution of ordinary differential equations and to communications systems. Credit does not apply to the 33 hour M.S.E.E. requirement. Prerequisites: One year of calculus and one semester of probability theory. (3-0) R

EEGR 5365 Engineering Leadership (3 semester hours) Interpersonal influence and organizational influence in leading engineering organizations. Leadership is addressed from the point of view of the technical manager as well as from that of the technical professional. Topics include staffing, motivation, performance evaluation, communication, project selection and planning, intellectual property and professional ethics. (3-0) R

EEGR 5381 Curriculum Practical Training in Electrical 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.E.E. requirement. Consent of Graduate Adviser required. (May be repeated to a maximum of 9 hours) (3-0) R

EEMF 5383 (MSEN 5383, 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. (3-0) Y

EECT 5385 Analog Filters (3 semester hours) This course aims at bridging the intermediate-level and the advanced-level knowledge in analog filter design. It moves from basic theory of analog passive filters to theoretical and practical aspects of active, switched-capacitor, and continuous time filters. For active solutions the focus is on integrated implementations on silicon. Prerequisites: EEGR 3301 and EE 3111. (3-0) Y

EEGR 5V80 Special Topics In Electrical Engineering (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

EEMF 6283 Plasma Science Laboratory (2 semester hours) Laboratory will provide a hands on experience to accompany EEMF 6383. Experiments will include measurements of fundamental plasma properties and understanding of important plasma diagnostics. Co-requisite: EEMF 6383, recommended co-requisite: EEMF 7171. (0-2) T

EEDG 6301 (CE 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

EEDG 6302 (CE 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 and background in VHDL/Verilog. (2-3) Y

EEDG 6303 (CE 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, such as PLA's, memory circuits, datapath, etc. Prerequisite: EE 3320 or equivalent and background in VHDL/Verilog. (3-0) Y

EEDG 6304 (CE 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. Prerequisite:

EE 4304 and C/C++. (3-0) Y

EEDG 6305 (CE 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

EEDG 6306 (CE 6306) Application Specific Integrated Circuit 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. Prerequisites: EE 3320 (3-0) Y

EEDG 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: EEDG 6301, EEGR 3341 or equivalent. (3-0) R

EEDG 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

EEOP 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: EEGR 3302 and EE 4301 or equivalents. (3-0) R

EEOP 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, 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

EERF 6311 RF and Microwave Circuits (3 semester hours) Analysis and design of RF and microwave circuits. Topics include impedance matching, network theory, S-parameters, transmission line media (waveguide, coax, microstrip, stripline, coplanar waveguide, etc.) and passive component design (power dividers, couplers, switches, attenuators, phase shifters, etc.). Industry-standard microwave CAD tools will be used. Prerequisite: EE 4368 or equivalent. (3-0) R

EEOP 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

EEOP 6313 (MSEN 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

EEOP 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: EEGR 3300 and EE 4301 or equivalents. (3-0) T

EEOP 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

EEGR 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

EEOP 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

EEMF 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: EEGR 3300 or equivalent. (3-0) Y

EEMF 6320 (MSEN 6320) Fundamentals of Semiconductor Devices (3 semester hours) Semiconductor material properties, band structure, equilibrium carrier distributions, non-equilibrium current-transport processes, and recombination-generation processes.. Prerequisite: EEMF 6319 or equivalent. Y

EEMF 6321 (MSEN 6321) Active Semiconductor Devices (3 semester hours) The physics of operation of active devices will be examined, including p-n junctions, bipolar junction transistors and field-effect transistors: MOSFETs, JFETS, and MESFETS. Active two-terminal devices and optoelectronic devices will be presented. Recommended co-requisite: EEMF 6320. (3-0) Y

EEMF 6322 (MECH 6322, MSEN 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

EEMF 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: EEMF 6320 and EEMF 6321. (3-0) R

EEMF 6324 (MSEN 6324) Electronic, Optical and Magnetic Materials (3 semester hours) Foundations of materials properties for electronic, optical and magnetic applications. Electrical and Thermal Conduction, Elementary Quantum Physics, Modern Theory of Solids, Semiconductors and Devices, Dielectrics, Magnetic and Optical Materials properties. Prerequisite: MSEN 5300 or equivalent. (3-0) T

EECT 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.. Use of CAD tools to design, layout, check, extract and simulate a small project. Prerequisites: EE 3320, EEGR 3301 or equivalent. (3-0) Y

EECT 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

EEOP 6328 Nonlinear Optics (3 semester hours) Survey of nonlinear optical effects; origins of optical nonlinearities; laser-pulse propagation equations in bulk media and optical fibers; the nonlinear optical susceptibility tensor; second-order nonlinear optical 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; EEOP 6310 recommended. (3-0) R

EEOP 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 EEOP 6317 recommended. (3-0) R

EERF 6330 RF Integrated Circuit Design (3 semester hours) Introduction to RF and Wireless systems; Basic Concepts of RF Design: Linearity, Distortion, (P1dB, IIP3), Sensitivity, Noise Figure; RF Passives: Q-factors, Impedance Transformation, Matching Network; Transceiver Architectures: Receivers – Heterodyne, Direct downconversion, Image Reject Receivers, Direct conversion transmitter, two-step transmitter; Low Noise Amplifier Design; Mixer Design; Oscillator Design; Basic architectures of Power Amplifiers. Use of Agilent ADS for Design Projects. Prerequisite EE 4340. (3-0). Y

EESC 6331 Linear Systems and Signals (3 semester hours) Systems and control theory: state space, convolution integrals, transfer functions, stability, controllability, observability, and feedback.

Prerequisites: EEGR 2300 and EE 4310. (3-0) Y

EEGR 6332 (MECH 6332) Advanced Control (3 semester hours) Modern control techniques in state space and frequency domain: optimal control, robust control, and stability. Prerequisite: EESC 6331. (3-0) R

EEOP 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: EEOP 6317. (3-0) R

EEOP 6335 Engineering of Infrared Imaging Systems (3 semester hours) Thermal optics, review of Fourier optics, review of information theory, embedded system design principles, and system modeling. Prerequisites: EEOP 6309 or 6315 or equivalents. (3-0) T

EEGR 6336 (MECH 6336) Nonlinear Control Systems (3 semester hours) Differential geometric tools, feedback linearization, input-output linearization, output injection, output tracking, stability. Prerequisite: EESC 6331. (3-0) R

EEOP 6338 High-Speed Optical Receivers and Transmitters (3 semester hours) Review of optical communication systems. Definitions of attenuation and dispersion. Architecture of optical transmitters and receivers. Principles of operation of photodetectors (PIN and APD). Application of digital communication theory to the analysis of optical receivers. Definition of sensitivity and dynamic range in optical receivers. Study of high-speed transimpedance and limiting amplifiers. Principles of operation of lasers (DFB and Fabry-Perot). Study of tunable lasers and high-speed external modulators. Direct and externally modulated transmitters. Study of high-speed drivers for laser and modulators. Characteristics of optical transmitters. Prerequisite: EE 3311 or equivalent. (3-0) R

EEGR 6V40 Individual Instruction in Electrical Engineering (1-6 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-6]-0) R

EESC 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, and error detection. The data link control layer: retransmission strategies, framing, multiaccess protocols, e.g., Aloha, slotted Aloha, CSMA, and CSMA/CD. The network layer: routing, broadcasting, multicasting, flow control schemes. Co-requisite: EESC 6349. (3-0) Y

EESC 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: EESC 6352. (3-0) R

EESC 6343 Detection and Estimation Theory (3 semester hours) Parameter estimation. Least-square, mean-square, and minimum-variance estimators. Maximum A Posteriori (MAP) and Maximum-Likelihood (ML) estimators. Bayes estimation. Cramer-Rao lower bound. BLUE estimator and Wiener filtering. Prerequisite: EESC 6349. (3-0) R

EESC 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: EESC 6352. (3-0) R

EEDG 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 masters-level introduction to packet networks. Prior knowledge of digital communication systems is strongly recommended. Prerequisite: EE 3350 or equivalent. (3-0) Y

EEMF 6348 (MSEN 6348) Lithography and Nanofabrication (3 semester hours) Study of the principles, practical considerations, and instrumentation of major lithography technologies for nanofabrication of devices and materials. Advanced photolithography, electron beam lithography, nanoimprint lithography, x-ray lithography, ion beam lithography, soft lithography, and scanning probe lithography, basic resist and

polymer science, applications in nanoelectronics and biomaterials. (3-0) Y

EESC 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. Prerequisite: EEGR 3302 and EEGR 3341 or equivalent. (3-0) Y

EESC 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: EEGR 3302 or equivalent. (3-0) Y

EERF 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) R

EESC 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 communications systems are emphasized. Prerequisite: EESC 6349 or equivalent. (3-0) Y

EESC 6353 Broadband Digital Communication (3 semester hours) Characterization of broadband wireline and wireless channels. MAP and ML detection. 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 4360 and knowledge of MATLAB. (3-0) T

EERF 6355 RF and Microwave Amplifier Design (3 semester hours) Design of high-frequency active circuits. Review of transmission line theory. RF and microwave matching circuits using discrete and guided wave structures. Detailed study of S-parameters. Design of narrow band, broadband and low noise amplifiers. Detailed study of noise figure, noise parameters and stability of RF and microwave circuits using S-parameters. Prerequisite: EE 4368 or equivalent. (3-0) R

EESC 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: EEGR 3302 or EE 4361 or equivalent. (3-0) Y

EESC 6361 Digital Signal Processing II (3 semester hours) Continuation of EESC 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: EESC 6360. (3-0) T

EESC 6362 Introduction to Speech Processing (3 semester hours) Introduction to the fundamentals of speech signal processing and speech applications. Speech analysis and speech synthesis techniques, speech enhancement and speech coding techniques including ADPCM and linear-predictive based methods such as CELP. Prerequisite: EESC 6360. (3-0) Y

EESC 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 4361 or equivalent and knowledge of C or MATLAB. (3-0) T

EESC 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. Prerequisite: Knowledge of C or MATLAB. Co-requisite: EESC 6349. (3-0) T

EESC 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: EESC 6349, EESC 6360 and knowledge of matrix algebra. (3-0) T

EESC 6366 Speech and Speaker Recognition (3 semester hours) Introduction to concepts in automatic recognition methods for speech applications; the primary emphasis is for automatic speech recognition and speaker identification techniques. Topics include speech features for recognition, hidden Markov models for acoustic and language applications, Gaussian mixture models for speaker characterization, robustness issues to address noise and channel conditions for automatic recognition. Co-requisite: EESC 6349. (3-0) Y

EESC 6367 Applied Digital Signal Processing (3 semester hours) Implementation of signal processing algorithms, combination of textual and graphical programming of DSP systems, fixed-point versus floating-point, FPGA/DSP chip architecture, FPGA/DSP software development tools, code optimization, application project. Prerequisites: EE 4361 or equivalent and knowledge of C or MATLAB. (2-3) Y

EEDG 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) R

EEGR 6V70 Research In Electrical Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) R

EEMF 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) R

EEBM 6373 (BMEN 6373) Anatomy and Human Physiology for Engineers (3 semester hours) This course provides an introduction to anatomy and human physiology for engineers and other non-life-scientists. Topics include nervous system, muscle and cardiac function, digestive system, immune system. (3-0) Y

EEBM 6374 (BMEN 6374) Genes, Proteins and Cell Biology for Engineers (3 semester hours) This course provides an introduction to principles of modern molecular and cellular biology for engineers and other non-life-scientists. Topics include genes, protein structure and function, organization of cells and cellular trafficking. (3-0) Y

EEDG 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, and design rule checking (DRC). Introduction to CAD algorithms for RTL and behavior level synthesis, module generators, and silicon compilation. Prerequisite: CS 5343. Co-requisite: EECT 6325. (3-0) Y

EEBM 6376 (BMEN 6376) Lecture Course in Biomedical Applications of Electrical Engineering (3 semester hours) This course provides an introduction to different areas of biomedical applications of electrical engineering. A special emphasis will be placed on research topics that are actively pursued at UTD. (3-0) Y

EECT 6378 Power Management Circuits (3 semester hours): Operating principles of rectifiers and different dc-dc converters: switched-mode power converters, charge pumps and linear regulators. Design and analysis of voltage references and frequency compensation techniques for two-stage and three-stage amplifiers. Use of CAD tools to simulate power management circuits. Prerequisite: EECT 6326 or equivalent (3-0) Y

EEGR 6V80 Special Topics in Electrical Engineering (1–6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

EEGR 6381 (MECH 6381) Numerical Methods In Engineering (3 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: ENGR 2300 and ENGR 3300 or equivalents, and knowledge of a scientific programming language. (3-0) T

EEMF 6382 (MECH 6382) 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

EEMF 6383 (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 5320 or EEMF 6316. (3-0) T

EESC 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. Prerequisite: EE 3350 or equivalent. (3-0) Y

EESC 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: EESC 6352 and EESC 6390. (3-0) T

EESC 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; EESC 6390. (3-0) R

EESC 6393 Imaging Radar Systems Design and Analysis (3 semester hours) Radar systems, antenna systems, the radar equation, electromagnetic waves scattering from targets, radar signal and noise, detection and extraction of signal from noise or clutter, range and Doppler profiles, radar image formation, real aperture radar imaging, SAR imaging, ISAR imaging, image distortion, super resolution radar imaging techniques, and advanced holographic radar imaging techniques. Prerequisites: EE 3350 and EE 4301 or equivalents. (3-0) T

EERF 6394 Antenna Engineering and Wave Propagation (3 semester hours) Operating principles for microwave antennas used in modern wireless communications and radar systems. Prerequisite: EEGR 6316 or equivalent. (3-0) T

EERF 6395 Radiofrequency and Microwave Systems Engineering (3 semester hours) Review of RF and microwave systems, such as cellular, point-to-point radio, satellite, RFID and RADAR. Topics include: system architectures, noise & distortion, antennas & propagation, transmission lines & network analysis, active & passive components, modulation techniques and specification flowdown. Prerequisite: EE 4368 or equivalent. (3-0) R

EERF 6396 Microwave Design and Measurement (3 semester hours) This lecture and lab course covers the fundamentals of microwave component design and measurements, including vector impedance (scattering parameters), scalar measurements and spectrum analysis. Microwave components, such as filters, directional couplers, switches, amplifiers, and oscillators, will be designed and simulated with various CAD tools and then built and measured to compare performance with theory. Prerequisite: EE 4368 or equivalent. (2-1) R

EEDG 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

EEGR 6V98 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

EE 6V99 Special Topics in Electrical Engineering (1-9 semester hours) Topics vary from semester to

semester. May be repeated for credit as topics vary. ([1-9]-0) S

EEDG 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: EEDG 6304, CS 5348, EEGR 3341 and knowledge of C/C++. (3-0) R

EEMF 7320 (MSEN 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. Prerequisites: EEMF 6320 and EEMF 6321. (3-0) R

EECT 7325 (CE 7325) Advanced VLSI Design (3 semester hours) Advanced topics in VLSI design covering topics beyond the first course (EECT 6325). Topics include: use of high-level design, synthesis, and simulation tools, clock distribution and routing problems, (a)synchronous circuits, low-power design techniques, study of various VLSI-based computations, systolic arrays, etc. Discussions on current research topics in VLSI design. Prerequisite: EECT 6325 or equivalent. (3-0) R

EECT 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: EECT 6326 (3-0) Y

EECT 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: EECT 6326 and EECT 6325. (3-0) Y

EEDG 7328 (CE 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 state-of-the-art practical industrial design examples. A project related to the development of a prototype CAD tool. Prerequisites: EECT 6325 and knowledge of programming in C. (3-0) T

EECT 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: EECT 6326 (3-0) T

EERF 7330 Advanced RF Integrated Circuit Design (3 semester hours) Power Amplifiers, different classes of linear (A, B, AB, C) and switching power amplifiers (E, G, H), CMOS Integrated power amplifiers, High Efficiency Power Amplifiers (Doherty Power Amplifier); Phase Locked Loops: Basic concepts of PLL, Charge pumps, Type-I and Type-II PLLs, Noise in PLLs, Phase Noise, Frequency multiplication, RF Synthesizer Architectures, Frequency Dividers, Fractional-N PLLs, Delta-Sigma based PLLs, ADPLL; Advanced RF transceivers; Wideband and multiband radio design; Complete link budget analysis for wireless systems. Design project will focus on design of the entire transmitter using Agilent ADS. Prerequisite: RF Integrated Circuit Design. (3-0) Y

EECT 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: EECT 6326. Y

EEOP 7340 Optical Network Architectures and Protocols (3 semester hours) Introduction to optical networks. The ITU Optical Layer. First-generation optical networks. Standards, e.g. SONET/SDH, FDDI. Second-generation optical networks. Broadcast and select networks. The lightpath concept. Wavelength routing networks. Virtual topology design. Photonic packet switching. Advanced solutions and test beds. Prerequisite: EEOP 6340 (3-0) R

EEDG 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
EEMF 7V82 Special Topics In Microelectronics (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S
EEOP 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
EESC 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) R
EESC 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
EESC 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
EEBM 7V87 Special Topics in Biomedical Applications of Electrical Engineering (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S
EECT 7V88 Special Topics in Circuits and Systems (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S
EEGR 8V40 Individual Instruction in Electrical Engineering (1-6 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-6]-0) R
EEGR 8V70 Research In Electrical Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) R
EEGR 8V99 Dissertation (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

Department of Materials Science and Engineering

<http://www.mse.utdallas.edu/index.html>

Faculty

Professors: Yves Chabal, Bruce E. Gnade, Moon J. Kim, Robert M. Wallace

Associate Professors: Amy Walker, Jiyoung Kim

Assistant Professors: Christopher Hinkle

Affiliated Faculty: Kenneth J. Balkus (Chemistry), Ray H. Baughman (Chemistry), Cyrus D. Cantrell (Electrical Engineering), Kyeongjae Cho (Physics), Santosh R. D'Mello (Biology), Rockford K. Draper (Biology), John P. Ferraris (Chemistry), Yuri Gartstein (Physics), Robert Glosser (Physics), Juan E. González (Biology), Steven R. Goodman (Biology), Wenchuang Hu (Electrical Engineering), Gil S. Lee (Electrical Engineering), Jeong-Bong Lee (Electrical Engineering), Sanjeev K. Manohar (Chemistry), Inga Holl Musselman (Chemistry), Lawrence J. Overzet (Electrical Engineering), Eric Vogel (Electrical Engineering), Anvar A. Zakhidov (Physics)

Adjunct Faculty: H. Edwards (Texas Instruments), E. Forsythe (Army Research Laboratory), R. Irwin (Texas Instruments), M. Quevedo-Lopez

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 nano-structured materials, electronic, optical and magnetic materials, bio-mimetic materials, polymeric materials, MEMS materials and systems, organic electronics, and advanced processing of modern materials.

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Advanced Electron Microscopy Laboratory

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, SiO₂) 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 2100 F 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 monochrometers 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 900C 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 2×10^{-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.

Computational Materials Science Laboratory

Materials modeling software tools and hardware facilities are available for nanoscale materials research. Atomistic modeling software tools are used for structure and dynamic analysis of diverse material systems at nanoscales, and the examples include nanoelectronic materials and nanomaterials for renewable energy applications. For quantum mechanical analysis of materials, density functional theory (DFT) software tools (VASP, ABINIT, PWSCF, and SIESTA) are used on local parallel computing cluster. In-house quantum transport modeling software tool is used for I-V calculation of nanoelectronic devices using the non-equilibrium Green's function (NEGF) method. These software and hardware tools are also used for class projects of MSEN 5377.

Cleanroom Research Laboratory

The new cleanroom facility located in the Natural Science and Engineering Research Laboratory (<http://www.utdallas.edu/eecs/cleanroom/>) is utilized for materials and device research. The facility has 5,000 sq. ft. of class 10,000 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.

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 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are advisable based on our experience with student success in the program.

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 20.

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:

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 6324 (EE 6324) Electronic, Optical and Magnetic Materials
- 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 (5377) (PHYS 5377) Computational Physics of Nanomaterials
- 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 5410 (BIOL 5410) Biochemistry of Proteins and Nucleic Acids
- MSEN 5440 (BIOL 5440) Cell Biology
- 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 6358 (BIOL 6358) Bionanotechnology
- 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 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are advisable based on our experience with student success in the program.

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 20.

The MSEN Ph.D. requires a minimum of 60 semester hours beyond the Master's degree.

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 MSE.

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, Optical and Magnetic 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 (5377) (PHYS 5377) Computational Physics of Nanomaterials
- 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 5410 (BIOL 5410) Biochemistry of Proteins and Nucleic Acids
- MSEN 5440 (BIOL 5440) Cell Biology
- 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 6358 (BIOL 6358) Bionanotechnology
- 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
- MSEN 8V99 Dissertation

Materials Science and Engineering Course Descriptions

CORE COURSES

MSEN 5310 Thermodynamics of Materials (3 semester hours) Fundamental laws of thermodynamics, theory of solution, thermodynamic identities and their uses, chemical reactions, phase equilibria.

Electrochemistry. Thermodynamics of modern materials, kinetics. (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)Y

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. Prerequisite: EEGR 5300 or equivalent. (3-0) Y

MSEN 5320 Materials Science for Sustainable Energy (3 semester hours) Sustainable energy solutions require examining current fossil fuel supply, climate change, and renewable energy source development. Fossil fuel supply and climate change are intimately related, and global community is actively developing renewable energy source to replace the fossil fuel and minimize its impact on the climate change. Materials science will provide key enable technology solutions to diverse renewable energy technology under development (solar cell, biofuel, wind, geothermal etc.) and their practical utilization (energy storage, fuel cell, electrical vehicle, etc.). This course will examine the energy and climate issues, and sustainable energy solutions with emphasis on the role of materials science. (3-0) T"

MSEN 6324 (EEMF 6324) Electronic, Optical and Magnetic Materials (3 semester hours) Foundations of materials properties for electronic, optical and magnetic applications. Electrical and Thermal Conduction, Elementary Quantum Physics, Modern Theory of Solids, Semiconductors and Devices, Dielectrics, Magnetic and Optical Materials properties. Prerequisite: MSEN 5300 or equivalent. (3-0) T

ADVANCED COURSE LIST

MSEN 5340(CHEM 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 5377 (PHYS 5377) Computational Physics of Nanomaterials (3 semester hours) This course introduces atomistic and quantum simulation methods and their applications to modeling study nanomaterials (nanoparticles, nanowires, and thin films). The course has three main parts: basic theory of materials (thermodynamics, statistical mechanics, and solid state physics), computational methods to model materials systems, and applications to practical problems. There are three main themes of the course: structure-property relationship of nanomaterials; atomistic modeling for atomic structure optimization; and quantum simulations for electronic structure study and functional property analysis. (3-

0) R

MSEN 6310 (MECH 6301) Mechanical Properties of Materials (3 semester hours) Phenomenology of mechanical behavior of materials at the macroscopic level and the relationship of mechanical behavior to material structure and mechanisms of deformation and failure. Topics covered include elasticity, viscoelasticity, plasticity, creep, fracture, and fatigue. Prerequisite: MECH 3301 or MSEN 5300 or equivalent. (3-0) Y

MSEN 6330 Phase Transformations (3 semester hours) Thermodynamic, diffusion processes, kinetic, and structural aspects of metallic phase transformations: surface energy and interfaces, solidification, diffusionless phase transformation, mechanisms and rate-determining factors in oxidation and thin film deposition; nucleation theory, precipitations from solid solution, order-disorder phenomena, and applications of phase diagrams. (3-0) R

MSEN 6348 (EEMF 6348) Lithography and Nanofabrication (3 semester hours) Study of the principles, practical considerations, and instrumentation of major lithography technologies for nanofabrication of devices and materials. Advanced photolithography, electron beam lithography, nanoimprint lithography x-ray lithography, ion beam lithography, soft lithography, and scanning probe lithography, basic resist and polymer science, applications in nanoelectronic and biomaterials. (3-0) Y

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

MSEN 6377 (PHYS 6377) Physics of Nanostructures: Carbon Nanotubes, Fullerenes, Quantum Wells, Dots and Wires (3 semester hours) Electronic bands in low dimensions. 0-d systems: fullerenes and quantum dots. Optical properties, superconductivity and ferromagnetism of fullerenes. 1-d systems: nano-wires and carbon nanotubes (CNTs). Energy bands of CNTs: chirality and electronic spectrum. Metallic versus semiconducting CNT: arm-chair, zigzag and chiral tubes. Electrical conductivity and superconductivity of CNTs, thermopower. Electromechanics of SWCNT: artificial muscles. Quantum wells, FETs and organic superlattices: confinement of electrons and excitons. Integer and fractional quantum Hall effect (QHE). (3-0) R

SPECIALIZED COURSE LIST

MSEN 5300 (PHYS 5376) Introduction to Materials Science and Engineering (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. (3-0) R.

MSEN 5331 (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. Prerequisite: CHEM 2325 or equivalent. (3-0) Y

MSEN 5333 (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: MSEN 5331/CHEM 5331. (3-0) R

MSEN 5341 (CHEM 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.

MSEN 5344 Thermal Analysis (3 semester hours) Differential scanning calorimetry; thermogravimetric 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 (CHEM 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

MSEN 5356 (CHEM 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. Prerequisite: CHEM 5355 or MSEN 5355 or consent of instructor. (3-0) Y

MSEN 5361 Fundamentals of Surface and Thin Film Analysis (3 semester hours) Survey of materials characterization techniques; Rutherford backscattering; secondary ion mass spectroscopy; ion channeling; scanning tunneling and transmission microscopy; x-ray photoelectron and Auger electron spectroscopy; x-ray and electron diffraction. (3-0) R

MSEN 5371 (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 5301 and 5320 or equivalent. (3-0) Y

MSEN 5375 (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

MSEN 5383 (PHYS 5383 and EEMF 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. (3-0) Y

MSEN 5410 (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

MSEN 5440 (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

MSEN 6313 (EEOP 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

MSEN 6320 (EEMF 6320) Fundamentals of Semiconductor Devices (3 semester hours) Semiconductor material properties, band structure, equilibrium carrier distributions, non-equilibrium current-transport processes, and recombination-generation processes. Prerequisite: EEMF 6319 or equivalent. (3-0) Y

MSEN 6321 (EEMF 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. Recommended co-requisite: EEMF 6320. (3-0) Y

MSEN 6322 (EEMF 6322, MECH 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

MSEN 6340 Advanced Electron Microscopy (3 semester hours) Theory and applications of scanning and transmission electron microscopy; sample preparation, ion beam and analytical techniques. (3-0) Y

MSEN 6341 Advanced Electron Microscopy Laboratory (3 semester hours) Lab support for MSEN 6340. (0-3) Y

MSEN 6358 (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. (3-0) Y

MSEN 6361 (MECH 6361) Deformation Mechanisms in Solid Materials (3 semester hours) Linear elastic fracture mechanics, elastic-plastic fracture mechanics, time dependent failure, creep and fatigue, experimental analysis of fracture, fracture and failure of metals, ceramics, polymers and composites. Failure analysis related to material, product design, manufacturing and product application. Prerequisites: MSEN 5300 or MECH 6301/MSEN 6310 or equivalent. (3-0) Y

MSEN 6362 Diffraction Science (3 semester hours) Structure of materials: crystal, amorphous, liquid crystals, Diffraction theory; scattering and diffraction experiments; x-ray topography; X-ray camera including XRD, textured structures, crystal structure analysis; disordered crystals; quasi-crystals. (3-0) S

MSEN 6371 (PHYS 6371) Advanced Solid State Physics (3 semester hours) Continuation of MSEN 5371/PHYS 5371, transport properties of semiconductors, ferroelectricity and structural phase transitions, magnetism, superconductivity, quantum devices, surfaces. Prerequisite: MSEN 5371/PHYS 5371 or equivalent. (3-0) R

MSEN 6374 (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: MSEN 5371/PHYS 5371 or equivalent. (3-0) T

MSEN 7320 (EEMF 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: EEMF 6320 and EEMF 6321. (3-0) R

MSEN 7382 Introduction to MEMS (3 semester hours) Study of fabrication techniques for micro-electro-mechanical and micro-opto-mechanical devices and systems and their applications. Techniques for both silicon, non-silicon processing and emerging new micromachining processes are studied as well as their process physics. Topics to include: bulk and surface micromachining, electroplating-based micromachining and micro devices packaging. (3-0) Y

MSEN 6V99 Special Topics in ____ (1-9 semester hours) Topics vary from semester to semester. May be repeated for credit as topics vary. ([1-9]-0) S

MSEN 7V80 Special Topics in Materials Science and Engineering (1-6 semester hours) For letter grade credit only. (May be repeated to a maximum of 9 hours.) ([1-6]-0) S

MSEN 8V40 Individual Instruction in Materials Science and Engineering (1-6 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-6]-0) R

MSEN 8V70 Research In Materials Science and Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) R

MSEN 8V98 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

MSEN 8V99 Dissertation (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

Department of Mechanical Engineering

<http://ecs.utdallas.edu/ME/>

Faculty

Professors: Andrew J. Blanchard, Cyrus D. Cantrell III, Yves .J. Chabal, Bruce E. Gnade, Matthew J. Goeckner, Louis R. Hunt (Emeritus), Moon J. Kim, Mario Rotea, Mark W. Spong, Mathukumalli Vidyasagar, Robert M. Wallace

Associate Professors: Gerald O. Burnham, Kyeongjae Cho, Jiyoung Kim, Jeong-Bong Lee

Assistant Professors: Fatemeh Hassanipour, Walter Hu

Visiting Assistant Professors: Greg Lee.

Objectives

The program leading to the M.S.M.E. degree prepares both recent baccalaureate graduates and experienced mechanical engineers for advanced micro-scale and nano-scale mechanical and thermal design and development. 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 Engineering and Computer Science Building and the new Natural Science and Engineering Research Laboratory provide extensive facilities for research on micro-scale and nano-scale systems. A Class 10000 microelectronics clean room facility, including e-beam lithography, sputter deposition, PECVD, LPCVD, etch, ash and evaporation, is available for student projects and research.

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 Mechanical Engineering

Admission Requirements

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

A student lacking undergraduate prerequisites for graduate courses in mechanical 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.M.E. program should meet the following guidelines:

- An undergraduate preparation equivalent to a baccalaureate in mechanical 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 scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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 20.

The M.S.M.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 (Microelectromechanical Systems or Mechanical Systems Engineering). Courses taken without advisor approval will not count toward the 33 semester-hour requirement. Successful completion of an approved course of studies leads to the M.S.M.E. degree.

The M.S.M.E. program has both a thesis and a non-thesis option. All part-time M.S.M.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.M.E. degree plan unless a thesis is written and successfully defended.

M.S.M.E.

One of the two concentrations listed below, subject to approval by a graduate adviser, should be used to fulfill the requirements of this program. Only grades of B or better are acceptable in the five required core courses, MECH 6305, MECH 6340, MECH 6301, MECH 6310, and MECH 6331.

Microelectromechanical Systems

This concentration emphasizes the mechanical and thermal design, fabrication and testing of micro-scale and nano-scale microelectromechanical systems.

Each student electing this concentration must take four prescribed elective courses and two free electives to make a total of 33 hours.

The prescribed elective courses for this concentration are MECH 6382, MECH 6302, MECH 6315, MECH 6320, MECH 6321, MECH 6322, MECH 6381, MECH 6385, MSEN 5300, MECH 6310, MSEN 5340, MSEN 5353, MSEN 6310, MSEN 6361, and PHYS 6377.

Mechanical Systems Engineering

This concentration is focused on the fundamental principles, design, fabrication and analysis of complex mechanical systems.

Each student electing this concentration must take four prescribed elective courses and two free electives to make a total of 33 hours.

The prescribed elective courses for this concentration are MECH 6302, MECH 6315, MECH 6320, MECH 6321, MECH 6332, MECH 6336, MECH 6381, MECH 6385, MSEN 6310, MSEN 6361, and PHYS 6377.

Mechanical Engineering Course Descriptions

MECH 6301 (MSEN 6310) Mechanical Properties of Materials (3 semester hours) Phenomenology of mechanical behavior of materials at the macroscopic level and the relationship of mechanical behavior to material structure and mechanisms of deformation and failure. Topics covered include elasticity, viscoelasticity, plasticity, creep, fracture, and fatigue. Prerequisite: MECH 3301 or MSEN 5301 or equivalent. (3-0) Y

MECH 6302 Dynamics of Complex Structures (3 semester hours) Design, development, manufacturing and analysis of large, complex mechanical systems. Prerequisite: MECH 3302 or equivalent. (3-0) Y

MECH 6305 CAD Technology (3 semester hours) Introduction to computer-aided design. Principles of geometrical modeling. Curve and surface fitting in an automated environment. CAD/CAM simulation of manufacturing. Computer-aided solid modeling. Prerequisites: MECH 3305 or equivalent. (3-0) Y

MECH 6310 Intermediate Fluid Mechanics (3 semester hours) Ideal fluid flow including potential flow theory. Computer solutions in ideal fluid flow. Viscous flow and boundary layer theory. Introduction to turbulence. Prerequisite: MECH 3310 or equivalent. (3-0) Y

MECH 6315 Advanced Fluid Mechanics (3 semester hours) A mechanically and mathematically sophisticated introduction to the fundamentals of fluid mechanics. This course is intended to provide the

beginning graduate student with a broad background in the fundamentals of fluid mechanics and an introduction to the various flow regimes. After completing this course, the student should be prepared to take subsequent courses in a broad range of engineering disciplines, such as mechanical, bioengineering, aerospace, and civil engineering. Derivation of the governing equations of motion. An introduction to viscous, inviscid, turbulent, and boundary-layer flows. Prerequisite: MECH 3310 or equivalent. (3-0) T

MECH 6320 Conductive Heat Transfer (3 semester hours) Introduction to fundamentals of conductive heat transfer with an emphasis on numerical and analytical solutions. Steady and transient one- and multi-dimensional thermal conduction. Emphasis on analytical methods, numerical techniques and approximate solutions. Prerequisite: MECH 3320 or equivalent. (3-0) T

MECH 6321 Convective Heat Transfer (3 semester hours) A rigorous and advanced development of the fundamentals of convective heat transfer and its applications. Convection (forced and free) in laminar and turbulent, internal and external flows. Analogy between momentum and heat transfer. Scaling laws and modeling. Prerequisite: MECH 3320 or equivalent. (3-0) T

MECH 6322 (EEMF 6322, MSEN 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

MECH 6331 Systems and Control Theory (3 semester hours) Systems and control theory: state space, convolution integrals, transfer functions, stability, controllability, observability, and feedback. Prerequisites: ENGR 2300 and MECH 4310 or equivalents. (3-0) Y

MECH 6332 (EEGR 6332) Advanced Control (3 semester hours) Modern control techniques in state space and frequency domain: optimal control, robust control, and stability. Prerequisite: MECH/EESC 6331. (3-0) R

MECH 6336 (EEGR 6336) Nonlinear Control Systems (3 semester hours) Differential geometric tools, feedback linearization, input-output linearization, output injection, output tracking, stability. Prerequisite: MECH/EE 6331. (3-0) R

MECH 6340 Intermediate Mechanical Vibrations (3 semester hours) Fundamental phenomena of multi-degree discrete and continuous systems. Matrix methods of solution of discrete systems. Determination of natural frequencies and mode shapes of discrete and continuous systems. Passive methods of vibration control. Applications of finite element methods to analysis of mechanical vibrations. Prerequisite: MECH 3302. (3-0) Y

MECH 6361 Deformation Mechanisms in Solid Materials (3 semester hours) Linear elastic fracture mechanics, elastic-plastic fracture mechanics, time dependent failure, creep and fatigue, experimental analysis of fracture, fracture and failure of metals, ceramics, polymers and composites. Failure analysis related to material, product design, manufacturing and product application. Prerequisite: MSEN 5300 or MECH 6301/MSEN 6310 or equivalent. (3-0) Y

MECH 6381 (EEGR 6381) Numerical Methods In Engineering (3 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: ENGR 2300 and ENGR 3300 or equivalents, and knowledge of a scientific programming language. (3-0) T

MECH 6382 (EEMF 6382) 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

MECH 6385 Computational Modeling of Mechanical Systems (3 semester hours) Modeling of mechanisms, thermal systems and fluid flow using the finite-element method. Prerequisite: MECH 6381 or equivalent. (3-0) T

MECH 6V98 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

MECH 7V80 Special Topics In Mechanical Engineering (1-6 semester hours) (May be repeated to a

maximum of 9 hours.) For letter grade credit only. ([1-6]-0) S
MECH 8V70 Research In Mechanical Engineering (3-9 semester hours) (May be repeated for credit.)
For pass/fail credit only. ([3-9]-0) R

Department of Bioengineering

<http://ecs.utdallas.edu/BME/>

Faculty

Professors: John H. L. Hansen, Philipos Loizou, Raimund Ober, Mathukumalli Vidyasagar, Li Zhang

Associate Professors: Dinesh Bhatia, Jinming Gao

Assistant Professors: Leonidas Bleris, Walter Hu, Hyun-Joo Nam

Objectives

The objective of the Ph.D. Program in Biomedical Engineering is to train exceptional persons to become leaders in the field through high quality original research work, supplemented as appropriate by a broad range of interdisciplinary courses. The new generation of biomedical engineers will address fundamental scientific questions, provide answers to critical problems and develop novel applications with commercial potential. The opportunities for interdisciplinary research and course work in several branches of engineering coupled with the life sciences will allow the graduates of this program to tackle complex life sciences-related problems in novel ways and to create solutions for the future.

The objective of the MS degree program in Biomedical Engineering is to produce BME graduates who will be capable of undertaking challenging BME-related projects. The primary educational objective of the M.S. program is to expose students to the latest developments in biomedicine and to provide them with the appropriate tools to understand and contribute further to these developments. The M.S. degree program will provide the necessary education and immediately applicable skills that will enable both recent baccalaureate graduates and experienced biomedical engineers to develop new life science related technologies and applications.

Facilities

The Engineering and Computer Science Building and the new Natural Science and Engineering Research Laboratory provide extensive wet lab, fabrication, instrumentation, and high performance computing facilities to foster biomedical engineering and nano-technology research. A Class 10000 microelectronics clean room facility, including e-beam lithography, sputter deposition, PECVD, LPCVD, etch, ash and evaporation, is available for student projects and research. In addition to the facilities on campus, students in this program will also have an opportunity to work closely with researchers in the UT Southwestern Medical School.

Master of Science in Biomedical Engineering

Admission Requirements

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

A student lacking undergraduate prerequisites for graduate courses in biomedical engineering must complete these prerequisites or receive approval from the graduate adviser and the course instructor.

An entrance examination may be required. Specific admission requirements follow.

The student entering the M.S.B.M.E. program should meet the following guidelines:

- An undergraduate preparation equivalent to a baccalaureate in a field of engineering or the sciences.
- A grade point average in upper-division quantitative course work of 3.0 or better on a 4-point scale, and
- GRE scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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.

Degree Requirements

The University's general degree requirements are discussed on page 20.

The M.S.B.M.E. requires the completion of a minimum of 33 semester hours.

All students must have an academic advisor and an approved degree plan.

For the M.S.B.M.E program, all students must pass the following courses with a grade of B- or better:

- BMEN 6376 Lecture Course in Biomedical Engineering Applications
- BMEN 6373 Anatomy and Human Physiology for Engineers
- BMEN 6374 Genes, Proteins and Cell Biology for Engineers

The M.S.B.M.E. program has both a thesis and a non-thesis option. All part-time M.S.B.M.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. Research and thesis hours cannot be counted in a M.S.B.M.E. degree plan unless a thesis is written and successfully defended.

Students must achieve an overall GPA of 3.0 or better, a GPA of 3.0 or better in their core MSBME classes, and a grade of B- or better in all their core MSBME classes in order to satisfy their degree requirements.

All full-time, supported students are required to participate in the thesis option.

Doctor of Philosophy in Biomedical Engineering

Admission Requirements

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

The Ph.D. in Biomedical 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 Biomedical 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 Biomedical Engineering:

- A master's degree in engineering or one of the sciences 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 scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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 biomedical 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 20.

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 75 semester credit hours beyond the baccalaureate degree. These credits must include at least 18 semester hours of graduate level courses beyond the baccalaureate level in the major concentration. All PhD students must demonstrate competence in the Master's level core courses in their research area. All students must have an academic advisor and an approved plan of study.

Also required are:

- A research oriented oral qualifying examination (QE) demonstrating competence in the Ph.D. candidate's research area. A student must make an oral presentation based on a review of 2 to 4 papers followed by a question-answer session. A student entering the Ph.D. program with a M.S.B.M.E. must pass this exam within 3 long semesters, and a student entering without an M.S.B.M.E. must pass this exam within 4 long semesters. A student has at most two attempts at this qualifying exam. The exam will be given during 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 Ph.D. candidate'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.

Biomedical Engineering Course Descriptions

BMEN 6373 (EEBM 6373) Anatomy and Human Physiology for Engineers (3 semester hours) This course provides an introduction to anatomy and human physiology for engineers and other non-life-scientists. Topics include nervous system, muscle and cardiac function, digestive system, and immune system. (3-0) Y

BMEN 6374 (EEBM 6374) Genes, Proteins and Cell Biology for Engineers (3 semester hours) This course provides an introduction to principles of modern molecular and cellular biology for engineers and other non-life-scientists. Topics include genes, protein structure and function, organization of cells and cellular trafficking. (3-0) Y

BMEN 6375 Techniques in Cell and Molecular Biology (3 semester hours) Introduction to various cell and molecular laboratory techniques including DNA recombinant technology, protein biochemistry, structural biology, and molecular biology. Intended for engineers and other non-life-scientists.

Prerequisite: BMEN 6374 or instructor permission. (3-0) Y

BMEN 6376 (EEBM 6376) Lecture Course in Biomedical Applications of Electrical Engineering (3 semester hours) This course provides an introduction to different areas of biomedical engineering. A special emphasis will be placed on research topics that are actively pursued at UTD. (3-0) Y

BMEN 6377 Introduction to Protein Engineering (3 semester hours) Development of proteins with practical utility will be discussed using examples and case studies taken from the current literature.

Prerequisites: BMEN 6374 or by instructor permission. (3-0) Y

BMEN 6380 Introduction to Cellular Microscopy (3 semester hours) Image formation, diffraction, labeling techniques, fluorescence and image processing techniques will be introduced. (3-0) Y

BMEN 6381 Advanced Concepts in Microscopy (3 semester hours) Continuation of BMEN 6380, with emphasis on advanced approaches such as vectorial diffraction, stochastic aspects of image formation and analysis. Prerequisites: BMEN 6380 or by instructor permission. (3-0) Y

BMEN 6382 Systems Biology (3 semester hours) An interdisciplinary approach to biology. It explores experimental, theoretical, and computational approaches from mathematics, physics, and engineering for the understanding and analysis of biological problems. Prerequisites: BMEN 6374 or instructor permission. (3-0) Y

BMEN 6383 Biological Networks (3 semester hours) This course will examine the fundamental principles and associated structure of a range of biological networks at the molecular, cellular, and population levels. Prerequisites: BMEN 6374 or instructor permission. (3-0) Y

BMEN 6384 Stochastic Methods in Biomedical Engineering (3 semester hours) This course will examine stochastic approaches to several problems in genomics and proteomics, such as sequence similarity detection, gene and protein classification, and structure prediction. Techniques such as Markov and hidden Markov models will be introduced in the course and applied to these problems. (3-0) Y

BMEN 6V70 Research In Biomedical Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) R

BMEN 6V71 Seminars In Biomedical Engineering (1-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-9]-0) R

BMEN 6V87 Special Topics in Biomedical Engineering (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

BMEN 6V40 Individual Instruction in Biomedical Engineering (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) R

BMEN 6V98 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

BMEN 7V87 Special Topics in Biomedical Engineering (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

BMEN 7V88 Seminars In Biomedical Engineering (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) R

BMEN 8V40 Individual Instruction in Biomedical Engineering (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) R

BMEN 8V70 Research In Biomedical Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) R

BMEN 8V99 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0)
S

Graduate Program in Computer Engineering

<http://www.ce.utdallas.edu>

Faculty

Professors: Poras T. Balsara, Farokh B. Bastani, Cyrus D. Cantrell III, Dingzhu Du, Andrea Fumagalli, Gopal Gupta, Kamran Kiasaleh, William J. Pervin, Lakshman Tamil, Carl Sechen, Hsing-Mean (Edwin) Sha, Kang Zhang, Si-Qing Zheng, Dian Zhou

Research Professor: Vojin Oklobdzija

Associate Professors: Dinesh K. Bhatia, Jorge A. Cobb, Ovidiu Daescu, Galigekere R. Dattatreya, Neeraj Mittal, Mehrdad Nourani, Ivor P. Page, Issa Panahi, Balakrishnan Prabhakaran, Ravi Prakash, S. Venkatesan, Yuke Wang, Weili Wu

Assistant Professors: Roozbeh Jafari

Senior Lecturer: Nathan Dodge

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 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 scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are advisable based on our experience with student success in the program.

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 20.

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

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

Students must achieve an overall GPA of 3.0 or higher, a GPA of 3.0 or higher in their core MSCE classes, and a grade of B- or higher in all their core MSCE classes in order to satisfy their degree requirements.

Doctor of Philosophy in Computer Engineering

Objectives

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 13.

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. Consideration will be given to highly qualified students wishing to pursue the doctorate without satisfying all of the requirements for a master's degree.
- GPA in graduate level course work of 3.5 or higher on a 4-point scale.
- GRE scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are advisable based on our experience with student success in the program.

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.

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 20.

The program will require a minimum of 75 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. The core requirements for the Ph.D. degree in Computer Engineering are the same as the ones for the M.S. in Computer Engineering. All PhD students must demonstrate competence in the Master's level core courses in their research area. 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. All students must have an academic advisor and an approved plan of study.

Also required are:

- A research oriented oral qualifying examination (QE) demonstrating competence in the Ph.D. candidate's research area. A student must make an oral presentation based on a review of 2 to 4 papers followed by a question-answer session. Admission to Ph.D. candidacy is based on two criteria: Graded performance in the QE and GPA in graduate level organized courses. A student entering the Ph.D. program must pass the QE within five long semesters from the date of admission into the Ph.D. program. A student has at most two attempts at this qualifying exam. The exam will be given during 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 Ph.D. candidate'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.

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.

Computer Engineering Course Descriptions

Computer Science Courses

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) R

CE 5325 (EEDG 5325) Hardware Modeling Using HDL (3 semester hours) This course introduces students to hardware description language (HDL) 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 HDL that may be used for synthesis of custom logic. HDL 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) R

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 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

Computer Engineering Courses

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 (EEDG 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 (EEDG 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 and background in VHDL/Verilog. (2-3) Y

CE 6303 (EEDG 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, such as PLA's, memory circuits, datapath, etc. Prerequisites: EE 3320 or equivalent and background in VHDL/Verilog. (3-0) Y

CE 6304 (EEDG 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 (EEDG 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 (EEDG 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 (EEDG 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: EEDG 6301, ENGR 3341 or equivalent. (3-0) R

CE 6308 (CS 6396, EEDG 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. 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 5343 (3-0) R

CE 6325 (EECT 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,. Use of CAD tools to design, layout, check, extract and simulate a small project. Prerequisite: EE 3320 and ENGR 3301 or equivalent. (3-0) Y

CE 6345 (EEDG 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. Prerequisite: EE 3350 or

equivalent. (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, 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

CE 6367 (CS 6367, SE 6367) Software Testing and Verification (3 semester hours) Fundamental concepts of software testing. Functional testing. GUI based testing tools. Control flow based test adequacy criteria. Data flow based test adequacy criteria. White box based testing tools. Mutation testing and testing tools. Relationship between test adequacy criteria. Finite state machine based testing. Static and dynamic program slicing for testing and debugging. Software reliability. Formal verification of program correctness. Prerequisites: CE/CS/SE 5354 or consent of instructor. (3-0) Y

CE 6370 (EEDG 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) R

CE 6375 (EEDG 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, and design rule checking (DRC). Introduction to CAD algorithms for RTL and behavior level synthesis, module generators, and silicon compilation. Prerequisite: CS 5343; Co-requisite: EECT 6325. (3-0) Y

CE 6378 (CS 6378, TE 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 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: CS 6378 or CS 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 5343. (3-0) Y

CE 6398 (CS 6398/EEDG 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 (EEDG 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: EEDG 6304, CS 5348, ENGR 3341 and knowledge of C/C++. (3-0) R

CE 7325 (EECT 7325) Advanced VLSI Design (3 semester hours) Advanced topics in VLSI design covering topics beyond the first course (EECT 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: EECT 6325 or equivalent. (3-0) R

CE 7328 (EEDG 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: EECT 6325 and knowledge of programming in C. (3-0) T

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 (1-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-9]-0) S

Doctor of Philosophy in Geospatial Information Sciences

<http://www.gis.utdallas.edu>

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), Denis J. Dean (Economic, Political and Policy Sciences), Daniel Griffith (Economic, Political and Policy Sciences), Paul Jargowsky (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), Fang Qiu (Economic, Political and Policy Sciences), Michael Tiefelsdorf (Economic, Political and Policy Sciences)

Assistant Professors: Yongwan Chun (Economic, Political and Policy Sciences), Karen Hayslett-McCall (Economic, Political and Policy Sciences), Weili Wu (Computer Science)

Clinical Assistant Professors: Stuart Murchison (Economic, Political and Policy Science)

Powerful technologies have emerged in recent years to collect, store, manage, analyze, and communicate 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 remote sensing, are used in many ways, including the production of digital maps in vehicles, the management and maintenance of city infrastructure, agriculture and forestry, the policing of communities, and the conduct of modern warfare. The PhD in Geospatial Information Sciences aims 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 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 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). These students may choose to pursue research projects that advance existing geospatial information sciences practices within that application area. Alternatively, students may opt to pursue research that expands the technological or theoretical base of all the geospatial information sciences.

Mission and Objectives

The mission of the Doctor of Philosophy in Geographic Information Sciences program is to cultivate innovative researchers capable of advancing the frontiers of knowledge in the geospatial information sciences through improved theories, new technologies, innovative methodologies, sophisticated quantitative analyses, and integrative applications. UT Dallas Doctoral graduates will find employment in research departments of public and private organizations and in major academic institutions. Specifically, program graduates will:

- demonstrate their knowledge of the fundamental theories and concepts underlying the geospatial sciences.
- master the advanced methodologies and/or quantitative analyses used in at least one of three geospatial specialization areas: [a] computing and information management, spatial analysis and modeling, or [c] remote sensing and satellite technologies.
- produce innovative research that advances theory or methodology in the geospatial sciences.
- participate at academic conferences, publish in peer-reviewed journals and find employment in research departments of public and private organizations and in major academic institutions.

Facilities

Students have access to state-of-the-art GIS computing facilities housed in the School of Economic, Political and Policy Sciences and at 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 computer workstation is available for every student. All major industry-standard GIS and remote sensing software is available. The University is 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. An analytical writing score of at least 4.5 in the GRE is considered 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 6317 *Computer Programming for GIS*, CS 6301 and CS 6311 *Computer Science I & II*, , MIS 6322 *Developing Business Applications with Visual Basic*, MIS 6323 *Object Oriented Systems*, or their equivalents, and (iii) at least one course in inferential statistics through to regression analysis equivalent to GISC 6301 *Geospatial Data Analysis Fundamentals*, EPPS 7313 *Descriptive and Inferential Statistics*, or GEOS 6313 *Data Analysis for Geoscientists*. Graduate courses taken at UT Dallas to meet these prerequisites may be counted as electives toward the 75 credit hours required of

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.

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. Students generally will not have a faculty advisor when they first enter the Ph.D. program, but every student is required to select (with consent of the potential advisor) an advisor from the advising faculty before they complete 20 credits after admission.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 75 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)

Students must earn a minimum grade point average (GPA) of 3.0 across the following five courses:

- GISC 6381 GIS Fundamentals
- GISC 6382 Applied GIS
- GISC 6384 Spatial Analysis and Modeling
- GISC 6385 GIS Theories, Models and Issues
- GISC 7310 Regression Analysis with Spatial Applications

Geospatial Specialization Area

Students must select from one of the following, with a minimum of 15 SCH. Courses selected must include at least three at successively advanced levels.

I. Geospatial Computing and Information Management

- CS 6359 Object Oriented Analysis and Design
- CS 6360 Database Design
- CS 6364 Artificial Intelligence
- CS 6366 Computer Graphics
- CS 6375 Neural Nets and Machine Learning
- CS 6378 Advanced Operating Systems
- CS 6V80 Spatial Data Management
- CS 6381 Combinatorics and Graph Algorithms
- CS 6384 Computer Vision
- GISC 6317 Computer Programming for GIS
- GISC 6388 GIS Application Software Development

GISC 7363 Internet Mapping and Information Management
*MISC 6326 Database Management Systems

II. Spatial Analysis and Modeling

CS 6312 Data Structures
*ECON 6309 Econometrics I
*ECON 6310 Econometrics II
*ECON 6314 Structural Equation and Multilevel (Hierarchical) Modeling
*ECON 6315 (POEC 7370) Time Series Econometrics
*ECON 6316 Spatial Econometrics
EPPS 7364 Demographic Analysis and Modeling
EPPS 7368 Spatial Epidemiology
*GEOS 6313 Data Analysis for Geoscientists
*GISC 6311 (ECON 6311) Statistics for Economists
GISC 7360 GIS Pattern Analysis
GISC 7361 Spatial Statistics
*EPPS 7313 Descriptive and Inferential Statistics
*EPPS 7316 Advanced Regression Analysis

III. Remote Sensing and Satellite Technologies

GEOS 7322 GPS Surveying Techniques
GEOS 7324 3-D GIS Data Capture and Ground Lidar
GISC 6325 (GEOS 6325) Introduction to Remote Sensing
GISC 7366 (GEOS 7366)/ Applied Remote Sensing
GISC/7365 (GEOS 7365) Remote Sensing Digital Image Processing
GISC 7367 (GEOS 7327) Remote Sensing Workshop
EE 6360 Digital Signal Processing
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.

* may not be used in conjunction with certain other courses. Consult GIS Doctoral Program Director

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 UT Dallas 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 (Variable SCHs)

All students must complete the following two classes as part of the research and dissertation requirement

GISC 7387 GIS Research Design
GISC 7389 GIS PhD Research Project Qualifier

In addition, students must complete sufficient additional research and dissertation credit hour to bring the total number of SCHs they have earned within the UTDallas doctoral program (or transferred into the UTDallas doctoral program) to 75, the minimum required to earn a doctoral degree. Additional research and dissertation SCHs above and beyond those required to reach the 75 credit hour minimum may be required at the discretion of the student's Ph.D. advisor. Additional research and dissertation SCHs can be earned through any of the following classes:

GEOS 8V29 Research in GIS
GISC 6387 GIS Workshop
GISC 6389 GIS Masters Project
GISC 7367/GEOS 7327 Remote Sensing Workshop
GISC 8V29 Research in GIS
*EPPS 6310 & 6342 Research Design I & II
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 their advisor or the GIS Doctoral Program Director.

Exams and Qualifiers

- **Ph.D. Research Project Qualifying Class**

Doctoral students must complete **GISC 7389** *Geospatial Information Sciences PhD Research Project Qualifier* according to uniform guidelines established by the GIS program.

- **Qualifying Examination and Defense of Proposal**

After meeting the Research Project Qualifier, doctoral students 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.

- **Grade Point Qualifier**

Doctoral students must have GPAs 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.

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 6301 Geospatial Data Analysis Fundamentals (3 semester hours) Focuses on data handling techniques and applying basic statistical methodology to spatial research questions. Concepts of statistical data analysis including descriptive statistics, exploratory methods, sampling theory, statistical inference and correlation analysis are reviewed from a Geo-Information Sciences perspective. Regression analysis and basic methods of spatial pattern analysis are introduced. A prior course in statistics (such as SOCS 3405) is strongly recommended. (3-0) Y

GISC 6317 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) Y

GISC 6311 (ECON 6311) Statistics for Geospatial Science (3 semester hours) Introduces calculus-based statistical analysis and probability theory, providing background for econometric and spatial modeling of simple stochastic processes. Covers standard probability distributions including Bernoulli, binomial, negative binomial, hypergeometric, Poisson, normal, gamma, beta, t and F distributions; estimation and hypothesis testing; introductory asymptomatic theory, including the Law(s) of Large Numbers and the Central Limit Theorem; real-world applications of probability theory, as time permits. (3-0) Y

GISC 6325 (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) Y

GISC 6326 Geovisualization (3 semester hours) Examines the theoretical concepts and practical applications of cartographic and geographic visualization. Topics covered in lectures include concepts for geographic data representation, symbolization and map design, and methods for geographic visualization and display. 3D visualization, cartographic animation, and web based mapping may also be included. Lab sessions explore the implementation of cartographic and geographic visualization with industry standard GIS software. Prerequisite: GISC 6381 or equivalent knowledge. (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. (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 6380 Spatial Concepts and Organization (3 semester hours) Examines the recurring patterns of physical and human objects on the Earth's surface, the flows of circulations among them, and the spatial concepts and theories which have been advanced to help understand and explain these spatial arrangements. Provides a fundamental understanding of spatial processes, concepts, and theories. (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 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 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 GIS Theories, Models and Issues (3 semester hours) Provides an understanding of the underlying theories, mathematical and geometric tools, and their computational implementations that establish GIS capabilities to handle and analyze geo-referenced information. Associated issues (such as uncertainty, spatial analysis and spatial data management) highlighted. Prerequisite: GISC 6381 and 6382, or equivalent with instructor's permission. (3-0) Y

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 Software 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 6317, 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 7310 Regression Analysis with Spatial Applications (3 semester hours) The specification, interpretation and properties of the multiple linear regression model including spatial and aspatial regression diagnostics are examined. Extensions to the logistic and Poisson regression models and spatial heterogeneity are provided. A review of the key concepts of matrix algebra and simulation techniques is given. Practical data analysis for large datasets is exercised by coupling statistical software with GIS environments. Prerequisite: GISC 6301 or GISC/ECON 6311 or equivalent. (3-0) Y

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: GISC 6381 or GISC 6311 and GISC 6301 or equivalent. (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: GISC 7310 or EPPS 7316 or equivalent; GISC 7360 recommended. (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 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: EPPS 7313. (3-0) R

GISC 7365 (GEOS 5326) 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. (3-0) Y

GISC 7366 (GEOS 5329) 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, land 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. Prerequisite: GISC 6325/GEOS 5325 (3-0) Y

GISC 7367 (GEOS 7327) 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/GEOS 5326. (3-0) Y

GISC 7387 GI Sciences Research Design (3 semester hours) Examines issues relative to the conduct of effective and valid research in geospatial information sciences and related fields.(3-0) Y

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 immediately 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) Y

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 6V98 Master's Thesis (3-9 semester hours) Provides faculty supervision of a student's master's thesis research. Prerequisite: Consent of GIS Program Head and instructor. (May be repeated for credit.) ([3-9]-0) S

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

GISC 8V99 Dissertation (1-9 semester hours) Provides faculty supervision of a student's dissertation research. Prerequisite: Consent of instructor. (May be repeated for credit.)([1-9]-0) S

Graduate Program in Telecommunications Engineering

<http://www.te.utdallas.edu/>

Faculty

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Objectives

The Graduate Program in Telecommunications Engineering provides intensive preparation for professional practice in the design, programming, theory, and applications of telecommunications networks. It is designed to serve the needs of engineers who wish to continue their education. The Telecommunications Engineering Program offers courses of study leading to the M. S. and a Ph.D. degree in Telecommunications Engineering. Education and training is provided to both academically oriented students and students with professional goals in industrial or governmental occupations requiring advanced knowledge of telecommunications and related technology. A comprehensive program of evening courses is also offered, which enables part-time students to earn the M.S. and Ph.D. degree or to select individual courses of interest. Courses and research are both offered in a variety of sub fields of telecommunications engineering, including, fault-tolerant networks, digital communications, modulation and coding, electromagnetic-wave propagation, fiber and integrated optics, lasers, wireless communications, mobile computing, wireless multimedia, DWDM networks, QoS assurance protocols, network design and optimization, telecommunications software, performance of systems, ad-hoc and PCS wireless networks, network security and high speed transmission protocols.

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 Buildings provide extensive facilities for research in telecommunications, microelectronics, and computer science. The TARGET Laboratory has state-of-the-art telecommunications equipment, which includes a number of transport nodes, data packet routers, voice over IP gears, and a cluster of Linux workstations for protocols development and testing. The Wireless Information Systems (WISLAB) and Antenna Measurement Laboratories at UT Dallas have a wealth of experimental equipment with a unique reconfigurable multiple antenna testbed. Having this testbed allows wireless researchers to integrate and to demonstrate radio functions (i.e. WiFi and WiMAX) in geographically different regions under different frequency usage characteristics. With the aid of the Antenna Measurement Lab located in the Waterview Science and Technology Center (WSTC), the researchers can design, build, and test many type of antennas. 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 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 Photonic Technology and Engineering Center (PhoTEC) has produced more than thirty Ph.D. graduates. The PhoTEC faculty carry out research in enabling technologies for microelectronics and telecommunications.

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.

In addition to the aforementioned facilities, 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 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. Research in characterization and fabrication of nanoscale materials and devices is performed in the Nanoelectronics Laboratory.

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 scores of 500, 700 and 4 for the verbal, quantitative and analytical writing components, respectively, are 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 20.

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 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 6310 Optical Communication Systems
EE 6316 Fields and Waves
EE 6340 Introduction to Telecommunications Networks
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 sections, 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 20.

The Ph.D. requires a minimum of 75 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 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 6310 Optical Communication Systems
EE 6316 Fields and Waves
EE 6340 Introduction to Telecommunications Networks
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 members, with 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 Telecommunications Engineering graduate program are:

- Core and wireless networks
- Communications and signal processing
- Network design and protocols
- Embedded and reconfigurable systems
- Optical and photonic devices, materials and systems
- Fault-tolerant data networks

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 transmission 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 other strong programs, including computer science, electrical engineering, computer 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 4301 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 6343 Detection and Estimation Theory (3 semester hours) Parameter estimation. Least-square, mean-square, and minimum-variance estimators. Maximum A Posterior (MAP) and Maximum-Likelihood (ML) estimators. Bayes estimation. Cramer-Rao lower bound. BLUE estimator and Wiener filtering. Prerequisite: EE 6349. (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 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 Amplifier Design (3 semester hours) Design of high-frequency active circuits. Review of transmission line theory. RF and microwave matching circuits using discrete and guided wave structures. Detailed study of S-parameters. Design of narrow band, broadband and low noise amplifiers. Detailed study of noise figure, noise parameters and stability of RF and microwave circuits using S-parameters. 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 speech 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. 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 and Wave Propagation (3 semester hours) Operating principles for microwave antennas used in modern wireless communications and radar systems. Prerequisite: EE 6316 or equivalent. (3-0) T

EE 6395 Radiofrequency and Microwave Systems Engineering (3 semester hours) Review of RF and microwave systems, such as cellular, point-to-point radio, satellite, RFID and RADAR. Topics include: system architectures, noise & distortion, antennas & propagation, transmission lines & network analysis, active & passive components, modulation techniques and specification flowdown. Prerequisite: EE 4368 or equivalent. (2-1) R

EE 7340 Optical Network Architectures and Protocols (3 semester hours) Introduction to optical networks. The ITU Optical Layer. First-generation optical networks. Standards, e.g. SONET/SDH, FDDI. Second-generation optical networks. Broadcast and select networks. The lightpath concept. Wavelength routing networks. Virtual topology design. Photonic packet switching. Advanced solutions and testbeds. Prerequisite: EE 6340 (3-0) 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 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 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 6394 Digital Telephony (3 semester hours) Introduction and overview emphasizing the advantages of digital voice networks. Voice digitization. Digital transmission, multiplexing, and switching.

Rearrangeable switching networks. Digital modulation for radio systems. Network operation issues: synchronization, control; integration of voice and data, packet switching and traffic analysis. (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) R

TE 6378 (CE 6378 and 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

TE 6385 (CS 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

TE 7V81 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) R

TE 8V40 Individual Instruction in Telecommunications Engineering (1-6 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-6]-0) Y

TE 8V70 Research In Telecommunications Engineering (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) Y

TE 8V98 Thesis (3-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([3-9]-0) S

TE 8V99 Dissertation (1-9 semester hours) (May be repeated for credit.) For pass/fail credit only. ([1-9]-0) S

Combination of Engineering and Management Graduate Degrees

<http://www.utdallas.edu/dept/ee>

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. The degree requirements are discussed [here](#). For this program of studies, the School of Management will accept a competitive GRE performance in lieu of the GMAT.

Degree Requirements

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 44hours 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, 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.

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, 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.

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 2.502.

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. (1-0) 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.(1-0) Y

SCHOOL OF INTERDISCIPLINARY 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 initial teaching 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 program of study. Tel: (972) 883-2730.

DEGREES OFFERED

Master of Arts in Interdisciplinary Studies

Graduate Program in Interdisciplinary Studies

<http://www.utdallas.edu/dept/gs/>

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, Tonja Wissinger

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 20.

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, 5307, or 5330). 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 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 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 forms 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 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 5320 Special Topics in Interdisciplinary Studies (3 semester hours) Topics will vary each semester. May be repeated for credit. (3-0) S

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 Interdisciplinary 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

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 must meet the 24 semester hour requirement in the appropriate teaching field. A certification plan will be developed based on an evaluation of the student's transcript. 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 – <http://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 Interdisciplinary 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 Interdisciplinary Studies.

Course Descriptions

ED 5318 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. Student will also enroll in ED 5319 the second semester of

the Internship. Prerequisite: Admission to internship program and passing scores on both state required TExES examinations. (3-0) Y

ED 5319 Supervised Teaching Internship II (3 semester hours) The second semester of supervised teaching internship. Prerequisite: successful completion of ED 5318 (3-0) Y

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 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 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 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

SCHOOL OF MANAGEMENT

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 for medical doctors. In 2007, the program was split into two parts and renamed the Master of Science in Healthcare Management Executive Track in 2007 (for medical doctors) and the Master of Science in Healthcare Management Professional Track for all other healthcare professionals.

To help bridge the gap between business and information technology, the School established the Master of Science in Information Technology and Management in 2003. In Fall, 2008, the school added two new masters degree programs, the M.S. in Finance and the M.S. in Supply Chain Management. The last program to be added was the M.S. in Innovation and Entrepreneurship, which opened in Spring of 2010.

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 35 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 world-class research enhancing cutting-edge 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 Innovation and Entrepreneurship (M.S.)
Master of Science in Management and Administrative Sciences (M.S.)
Master of Science in Healthcare Management - Executive Track (M.S.)
Master of Science in Healthcare Management - Professional Track (M.S.)
Master of Science in Finance (M.S.)
Master of Science in Supply Chain Management (M.S.)

Doctor of Philosophy in International Management Studies (Ph.D.)
Doctor of Philosophy in Management Science (Ph.D.)

Project Management (Certificate)
Organizational Behavior and Coaching (Certificate)
Supply Chain Management (Certificate)
Sourcing (Certificate)
Product Lifecycle Management (Certificate)
Lean 6 Sigma (Certificate)
Business Intelligence and Data Mining (Certificate)
Healthcare Management (Certificate)

Graduate Programs in Management

<http://som.utdallas.edu/>

Faculty

Professors: Ashiq Ali, Alain Bensoussan, Ramaswamy Chandrasekaran, William Cready, Rachel Croson, Milind Dawande, Theodore Day, Gregory Dess, Adolf J.H. Enthoven, David L. Ford, Jr., Varghese S. Jacob, Constantine Konstans, Stan Liebowitz, Sumit Majumdar, David Mauer, Vijay Mookerjee, B.P.S. Murthi, Shun Chen Niu, Mike Peng, Hasan Pirkul, Suresh Radhakrishnan, Srinivasan Raghunathan, Ram C. Rao, Brian Ratchford, Michael Rebello, Sumit Sarkar, Suresh P. Sethi, Chelliah Sriskandarajah, Kathryn Stecke, John Wiorkowski, Harold Zhang

Associate Professors: Mark Anderson, Indranil Bardhan, Norris Bruce, Metin Cakanyildirim, J. Richard Harrison, Ernan Haruvy, Ganesh Janakiraman, Surya Janakiraman, Robert Kieschnick, Nanda Kumar, Seung-Hyun Lee, Zhiang (John) Lin, Livia Markoczy, Stan Markov, Syam Menon, Ramachandran Natarajan, Ozalp Ozer, Ashutosh Prasad, Orlando Richard, Young Ryu, Jane Salk, David Springate, Eric Tseng, Yexiao Xu, Eric Zheng.

Assistant Professors: Jayatirtha Asundi, Nina Baranchuk, Octavian Carare, Huseyin Cavusoglu, Zhonglan Dai, Kutsal Dogan, Rebecca Files, Xianjun Geng, Umit Gurun, Todd Kravet, Xu Li, Elisabeth Ngah-Kiing Lim, Xiaohui Liu, Volkan Muslu, Valery Polkovnichenko, Roberto Ragozzino, Gonca Soysal, Andrei Strijnev, Upender Subramanian, Mark Vargus, Minhua Wan, Yu Wang, Kelsey Wei, Yuanping Ying, Wei Yue, Alejandro Zentner, Jun Zhang, Qin Zhang, Feng Zhao, Yibin Zhou.

Senior Lecturers: Joachim Adler, Art Agulnek, Shawn Alborz, Frank Anderson, John Barden, George Barnes, Abhijit Biswas, Ron Blair, Daniel Bochsler, Tiffany Bortz, LeeAnn Butler, Mary Chaffin, Mary Beth Goodrich, Maria Hassenhuttl, Jonathon Hochberg, Jennifer Johnson, Marilyn Kaplan, Jackie Kimsey, Chris Linsteadt, Diane S. McNulty, Radha Mookerjee, Madison Pedigo, Joseph Picken, Nataliya Polkovnichenko, Matt Polze, Carolyn Reichert, Robert Robb, Tracey Rockett, Mark Salamasick, Phil Sanchez, Michael Savoie, Avanti Sethi, Jeanne Sluder, Charles Solcher, Lou Thompson, Mark Thouin, Amy Troutman, John Watson, Habte Woldu, Laurie Ziegler

Clinical Faculty: David Cordell, Tefvik Dalgic, Forney Fleming, Charlie Hazzard, Rob Hicks, Peter Lewin, Holly Lutze, John McCracken, Kumar Nair, Divakar Rajamani, Rajiv Shah, Fang Wu

Visiting Faculty: Usman Ghani, Francisco Szekely

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 result 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 analysis, audit and professional services, taxation services, information management services, international services, management consulting, and internal audit. 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.

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 degree requires a minimum of 36 credit hours, consisting of basic business courses, IT foundation courses, IT elective courses, and free 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. The IT elective courses provide in-depth knowledge of the technology and technology management issues. In addition, students may choose approved electives that maximize their individual educational and professional goals. The program also offers opportunities for students to concentrate in specific tracks such as '*Enterprise Systems*', '*Business Intelligence*', '*Healthcare Systems*', and '*Information Security*' depending on their interests and goals.

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, and the remaining hours as elective courses. Potential concentration areas for students include: accounting, enterprise systems, internal audit, corporate finance, investments, marketing, e-commerce, information systems, operations and supply chain, organizations, strategy and international topics. The classes for this degree are largely offered in the evenings.

The **M.S. in Healthcare Management** prepares students for roles in the leadership and management of the US healthcare industry. The 36 credit hour program integrates a thorough grounding in advanced business management theory and practice with an understanding of the structure, operation and financing of the US healthcare system. The curriculum is customized to accommodate the needs of two different audiences: the Professional Track for healthcare administrators and those desiring a management career in healthcare; and the Executive Track, for physicians and senior level healthcare executives.

The Professional Track classes are offered on a semester-long basis in the evenings, with core business classes also offered online. Admission may be in Fall, Spring, or Summer semesters. The Executive Track is delivered in a different format, consisting of nine 4-day residential classes. A different class is offered every two months and classes may be started at any time and taken in any order. The Executive curriculum is jointly taught by faculty from the University of Texas at Dallas School of Management and the University of Texas Southwestern Medical Center. The Executive program is entirely supported by participant fees and special admission requirements apply. For information, contact the program office at (972) 883-6252.

The **M.S. in Finance** is designed for students with or without previous educational background in finance. Candidates in the M.S. in Finance choose one of four concentrations: Financial Analysis, Financial Management, Financial Risk Management, and Financial Engineering. The Financial Analysis concentration is designed for students interested in pursuing a career as a financial analyst and completing the Chartered Financial Analyst (CFA) examinations. The Financial Management concentration allows students to tailor their course work for careers in a range of activities: e.g., corporate finance, investment banking, venture capital, private equity, commercial banking, insurance, etc. The Financial Risk Management concentration is designed for students interested in a career in financial risk management and one of the financial risk management certifications. The Financial Engineering concentration is designed for students with the quantitative ability to pursue a career applying quantitative methods to investment and risk management problems. Because several of these concentrations designed to best prepare students for certain certifications, students are required to complete all the course work in a particular concentration to graduate with that concentration.

The **M.S. in Supply Chain Management (SCM)** will explore the key issues associated with the design and management of industrial supply chains. It will entail concepts dealing with the improvement of supply chain operations towards lower costs, faster delivery, higher quality and bigger variety. The ultimate objective is using SCM to mold traditional business operations into competitive weapons for today's global economy. Students will acquire not only fundamental knowledge of business management but also analytical decision-making skills (especially for complex systems) along with real-life experiences gained through projects with area companies.

The M.S. in Innovation and Entrepreneurship (MSIE) prepares students for successful business careers in entrepreneurial new ventures, entrepreneurial finance (venture capital/private equity), or innovation-related roles in mature organizations (product planning, product marketing, product development, etc.). This degree will complement baccalaureate or advanced degrees in a scientific or engineering discipline, and will be valued by employers in technology-related or consumer products industries. The program will provide students with a solid foundation in the management disciplines essential to the successful innovation of new ideas, new products and new business models, whether in the context of an entrepreneurial startup or within the more structured environment of a mature corporation.

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 Executive MBA with emphasis in Project Management that highlights managing complex projects, (3) the Healthcare Management Executive MBA for physicians and senior level healthcare executives interested in learning how to improve the leadership and 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.

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 page XX in 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 corporate strategy, international business, multinational management, organization design and change, technological and industrial development, and managerial decision making are examined using management theories and empirical methods.

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 consideration of the applicants' entire 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 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.

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.

Full-time (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 programs: 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 Healthcare Management: The M.S. in Healthcare Management is customized to accommodate the needs of two different audiences: the Professional Track for healthcare administrators and those desiring a management career in healthcare; and the Executive Track, for physicians and senior level healthcare executives. The admission requirements for the Professional Track are the same as those listed above for all other School of Management evening and online degree programs.

For physicians, admission to the Executive Track requires an MD or DO degree from an accredited school of medicine or school of osteopathy, a copy of a current unrestricted license to practice medicine in the U.S., and medical school and undergraduate transcripts. For healthcare executives, the requirements include seven or more years of senior management experience in a U.S. healthcare organization; a baccalaureate degree with an undergraduate GPA of 3.0 or higher; the ability to successfully perform graduate level work as evidenced by either a Master's degree or higher from a U.S. accredited college or university or by providing an acceptable 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.

Non-Degree Seeking Students: 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 nine hours toward the M.A. and M.S. degree, and twelve 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 passing an exam. A modest fee is required to take the exam. 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 Arts in International Management Studies

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 FIN6366 International Financial Management
BPS 6332 Strategic Leadership
IMS6312 International Advertising
IMS6314 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 Accounting and Information Management

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 either 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 Services, 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 or FIN 6301 Financial Management
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 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 20.

The MBA degree is obtained by completing a 53-hour program beyond prerequisite courses 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.

There are three different programs for students interested in the MBA. We offer a daytime, full-time, cohort MBA program, a professional evening MBA program, and an online MBA.

Note: The Executive Education area of the School of Management offers four distinctive and separate MBA programs, which retain the same set of MBA core courses but have their own set of specific topical electives. These include: the Executive MBA (EMBA), the Global Leadership Executive MBA (GLEMBA), the Executive MBA with project management emphasis, and the Executive Healthcare MBA. These are described in the Executive Education section of the School of Management chapter. All four programs are supported entirely by participant fees and special admissions requirements apply.

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 6204 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.
- **Electronic Commerce:** Every organization will increasingly use the Internet as an integral component of their overall strategy in coming years. Students can select courses to provide a solid understanding of issues pertaining to the use of the internet as a marketing tool – focusing on both strategic and technological aspects. This includes topics such as database management systems, web design and development, and Internet business models. The Advising Office can provide a plan of study that covers topics in this area.
- **Finance:** Students can prepare for careers in corporate finance, investment management, or the management of financial institutions. Courses in this area emphasize 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.
- **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.
- **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.
- **Innovation and Entrepreneurship:** Focused on the processes of technological innovation in both large and small organizations, a set of multidisciplinary courses prepares students for

successful careers either as principals or key functional managers in emerging growth firms, or as leaders of technological innovation in established firms.

- **International Management:** In this concentration, students can 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.
- **Leadership in Organizations:** The leadership concentration prepares 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.
- **Marketing:** Students learn to understand customers' needs and purchase behaviors, how to satisfy those needs, and how to make a profit in competitive industries and markets. Topics include: developing an effective marketing strategy, developing new products, and managing different brands and product categories. Students can also acquire expertise in pricing, advertising and promotions, market research, and retailing strategies. Courses are also available on the Internet's effect on marketing and business.
- **Operations:** Firms can use effective and innovative operations to create and sustain competitive advantages. Students in these courses gain a deep, analytical understanding of how challenges posed by fast developing business environments can become profit-making opportunities. 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.
- **Organizations:** This concentration emphasizes organizational behavior and theory, and human resources management. Students learn how to effectively integrate and leverage human resources to create sustainable advantages in a competitive marketplace. Courses chosen in this area integrate a wide variety of disciplines, including economics, organization theory, finance, psychology, and sociology.
- **Strategy:** 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.

Master of Science in Finance

Degree Requirements

At least 36 hours of management course work beyond prerequisite courses is required, including 12 hours of basic business core courses and 24 hours of graduate finance courses. The M.S. in Finance is designed for students with or without previous educational background in finance. Candidates in the M.S. in Finance choose one of three concentrations: *Investment Management*, *Financial Analyst*, or *Financial Engineering and Risk Management*. In addition, there is the *Financial Management option*. The *Investment Management* concentration is designed for students interested in pursuing an investment career and completing the *Chartered Financial Analyst (CFA)* examinations. The *Financial Analyst* concentration is designed for students interested in corporate finance, investment banking, venture capital, private equity, or corporate restructuring and turnarounds.. The *Financial Engineering and Risk Management* concentration is designed for students with the quantitative ability to pursue a career applying quantitative methods to investment and risk management problems. The *Financial Management option* allows students to tailor their course work for careers in a range of activities. Because several of these concentrations have been designed to prepare students for certain certifications, students are

recommended to complete all the course work in a particular concentration in order to prepare for its associated certification.

Prerequisites

Calculus, basic statistics, and competence in personal computing are required as prerequisites. Candidates that have not taken equivalent courses will need to take MATH 5304 to meet the calculus requirement; OPRE 6301 to complete the basic statistics requirement, and BA 3351 to complete the personal computing requirement.

Basic Core Courses (12 credit hours)

All students enrolling in the Master of Science in Finance program must complete the following Basic Business Core courses, or their equivalents. Please see the catalog for further prerequisite information.

AIM 6305	Accounting for Managers or AIM 6201 and AIM 6202
MECO 6303	Business Economics
FIN 6301	Financial Management
FIN 6306	Quantitative Methods in Finance

Concentrations:

Investment Management (CFA) Concentration (24 hours):

AIM 6344 Financial Statement Analysis
FIN 6308 Regulation of business and financial markets
FIN 6310 Investment Management
FIN 6314 Fixed income securities and their derivatives
FIN 6320 Financial markets and institutions or FIN 6364 Advanced Investment Management
FIN 6350 Advanced Financial Management
FIN 6350 Options and Futures Markets
FIN 6364 Advanced Investment Management or FIN 6380 Practicum in Investment Management

Financial Analyst Concentration (24 hours):

AIM 6330: Intermediate Financial Accounting I
AIM 6332: Intermediate Financial Accounting II
AIM 6341: Planning, Control, and Performance Evaluation
FIN 6316: Private Equity Finance or FIN 6357: Corporate Restructuring and Turnarounds
FIN 6350: Advanced Financial Management
FIN 6352: Financial Modeling
FIN 6355: Corporate Financial Policy
FIN 6356: Mergers, Acquisitions and Corporate Restructuring or AIM 6346: Financial Dimensions of Mergers and Acquisitions

Financial Engineering and Risk Management Concentration (24 hours):

FIN 6310 Investment Management
FIN 6314 Fixed income securities and their derivatives
FIN 6360 Options and Futures Markets
FIN 6370 Theory of Finance or OPRE 6335 Risk and Decision Analysis
FIN 6382 Introductory Mathematical Finance
FIN 6384: Financial Asset Pricing and Engineering

ECO 6311 Statistics for Economists or MECO 6315 Approaches to Statistical Inference
 MECO 6312 Applied Econometrics and Times Series Analysis or MECO 6320 Econometrics

Financial Management Option (24 hours):

Students must complete eight courses; of which at least one course must come from category A and five must come from category B.

Category A	Category B
AIM 6330: Intermediate Financial Accounting I	FIN 6308: Regulation of Business and Financial Markets
AIM 6332: Intermediate Financial Accounting II	FIN 6310: Investment Management
AIM 6341: Planning, Control and Performance Evaluation	FIN 6314: Fixed Income Securities and their Derivatives
AIM 6342: Strategic Cost Management	FIN 6315: Entrepreneurial Finance
AIM 6344: Financial Statement Analysis	FIN 6316: Private Equity Finance
AIM 6345: Business Valuation	FIN 6320: Financial Markets and Institutions
AIM 6346: Financial Dimensions of Mergers and Acquisitions	FIN 6330: Behavioral Finance
AIM 6351: Individual Taxation	FIN 6340: Management of Financial Institutions
AIM 6342: Corporate Taxation	FIN 6350: Advanced Financial Management
AIM 6380: Internal Audit	FIN 6352: Financial Modeling
	FIN 6355: Corporate Financial and Policy
	FIN 6356: Mergers, Acquisitions, and Corporate Finance
	FIN 6357: Corporate Restructuring and Turnarounds
	FIN 6360: Options and Futures Markets
	FIN 6364: Advanced Investment Management
	FIN 6366: International Financial Management
	FIN 6370: Theory of Finance and Its Applications
	FIN 6382: Introductory Mathematical Finance
	FIN 6384: Financial Asset Pricing and Engineering

Master of Science in Healthcare Management

Degree Requirements

The Master of Science in Healthcare Management prepares students for roles in the leadership and management of the U.S. healthcare industry. It integrates a thorough grounding in advanced business management theory and practice with an understanding of the structure, operation and financing of the U.S. healthcare system. The curriculum is customized to accommodate the needs of two different audiences:

Professional Track – for healthcare administrators and those desiring a management career in the healthcare industry; and

Executive Track – for physicians and senior healthcare executives.

Professional Track

The Professional Track MS in Healthcare Management is a 36 credit hour program consisting of business core, healthcare management courses and electives. Students must maintain a 3.0 grade point average in both core courses and overall to qualify for the M.S. degree.

Required Business Core (15 hours)

OB 6301 Organizational Behavior
FIN 6301 Financial Management
AIM 6305 Accounting for Managers
MKT 6301 Marketing Management
OPRE 6301 Quantitative Intro to Risk and Uncertainty

Healthcare Management Core (12 hours)

The following four courses are required:

HMGT 6320 The American Healthcare System
HMGT 6321 Strategic Management of Healthcare Organizations
HMGT 6323 Healthcare Informatics
HMGT 6330 Healthcare Law, Policy, and Regulation

Choose at least 6 credit hours from the following:

HMGT 6322 Healthcare Cost Management and Control
HMGT 6324 (OB 6332) Healthcare Negotiation and Dispute Resolution
HMGT 6325 Healthcare Operations Management
HMGT 6329 Seminar in Healthcare Management
HMGT 6331 Healthcare Economics
MIS 6324 Business Intelligence Software and Techniques
BPS 6340 Accountability and Ethics in Corporate Governance
OB 6307 Strategic Human Resources Management
OB 6331 Power and Politics in Organizations
MKT 6309 Marketing Research
BPS 6332 Strategic Leadership

Other Electives (3 hours)

The 3 hour Business Management elective requirement may be met by additional healthcare courses as well as by advanced courses in other management disciplines.

Executive Track

The Executive Track for physicians and senior healthcare executives is delivered in a non-semester format. The 36 credit hour curriculum consists of nine 4-day residential classes. A different class is offered every two months and classes may be started at any time and taken in any order. 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. Eight classes 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 executives.

Successful completion of any five classes is recognized by the award of a Graduate Certificate in Healthcare Management. Completion of the nine healthcare management classes OR any eight classes

plus a self-directed field study is recognized by the award of a Master of Science in Healthcare Management. Students must maintain a 3.0 overall grade point average in order to qualify for the M.S. degree.

The Executive Track MS in Healthcare Management is supported entirely by participant fees and special admission requirements apply. For information, contact the program office at (972) 883-6252.

HMGT 6401 Negotiation and Conflict Management in Healthcare

HMGT 6402 Financial Management of Healthcare Organizations

HMGT 6403 Medical Cost and Performance Management

HMGT 6404 Service Quality Improvement and Patient Satisfaction

HMGT 6405 Healthcare Information Management and Technology

HMGT 6406 Strategic Leadership of Healthcare Organizations

HMGT 6407 Healthcare Policy and Regulation

HMGT 6408 Motivational Leadership in Healthcare Organizations

HMGT 6410 Coaching as a Leadership Style

HMGT 6V15 Self-Directed Field Study

Master of Science in Information Technology and Management

Degree Requirements

The University's general degree requirements are discussed on page 20.

The M.S. degree in ITM requires a minimum of 36 credit hours, consisting of basic business courses, IT foundation courses, IT elective courses, and free 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. The IT elective courses provide in-depth knowledge of the technology and technology management issues. In addition, students may choose approved electives that maximize their individual educational and professional goals. The program also offers opportunities for students to concentrate in specific tracks such as '*Enterprise Systems*', '*Healthcare Systems*', and '*Information Security*' depending on their interests and goals. The students can contact the advising office for the recommended courses for these tracks.

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)

AIM 6305 Accounting for Managers

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 Data Communications
MIS 6323 Object Oriented Systems
MIS 6326 Database Management Systems
MIS 6308 Systems Analysis and Project Management

IT Electives Choose 9 hours from the list of courses that have an MIS prefix.

MIS 6302 Information Technology Strategy and Management
MIS 6309 Business Data Warehousing with SAP
MIS 6314 Systems Re-Engineering
MIS 6317 Healthcare Informatics
MIS 6318 Electronic Commerce
MIS 6319 Enterprise Resource Planning
MIS 6322 Developing Business Applications with Visual Basic
MIS 6324 Business Intelligence Software and Techniques
MIS 6325 Advanced Telecommunications
MIS 6327 Analysis and Design of Telecommunication Networks
MIS 6329 Contemporary Issues in Telecommunications
MIS 6330 Information Technology Security
MIS 6332 Advanced ERP: Sales and Distribution
MIS 6334 Advanced Business Intelligence
MIS 6352 Web Systems Design and Development
MIS 6355 Information Technology for E-Business
MIS 6369 Supply Chain Software
MIS 6378 (AIM 6378) Enterprise Systems and CRM
MIS 6379 SAP ABAP Programming

Free Electives (6 credit hours)

Any course from the set of IT electives may be used as a free elective. Also any course from the set of business core courses, or any other graduate level business course may be used as a free elective.

The following are some of the other IT-related courses offered by the school.

AIM 6336 Information Technology Audit and Risk Management
AIM 6338 Accounting Systems Integration and Configuration
AIM 6339 Financial Reporting using XBRL and XML
AIM 6340 Information Technology Project Management
AIM 6343 Accounting Information Systems
AIM 6378 Enterprise Systems and CRM
AIM 6384 Analytical Reviews using Audit Software
AIM 6385 Managerial Accounting in Enterprise Systems
IMS 6314 Global E-business Marketing
MECO 6311 Economics of Information Goods
MKT 6322 Internet Business Models
MKT 6323 Database Marketing
OPRE 6332 Spreadsheet Modeling
OPRE 6386 Applied Programming Languages

Master of Science in Management and Administrative Sciences

Degree Requirements

The University's general degree requirements are discussed on page 20.

The M.S. in Management and Administrative Sciences degree is a flexible degree that allows students to design a program of study that fits their specific needs. Students complete a 36-hour program, beyond prerequisite courses, consisting of 10 hours of basic core courses, and 26 credit hours of graduate level electives. Students must maintain a 3.0 grade point average in both core courses and in aggregate courses to qualify for the M.S. degree.

Students should be aware that separate Master of Science programs, with varying core and elective requirements exist in the following areas:

1. Accounting and Information Management
2. Finance
3. Healthcare Management (for Professionals)
4. Information Technology and Management
5. Innovation & Entrepreneurship
6. Supply Chain Management
7. International Management Studies (Master of Arts)

For the MS-MAS degree program, students choose their own course of study, pulling courses from the School of Management graduate catalog.

Note: The Executive Education area of the School of Management offers three additional and separate MS-MAS programs, which retain the same set of core courses but have their own set of specific topical electives. These include: the MS-MAS with an emphasis in project management, the Executive Healthcare MS-MAS, and the MS-MAS with an emphasis in Organizational Behavior and Coaching. These are described in the Executive Education section of the School of Management chapter. All three programs are supported entirely by participant fees and special admissions requirements apply.

MS-MAS Program Description

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

Elective Courses: (26 credit hours)

A student's course of study beyond the core can be determined in consultation with faculty members, area coordinators, or the Advising Office. A student can continue to generalize in management courses or choose to concentrate in a given subject.

Concentrations - Students may choose to concentrate in one of the areas listed below that have historically been offered as defined specialties in the masters programs. 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. Typical concentrations have a minimum of 15 credit hours in a given area, and 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.
- **Electronic Commerce:** Every organization will increasingly use the Internet as an integral component of their overall strategy in coming years. Students can select courses to provide a solid understanding of issues pertaining to the use of the internet as a marketing tool – focusing on both strategic and technological aspects. This includes topics such as database management systems, web design and development, and Internet business models. The Advising Office can provide a plan of study that covers topics in this area.
- **Finance:** Students can prepare for careers in corporate finance, investment management, or the management of financial institutions. Courses in this area emphasize 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.
- **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.
- **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.
- **Innovation and Entrepreneurship:** Focused on the processes of technological innovation in both large and small organizations, a set of multidisciplinary courses prepares students for successful careers either as principals or key functional managers in emerging growth firms, or as leaders of technological innovation in established firms.
- **International Management:** In this concentration, students can 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.
- **Leadership in Organizations:** The leadership concentration prepares 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.
- **Marketing:** Students learn to understand customers' needs and purchase behaviors, how to satisfy those needs, and how to make a profit in competitive industries and markets. Topics include: developing an effective marketing strategy, developing new products, and managing different brands and product categories. Students can also acquire expertise in pricing, advertising and promotions, market research, and retailing strategies. Courses are also available on the Internet's effect on marketing and business.

- **Operations:** Firms can use effective and innovative operations to create and sustain competitive advantages. Students in these courses gain a deep, analytical understanding of how challenges posed by fast developing business environments can become profit-making opportunities. 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.
- **Organizations:** This concentration emphasizes organizational behavior and theory, and human resources management. Students learn how to effectively integrate and leverage human resources to create sustainable advantages in a competitive marketplace. Courses chosen in this area integrate a wide variety of disciplines, including economics, organization theory, finance, psychology, and sociology.
- **Strategy:** 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.

Master of Science in Supply Chain Management

In the Master of Science in Supply Chain Management (MS-SCMT) students explore the key issues associated with the design and management of industrial supply chains, including methods for improving supply chain operations by lowering costs, speeding delivery, improving quality and expanding variety. The ultimate objective is to use SCM to mold traditional business operations into competitive tools for today's global economy. Students acquire not only fundamental knowledge of business management but also analytical decision-making skills (especially for complex systems) along with real-life experiences gained through projects with area companies.

The Master of Science in Supply Chain Management is designed for students with or without previous educational background in this area. Courses are primarily offered in the late afternoon and evening of weekdays. Several courses are currently offered and are planned to be offered through the World Wide Web. Students can obtain a dual MBA and MS degree by taking a total of 71 credits (assuming all prerequisites are met). This serves students who would like to get additional SCM skills at a reduced cost.

Degree Requirements

At least 36 hours of management course work beyond prerequisite courses is required, including 12 hours of basic business core courses and 21 hours of graduate courses in Supply Chain Management and other areas. The M.S. in Supply Chain Management is designed for students with or without previous educational background in this area.

Prerequisites

Calculus and competence in personal computing are required as graduate program prerequisites. If a student has not taken equivalent courses already, he/she will need to complete MATH 5304 with a grade of "B" to meet the calculus requirement and BA 3351 for personal computing. For specific course prerequisite information, please see the applicable catalog at <http://www.utdallas.edu/student/catalog>.

Basic Business Core Courses (15 hours)

All students enrolling in the MS-SCMT must complete the following Basic Business Core.

OPRE 6301	Quantitative Introduction to Risk and Uncertainty in Business
OPRE 6302	Operations Management
AIM 6305	Accounting for Managers
FIN 6301	Financial Management
And one of the following courses:	
MECO 6303	Business Economics
MKT 6301	Introduction to Marketing Management
OB 6301	Organizational Behavior
OB 6321	Principles of Leadership

Required Supply Chain Management Core Courses (9 credit hours)

OPRE 6366	Supply Chain Management
OPRE 6370	Logistics and Distribution
OPRE 6371	Purchasing and Sourcing Management

Elective Supply Chain Management Courses- choose nine credit hours (three courses)

OPRE 6332	Supply Chain Modeling
OPRE 6335	Risk and Decision Analysis
OPRE 6340	Flexible Manufacturing Strategies
OPRE 6361	Production Planning and Control
OPRE 6362	Project Management
OPRE 6363	Inventory Control
OPRE 6364	Quality Control (LEAN SIX SIGMA)
OPRE 6367	Capstone Project in Supply Chain Management
OPRE 6369	Supply Chain Software (SAP SCM)
OPRE 6377	Demand and Revenue Management
OPRE 6385	Scheduling
OB 6332	Negotiation and Dispute Resolution
MIS 6326	Database Management Systems
MKT 6333	Channels and Retailing

Free Elective Course (3 credit hours)

Students may choose any three credit hour graduate level course in the School of Management to satisfy this portion of the degree plan.

Master of Science in Innovation & Entrepreneurship

Objectives

The M.S. in Innovation and Entrepreneurship (MSIE) prepares students for successful business careers in entrepreneurial new ventures, entrepreneurial finance (venture capital/private equity), or innovation-related roles in mature organizations (product planning, product marketing, product development, etc.). This degree will complement baccalaureate or advanced degrees in a scientific or engineering discipline, and will be valued by employers in technology-related or consumer products industries.

The program will provide students with a solid foundation in the management disciplines essential to the successful innovation of new ideas, new products and new business models, whether in the context of an entrepreneurial startup or within the more structured environment of a mature corporation.

Prerequisites

Prerequisite knowledge in calculus is a requirement for the program. Candidates who have not taken equivalent courses will need to take MATH 5304 to meet the calculus requirement. Degree credit is not earned for program prerequisites.

Degree Requirements

The University's general degree requirements are discussed on page 20.

The Master of Science in Innovation and Entrepreneurship degree is designed for students with or without previous educational background in innovation and entrepreneurship. The M.S. degree is obtained by completing a 36-hour program, beyond prerequisite courses, consisting of: (a) basic core courses; (b) courses in a selected concentration area; and (c) electives.

The student may elect to submit a Master's thesis, which counts as three credit hours toward the total course requirements.

The MSIE degree requires 18 hours of basic core courses, which provide a solid foundation in the management disciplines essential to the successful innovation of new ideas, new products and new business models, including foundational courses in entrepreneurship and entrepreneurial finance.

The curriculum also provides two concentration areas, the first focused on the context of an entrepreneurial startup (New Venture concentration) and the second on the challenges of managing entrepreneurial innovation within the more structured environment of a mature organization (Innovation within the Corporation concentration). The student must take a minimum of 12 hours within one or the other of the designated concentration areas.

An additional six hours of electives may be chosen from among any of the concentration area courses not already taken, the other ENTP electives offered or, with permission, from among any of the other SOM offerings in the AIM, BPS, FIN, IMS, MIS, MKT, OPRE, or OB areas.

Basic Core Courses (21 hours)

Each candidate must satisfactorily complete the 21 hour basic core consisting of the following courses:

- AIM 6305 Accounting for Managers
- OB 6301 Organizational Behavior
- FIN 6301 Financial Management*
- MKT 6301 Introduction to Marketing
- BPS 6310 Strategic Management
- ENTP 6370 Entrepreneurship
- ENTP/FIN 6315 Entrepreneurial Finance

*FIN 6301 is a prerequisite for both BPS 6310 and ENTP/FIN 6315. The FIN 6301 requirement will be waived if the student has satisfactorily completed an equivalent course with a grade of B or better.

Concentration Area Courses (12 hours)

Each candidate must complete a minimum of 12 credit hours within the selection of courses offered within one or the other of the two concentration areas:

New Venture Concentration

ENTP 6378 Managing the Emerging Enterprise
ENTP 6380 Entrepreneurial Marketing
ENTP 6385 Entrepreneurial Business Strategies
ENTP 6387 Forecasting Industry and Technology Futures
ENTP 6390 Business Model Development

Innovation within the Corporation Concentration

ENTP 6375 Technology and New Product Development
ENTP 6387 Forecasting Industry and Technology Futures
ENTP 6388 Managing Innovation within the Corporation
ENTP 6390 Business Model Development
ENTP 6398 The Entrepreneurial Experience

Elective Courses (3-6 hours)

Students are required to complete a sufficient number of elective hours to earn a minimum of 36 hours toward the M.S. degree. These courses may be chosen from among: (a) the courses listed in the concentration areas above; or, (b) the entrepreneurship courses listed below:

ENTP/FIN 6316 Private Equity
ENTP 6392 Entrepreneurship in the Social Sector
ENTP 6395 Topics in Innovation and Entrepreneurship

With faculty permission, a student may substitute up to two electives from other SOM offerings in the AIM, BPS, FIN, IMS, MIS, MKT, OPRE, or OB areas.

For Further Information:

Dr. Joseph C. Picken, Program Director
School of Management 4.412
(972) 883-4986
jpicken@utdallas.edu

Combination of Engineering and Management Graduate Degrees

<http://www.utdallas.edu/dept/ee>

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 page13.

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. The degree requirements are discussed [here](#). For this program of studies, the School of Management will accept a competitive GRE performance in lieu of the GMAT.

Degree Requirements

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 44hours 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, 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..

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 24hours of approved electrical engineering courses in combination with a minimum of 27hours 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, 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.

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.

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 that 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 20.

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, International Management Studies (housed within the Organizations, Strategy and International Management [OSIM] area), Marketing, Operations Management, and Operations Research.

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 (21 hours)*

OB 7300 Organization Theory
MAS 8v42 Organizational Behavior
IMS 7300 International Management
IMS 8v40 International Business
BPS 7300 Strategic Management
BPS 7303 Doctoral Teaching and Writing Seminar

MAS 8v51 Advanced Strategic Management

Advanced Seminars (9 hours)*

Advanced seminars are offered on topics in international management, organizational behavior, organization theory, and strategic 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**
STAT 5312 Regression Analysis or POEC 5316 Policy Data Analysis II**
POEC 5331 Econometrics**
OB 7306 Macro-Organizational Empirical Investigation

Students are encouraged to take additional methods courses consistent with their research interests.

**Students desiring a methods sequence with a greater emphasis on mathematical statistics may substitute OPRE 6330 or STAT 5351, STAT 5352, and MECO 6320 for these three courses.

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
MAS 6v00 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.

Graduate Certificate in Business Intelligence and Data Mining

This is a new certificate program in data mining and business intelligence within the area of Information Systems and Operations Management in the School of Management. The proposed certificate program requires courses in business statistics, data preparation, and data mining leading to a joint SAS Institute/UTD certificate in data mining. The SAS Institute's platform of software solutions is the market leader in business intelligence and data mining.

Curriculum Requirements

The certificate requires students to complete the following four courses. Each course is a three credit hour semester long course currently being offered by the university.

MIS 6309 Business Data Warehousing with SAP
OPRE 6301 Quantitative Introduction to Risk and Uncertainty
MIS 6324 Business Intelligence Software and Techniques
MIS 6334 Advanced Business Intelligence with SAS

Graduate Certificates in Systems Engineering and Management (SEM)

The Systems Engineering and Management (SEM) program is jointly managed by the Erik Jonsson School of Engineering and Computer Science and the School of Management. The course of study has been designed to meet the need for formalized education in the design and management of complex systems involving a large number of interconnected components.

Certificates in Systems Engineering and Management will focus on educating industry-sponsored corporate employees in the disciplines of Systems Engineering, Systems Management, Entrepreneurship & Intrapreneurship, Product Line Development and Management, and Strategic Business Management.

Target industries for the program include: aerospace, defense and space systems; transportation systems; information and communications technology (ICT) systems; information assurance and cyber-security systems; healthcare systems; energy, environment and infrastructure systems; complex biological systems; and macro-economic and financial systems.

Prospective students should have a minimum of a BS in engineering, mathematics, physics, chemistry, economics or finance (in order to ensure adequate fundamental skills in mathematics) and at least 5 years of industry experience. We draw our faculty for the core courses from both the engineering and management schools; faculty from other schools on campus, and industry leaders with expertise in specific fields will be invited to teach courses as appropriate.

Curriculum Requirements

Students have a choice of two different certificates: a Certificate in Systems Engineering, or, a Certificate in Systems Management. Each certificate will require 12 credit hours. The courses will be offered in an Executive Education, 4-hour module format.

(1) The **Certificate in Systems Engineering** requires students to complete over the period of one academic year two courses from the set of engineering courses listed below, and any two additional courses from the remainder of the 20 SYSM-prefix courses listed below in either group, engineering or management.

Systems Engineering and Management (SEM) Courses		
Prefix & Number	Engineering Course Titles	Credit
SYSM 6301	Systems Engineering Architecture & Design	3
SYSM 6302	Dynamics of Complex Structures	3
SYSM 6303	Quantitative Risk, Probability, Stochastic Processes	3
SYSM 6304	Risk Assessment and Management	3
SYSM 6305	Dynamic Systems Modeling & Analysis	3
SYSM 6306	Modeling and Simulation of Engineering Systems	3
SYSM 6331	Systems and Control Theory	3
SYSM 6356	Software Maintenance, Evolution and Re-engineering	3
SYSM 6361	Advanced Requirements Engineering	3
SYSM 6367	Software Testing, Validation, Verification	3

(2) The **Certificate in Systems Management** requires students to complete over the period of one academic year two courses from the set of management courses listed below, and any two additional courses from the remainder of the 20 SYSM-prefix courses listed in either group, engineering or management.

Systems Engineering and Management (SEM) Courses		
Prefix & Number	Management Course Titles	Credit

SYSM 6311	Systems Project Management	3
SYSM 6312	Engineering Economics	3
SYSM 6313	Human Factors in Complex Organizations	3
SYSM 6314	Manufacturing and Service Systems Planning and Analysis	3
SYSM 6315	Entrepreneurship	3
SYSM 6316	Innovation within the Corporation	3
SYSM 6317	The Management of High Tech Products	3
SYSM 6318	Marketing Management, Marketing Systems Analysis	3
SYSM 6319	Business Economics	3
SYSM 6320	Strategic Management	3

Engineering Courses:

SYSM 6301 Systems Engineering, Architecture and Design (3 credit hours) The course will consider concepts related to the architecture and design of large-scale and decentralized Systems from technical and management perspectives. An overview of Systems architectures, requirements analysis, design tradeoffs, and reliability will be discussed through case studies and mathematical techniques. Students will explore the history and current state-of-the-art in systems architecture and design concepts, international standardization bodies, engineering processes, notations, and tool support from both theoretical and practical perspectives. Prerequisites: none (3-0) Y

SYSM 6302 Dynamics of Complex Structures (3 credit hours) MECH 6302 Dynamics of Complex Structures (3 semester hours) Design, development, manufacturing and analysis of large, complex mechanical systems. Prerequisite: MECH 3302 or equivalent. (3-0) Y

SYSM 6303 Quantitative Risk, Probability, Stochastic Processes (3 credit hours) Risk analysis is becoming prevalent in most technical and business aspects of economic activity. In this course, basic approaches of risk analysis in industry and finance will be presented. A solid review of the methodology based on probabilistic, statistical and decision making approaches will be made. Prerequisites: none (3-0) Y

SYSM 6304 Risk Assessment and Management (3 credit hours) This course will familiarize participants with various kinds of risk that an organization may face; methodologies for identifying these risks and classifying them into various categories, their extent and their potential for causing harm; methods for quantifying the potential impact of various kinds of risk, as well as the cost of implementing risk management techniques; and risk management and implementation strategies at an organizational level. Prerequisites: none (3-0) Y

SYSM 6305 Dynamic Systems Modeling & Analysis (3 credit hours) This course will address linear and non-linear Systems and fundamental properties of dynamical Systems. Techniques such as frequency domain analysis of linear Systems and numerical methods will be discussed. Chaotic Systems and stability of dynamical Systems and will also be addressed. Prerequisites: none (3-0) Y

SYSM 6306 Modeling & Simulation of Engineering Systems (3 credit hours) Principles of computational modeling and simulation of complex systems. Monte Carlo methods. Hierarchical simulation systems. Prerequisites: none. (3-0) Y

SYSM 6331 (MECH 6331) Systems & Control Theory (3 credit hours) (3 semester hours) Systems and control theory: state space, convolution integrals, transfer functions, stability, controllability, observability, and feedback. Prerequisites: MECH 2300 and MECH 4310 or equivalents. (3-0) Y

SYSM 6356 (CS 6356/SE 6356) Software Maintenance, Evolution & Re-engineering (3 credit 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: CE/CS/SE 5354. (3-0) Y

SYSM 6361 (SE 6361/CS 6361) Advanced Requirements Engineering (3 credit 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/SE 5354. (3-0) S

SYSM 6367 (SE 6367/CE 6367/CS 6367) Software Testing, Validation, Verification (3 credit hours) Fundamental concepts of software testing. Functional testing. GUI based testing tools. Control flow based test adequacy criteria. Data flow based test adequacy criteria. White box based testing tools. Mutation testing and testing tools. Relationship between test adequacy criteria. Finite state machine based testing. Static and dynamic program slicing for testing and debugging. Software reliability. Formal verification of program correctness. Prerequisites: CE/CS/SE 5354 or consent of instructor. (3-0) Y

Management Courses:

SYSM 6311 Systems Project Management (3 credit hours) Systems project management is the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives. The course will cover critical path methods for planning and controlling projects including time and cost tradeoffs, resource utilization, organizational design, conflict resolution and stochastic considerations. Prerequisites: none (3-0) Y

SYSM 6312 Engineering Economics and Finance (3 credit hours) This course is intended to develop capacity to both (1) recognize the relevant costs of engineering/Systems projects for investment decision purposes, and (2) measure the true economic value (to be) created, including consideration of associated project and system risks. We will deal with the relationship of project risk to those of the entire firm, with performance indicators that are used by investors and managers, and with costs of capital that are affected by funding choices and project risk Prerequisites: none (3-0) Y

SYSM 6313 Negotiating Deals & Resolving Conflict Within the Organization (3 credit hours) The major focus of this course will be on negotiating deals and resolving conflict in business situations, and understanding human behavior in organizational settings, and its causes and consequences e.g., how the individual is affected by and affects the structure of the organization; how reward structures and leadership processes are related to organizational goals; and how all of these and other factors impact managerial effectiveness in the organization. Prerequisites: none (3-0) Y

SYSM 6314 Manufacturing & Service Systems Planning & Analysis (3 credit hours) Manufacturing & Service Systems Planning & Analysis is the study of management related to transforming inputs to outputs for both manufacturing and service organizations. Its fundamental purpose is the adding of value to inputs - materials, labor, capital and management - to create outputs - products or services which customers want - throughout the supply chain. Prerequisites: none (3-0) Y

SYSM 6315 Entrepreneurship (3 credit hours) This course teaches 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. Prerequisites: none (3-0) Y

SYSM 6316 Innovation within the Corporation (3 credit 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 student 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. Prerequisites: none (3-0) Y

SYSM 6317 The Management of High Tech Products (3 credit hours) Building on the premise that successful product management involves getting the right product to the right customer at the right price at the right time, the course will teach techniques in product definition and requirements; product development; management of internal resources, including manufacturing, sales and management; costing and pricing decisions; product planning and winning the right design win. Prerequisites: none

(3-0) Y

SYSM 6318 Marketing Management, Marketing Systems Analysis (3 credit hours) The basic objective of this course is to help executives and managers develop relevant marketing skills and philosophies and to examine the trends and applicable techniques in the area of marketing management. This course should enhance understanding of marketing problems, the setting in which marketing decisions are made, the tools available to facilitate these decisions, and the impact of the decisions for the firm and the "larger marketplace." Prerequisites: none (3-0) Y

SYSM 6319 Business Economics (3 credit hours) This course provides 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. Prerequisites: none (3-0) Y

SYSM 6320 Strategic Management (3 credit 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: none (3-0) Y

School of Management Executive Education Degree And Course Descriptions Programs

UT Dallas School of Management Executive Education combines the best of the School's nationally recognized faculty with a select group of executives to provide an innovative, relevant portfolio of programs. Designed to advance knowledge and skills that improve organizational performance, these programs include both MBA and Master of Science degree programs, as well as certificate programs. Courses are taught on campus, on site, or online.

Executive MBA and Master's Degrees

- Executive MBA (EMBA)
- Global Leadership Executive MBA (GLEMBA)
- Executive MBA with an emphasis in Project Management
- Master of Science in Management and Administrative Sciences with an emphasis in Project Management
- Healthcare Management Executive MBA for Physicians and senior healthcare administrators
- Master of Science in Healthcare Management for Physicians and senior healthcare administrators
- Master of Science in Management and Administrative Sciences with an emphasis in Organizational Behavior and Coaching

Special admission and fee requirements apply to the following programs and courses.

Executive MBA Program

The Executive MBA – EMBA -- creates successful careers for busy, working managers and experienced professionals. The program provides a transformative, educational and personal improvement experience that profoundly enhances your success on the job and that takes you as high in your career as you wish to go. The 21-month program has only 3 class days per month, so that students miss fewer days of work. Students also work with their own executive coach, learn from projects at area companies, and participate in a 10-day international trip.

The EMBA program is supported entirely by participant fees and special admissions requirements apply. Further information may be obtained from the program website:
<http://som.utdallas.edu/graduate/execed/execMba/>

Executive MBA degree programs in the School of Management require a core of 29 credit hours, along with a set of specially designed elective courses equivalent to 24 credit hours, comprising a total of 53 credit hours. The MBA core is comprised of the following courses:

MBA Core Curriculum:

AIM 6201 Financial Accounting
AIM 6202 Managerial Accounting
BPS 6310 Strategic Management
FIN 6301 Financial Management
IMS 6204 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

The remaining electives are drawn from the following courses specific to the Executive MBA Program curriculum:

BPS 6250 Business Transformation Project I (2 credit hours). This 3 hour course will immerse the student in an initial examination and / or design of a substantial project within a corporation intended to raise corporate value by transforming the business. The emphasis will be on new uses of assets and resources, not the improved management of existing activities. This is intended to develop the executive capacity of the individual student. (2-0) Y

BPS 6351 Business Transformation Project II (3 credit hours). This 3 hour course will immerse the student in an initial examination and / or design of a substantial project within a corporation intended to raise corporate value by transforming the business. The emphasis will be on new uses of assets and resources, not the improved management of existing activities. This is intended to develop the executive capacity of the individual student. (2-0) Y

ENTP 6250 Managing Entrepreneurship (2 semester hours) The processes of starting and developing a new business are explored within the contexts of the established corporation and the newly-founded organization. Such topics as innovation, planning, feasibility analysis, and financing considerations are covered using readings, projects, and class discussion. (2-0) Y

FIN 6150 The Financial Crisis (1 credit hour). The reasons for the financial crisis of 2008-2009 will be examined. Then the focus investigates tie-ins to the subsequent economic downturn. Finally implications for future management strategy and corporate governance will be explored. (1-0) Y

FIN 6251 Strategic Financial Management and Valuation I (2 credit hours). This is a second level finance course stressing the linkages of corporate strategy, financial strategy and market valuation. Different methodologies of valuation will be covered. (2-0) Y

FIN 6250 Case Studies in Finance (2 semester hours) This course builds on the Financial Management course and stresses the application of the analytical tools and concepts learned there. It uses real-life case studies as the learning vehicle and stresses analysis, decision making, and the use of managerial judgment. Prerequisites: AIM 6201 and FIN 6301. (2-0) Y

FIN 6351 Strategic Financial Management and Valuation II (3 credit hours). This is a second level finance course stressing the linkages of corporate strategy, financial strategy and market valuation. Different methodologies of valuation will be covered. (3-0) Y

IMS 6150 International Business Management - EMBA (1 semester hour) Considers the role of general managers (CEO and country/regional managers) in multi-national companies and the working relationship of subsidiary and home offices in such companies. Topics include business strategies, control/cooperative systems, the dynamics of addressing local and global concerns, and corporate learning. Changes brought about by modern information technology are also considered. (1-0) Y

IMS 6250 Executive Study Trip - Mexico (2 semester hours) This course focuses on NAFTA and the business, political, and cultural issues related to conducting business in Mexico. It involves a trip to an important business center where students visit companies, participate in classes at Mexican universities, and have cultural experiences pertinent to business decision making and management in Mexico. (2-0) Y

IMS 6350 Management Consulting and Research (3 semester hours) This is a course taken under the supervision of an assigned faculty member. The student conducts a field consulting or research project on a topic that is approved and supervised by the faculty sponsor. The course is intended to develop deep knowledge and skill in an area that the student believes will enhance his or her job performance and that is academically rigorous. (3-0) Y

IMS 6351 Executive International Studies Trip - EMBA (3 semester hours) This course consists of a class trip to Europe, Asia or South America. The destinations are chosen to relate to the EMBA program's international emphasis and its themes of managing for change, the strategic perspective, and leadership effectiveness. While abroad, participants visit and hear presentations from local university faculty, local business executives, and expert panels. Participants are also expected to identify important cultural variables that impact business decision making and management in the countries visited. (3-0) Y

MKT 6351 Capstone Business Game (3 semester hours) Students work in teams and compete against each other in a computer simulation business game in which each team manages a company. The team makes decisions on new product development, pricing, advertising, sales force management, and production planning to generate superior performance. The course is designed to further develop the executive perspective and to integrate the knowledge and skills gained in the core curriculum. (3-0) Y

OB 6150 Functions of the Executive (1 semester hour) This course is based primarily on the work of Harvard's legendary Professor Chester Barnard and utilizes case studies. It seeks to help students identify, understand and apply the various mindsets, decisions and actions that effective executives employ. (1-0) Y

OB 6260 Executive Coaching (2 semester hours) This is a one-on-one, developmental experience with a professional, executive coach. The goals of the coaching experience are: to help the student learn as much as possible from the EMBA program and from working in student teams; to identify the student's strengths and weaknesses and to develop the person in relevant areas; to focus on career development issues unique to the individual; and to instruct the student on the principles and practices of coaching as a leadership style. (2-0) Y

OB 6261 Executive Workshop (2 semester hours) New students begin the Executive MBA program by attending this workshop and completing the follow-up assignments. The course focuses primarily on lectures and experiential learning exercises conducted by the Leadership Center at UTD and other Centers of Excellence from our School of Management. (2-0) Y

Global Leadership Executive MBA Program - GLEMBA

The Global Leadership Executive MBA - GLEMBA --is specifically designed for experienced professionals and managers who desire knowledge and skills to lead with a global mindset. GLEMBA is delivered in 23 months through a defined degree plan that expands the MBA core curriculum with an international curriculum.

GLEMBA is supported entirely by participant fees and special admissions requirements apply. Further information may be obtained from the program website: <http://som.utdallas.edu/graduate/execed/glemba/>.

GLEMBA students take additional courses from the following list specific to the Global Leadership Executive MBA Program curriculum.

ENTP 6351 International Entrepreneurship and Innovation (Executive Education Course: 3 semester hours) This course is an introduction to the International Business Plan and provides an introduction to entrepreneurship with an emphasis on identifying, evaluating and developing new venture opportunities for international markets. Topics include opportunity identification and evaluation, startup strategies, business valuation, business plan development, financing the venture, managing the growing business and exit strategies. Prerequisites: IMS 5200, MKTG 6301, FIN 6301, AIM 6201, and BPS 6310 (3-0) Y

ENTP 6352 International Business Plan (Executive Education Course: 3 semester hours) This course is a capstone that requires the development of a comprehensive business plan for market entry into a foreign country or region. The construct builds upon the core business and international coursework including the successful completion of key courses in accounting, finance, marketing and strategy, as well as, the international entrepreneurship and innovation. The course consists of lectures, research, and faculty coaching and guidance. Prerequisite: ENTP 6351 (3-0) Y

IMS 6251 Globalization and Sustainability (Executive Education Course: 2 semester hours) This course examines various historical and contemporary theories of globalization from an interdisciplinary perspective. Course content centers on key readings that address the globalization debate with a focus on regionalization versus globalization trends and global sustainability as a strategy. (2-0) Y

IMS 6352 International Business Implementation (Executive Education Course: 3 semester hours) This course explores current theories and issues concerning the development of various types of international business entities with a focus on organizational design and execution of strategy and operational delivery. Course content centers on key readings about international business implementation issues and case examples in emerging and developed economies. Prerequisite: IMS 5200. (3-0) Y

IMS 6353 International Study Tour - GLEMBA (Executive Education Course: 3 semester hours) This course investigates the political, economic, social and cultural forces in countries that attract foreign business investment, as well as, the experiences of local and foreign enterprises doing business in that country. Prerequisite: IMS 5200. (3-0) Y

IMS 6354 Global Marketing (Executive Education Course: 3 semester hours) This course promotes an appreciation and understanding of theoretical and practical issues involved in marketing products and services in the international context. 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. Prerequisite: MKT 6301 or consent of instructor. (3-0) Y

IMS 6355 Global Communications and Negotiations (Executive Education Course: 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. (3-0) Y

OB 6151 Intercultural Savvy (Executive Education Course: 1 semester hour) This course addresses the behavioral and skill competencies required to effectively communicate and develop business relations in multicultural and diverse work environments. Course is highly interactive with assessments and role plays. Prerequisite: IMS 5200. (1-0) Y

OPRE 6350 Global Supply Chain Management (Executive Education Course: 3 semester hours) This course addresses the design and management of global supply chain including international sourcing, integration of suppliers and distribution channels. Prerequisite: OPRE 6201 or OPRE 6302 or consent of instructor (3-0) Y

Certificate and Degree Programs with an emphasis in Project Management

The Executive Education Project Management program is one of three emphasis areas designed to begin with a set of specialized area courses, which then, with additional core and elective courses, could "roll-up" into either a Master of Science degree, or the Executive MBA with the chosen emphasis. Students can achieve three different levels of recognition depending on how many credit hours they accumulate. They first earn a graduate certificate in project management by completing the project management core. At this level, participants are ready to take the Project Management Institute PMP Certification Exam. Upon completion of the project management core, students may then continue to earn requirements for the Master of Science or the Master of Business Administration.

Project Management is taught by faculty who have industrial project management, consulting and teaching experience. The program curriculum is delivered both on campus and online. The online program is designed around weekly lessons. The campus program is a managed educational

environment with classes scheduled Thursday, Friday, and Saturday, 8 hours per day, once a month, to accommodate work and travel schedules. Students are pre-registered and all books are distributed during class.

The project management emphasis certificate and degree programs are supported entirely by participant fees and special admissions requirements apply. Further information may be obtained from the program website: <http://som.utdallas.edu/graduate/execed/projectMgmtProg/>. Both degree and non-degree seeking students with undergraduate degrees can study towards a Certificate in Project Management. Potential students are required to complete an application, provide written professional references from 3 people, attend an interview with the program director, and request all Universities attended send an official transcript.

Graduate Certificates in Project Management

The Graduate certificate in Project Management is awarded after 21 credit hours (see required set of courses below). It is taught as an integrated body of subject matter rather than a series of conventionally separated topics. While ultimately mapping to individual courses, teaching is by 4 hour blocks. This provides the opportunity to integrate different topics more effectively than taking one course at a time. This type of learning environment more closely tracks an actual work experience, and facilitates learning and application.

Courses Required for Certificate in Project Management:

OPRE6271 Project Overview, Strategic and Process Management (2 credits) 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.

OPRE6372 Project Initiation (3 credits) 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: OPRE6271.

OPRE6373 Project Planning (3 credits) Initial stages in planning a project to include scope definition; quality planning; organization considerations; negotiation; communication and decision making and related interpersonal considerations. Prerequisite: OPRE6372.

OPRE6374 Project Planning and Execution (3 credits) Planning techniques continued from OPRE6373 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: OPRE6373.

OPRE6375 Project Execution and Closeout (3 credits) Techniques required for successful execution of a project continued from OPRE6374 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: OPRE6374.

OPRE6376 Advanced Project Management and Simulation (3 credits) 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: OPRE6375.

MAS6101 Legal Considerations in Project Management (1 credit) This course provides an overview of legal issues encountered during the life of a project. Includes discussion of civil and criminal law; OSHA, safety, environmental and real estate law.

OB 6301 Organizational 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

Master of Science in Management and Administrative Sciences with an emphasis in Project Management

A Master of Science degree is awarded after the completion of an additional 18 credit hours beyond the Project Management Core requirements. The MS–MAS in Project Management requires the following coursework:

MS-MAS in Project Management supplemental curriculum:

AIM 6201 Financial Accounting
AIM6202 Managerial Accounting
MECO 6303 Business Economics
MIS 6204 Information Technology and MIS Fundamentals
OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business
MAS6v03 Seminar in Operations Management
MAS6v03 Seminar in Strategic Management

Executive MBA degree with an emphasis in Project Management

The Executive MBA is earned by waiving the Master of Science degree and completing an additional 14 credit hours, for a total of 53 hours. Students must include the executive core courses listed below to earn the degree.

Additional courses to fulfill requirements for the Executive MBA:

BPS 6310 Strategic Management
FIN 6301 Financial Management
IMS 6204 Global Business
MKT 6301 Introduction to Marketing Management
OPRE 6302 Operations Management

Executive Programs in Healthcare Management for Physicians and Senior Healthcare Administrators

The **Master of Science in Healthcare Management** is a specialized business degree available to licensed MDs and DOs and a select number of senior healthcare administrators. The 36 credit hour healthcare management curriculum consists of nine 4-day residential classes OR any eight classes plus a self-directed field study. A different class is offered every two months and classes may be started at any time and taken in any order. Eight classes are eligible for up to 36 hours each of Category 1 CME credit toward the AMA Physician's Award and CEU credit for healthcare administrators. Successful completion of any five classes is recognized by the award of a Graduate Certificate in Healthcare Management.

The curriculum is centered on real-life healthcare problems and cases. Classes are jointly taught by senior business and medical school faculty with outstanding academic credentials and real-world healthcare experience. Physicians and faculty work collaboratively in small teams to examine facts, evaluate alternatives and develop workable solutions.

The healthcare management curriculum consists of the following courses:

HMG 6401 Negotiation and Conflict Management in Healthcare (Executive Education Course; 4 semester hours) Develops critical negotiating and conflict management skills to significantly improve the quality of life within a medical organization. Topics include recognizing the difference between constructive and disruptive conflict, mediating disagreements among colleagues, negotiating against a stronger opponent and dealing with a disruptive or impaired colleague. (4-0) T

HMGT 6402 Financial Management of Healthcare Organizations (Executive Education Course; 4 semester hours) Develops the critical skills needed to make financial decisions that reduce risk and increase the economic value of a healthcare organization. Topics include how to read and interpret healthcare financial statements, determining a medical organization's cost of capital, using net present value to make value creating investment decisions; and evaluating the ability to attract and retain capital. (4-0) T

HMGT 6403 Medical Cost and Performance Management (Executive Education Course; 4 semester hours) Develops powerful tools to measure and control healthcare costs and improve operating performance. Topics include identifying and controlling important medical cost drivers, using flexible budgeting to improve operating performance, measuring the profitability of individual medical services and developing both financial and non-financial measures of organizational performance. (4-0) T

HMGT 6404 Service Quality Improvement and Patient Satisfaction (Executive Education Course; 4 semester hours) Provides the tools physicians need to position and grow their practices by improving the quality of their patient service processes. Topics include how to identify and improve key service processes, redesigning critical service processes to improve operating efficiency, and developing products and services that add patient value. (4-0) T

HMGT 6405 Healthcare Information Management and Technology (Executive Education Course; 4 semester hours) Examines the critical success factors for the specification, selection and implementation of a healthcare IT system. Topics include analyzing healthcare IT architectures, developing an IT implementation plan and budget, and developing the governance and oversight requirements of a major IT project. (4-0) T

HMGT 6406 Strategic Leadership of Healthcare Organizations (Executive Education Course; 4 semester hours) Develops the strategic thinking skills required to create sustainable competitive advantage in a healthcare organization. Topics include critically assessing a medical organization's competitive strengths and weaknesses, analyzing competitive threats to long-term survival, strategy formulation and the identification of potential strategic partners. (4-0) T

HMGT 6407 Healthcare Policy and Regulation (Executive Education Course; 4 semester hours) Examines the social and economic forces that are shaping US healthcare policy. Analyzes the federal government's role in the financing and regulation of healthcare, discusses the government's enforcement role with CMS and the OIG and analyzes the prospects for healthcare reform. This class is held in Washington, DC. (4-0) T

HMGT 6408 Motivational Leadership in Healthcare (Executive Education Course; 4 semester hours) Analyzes the types of behaviors which lead to high performance within healthcare organizations. Topics include individual behavior and motivation, behavioral job requirements and job/person matching,, the differences between leadership and managerial behavior; and how to establish and maintain a high performance work climate. (4-0) T

HMGT 6409 Self-directed Field Study (Executive Education Course; 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

HMGT 6410 Coaching as a Leadership Style (Executive Education Course; 4 semester hours) Develops highly effective coaching skills for fostering positive change in both individuals and teams. Topics include developing an effective coaching relationship through intelligent listening and authentic feedback, assessing an individual's readiness for change and helping to increase colleagues' personal and professional effectiveness. (4-0) T

HMGT 6V10 Special Topics in Healthcare Management (Executive Education Course) Issues in current Healthcare Management. Topics vary from semester to semester. May be repeated for credit to a maximum of six hours. (|1-3|-0)Y

HMGT 6V15 Self-directed Field Study (1-4 credit 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. (1-4 -0) S

The **Healthcare Management Executive MBA** is a general business degree preferred by physicians and healthcare administrators who wish to pursue a career in healthcare consulting. It requires the completion of the healthcare management curriculum plus an additional 17 credit hours consisting of six non-healthcare related general business classes. These classes provide an integrated overview of functional areas of management as well as analytical tools for effective decision making.

The general business classes are taken on line for maximum flexibility and convenience. The on-line classes require no on-campus visits.

The six general business classes required are:

FIN 6301 Financial Management

IMS 5200 Global Business

MECO 6303 Business Economics

MKT 6301 Introduction to Marketing Management

OPRE 6301 Quantitative Introduction to Risk and Uncertainty in Business

OPRE 6302 Operations Management

The Healthcare Management Executive MS and MBA degrees are supported entirely by participant fees and special admissions requirements apply. Further information may be obtained from the program website: <http://amme.utdallas.edu/>.

Executive Program in Organizational Behavior and Coaching

As is the case with both Project Management and Healthcare Management for Physicians, students in the executive program in Organizational Behavior and Coaching can complete multiple levels of recognition in the program, including:

1. A Graduate Certificate in Executive and Professional Coaching after 15 credit hours;
2. A Master of Science degree in Management and Administrative Sciences after the completion of an additional 21 credit hours beyond certificate requirements.

This concentration focuses on organizational behavior and coaching theory, methodology and techniques. Students learn how to become instruments of individual and organizational change, lead and manage organizational transitions, work effectively when there is resistance to change, and develop skills as an internal and external practitioner. Students deepen their knowledge of individual and organizational behavior through the integration of theory and practice. They leave the program with a set of tools for personal, group, organization and community transformation, qualified to apply for professional accreditation by the International Coach Federation.

Classes are conducted utilizing the very best in interactive distance learning methodologies, making the program convenient, efficient, and geographically independent for busy professionals. Students are taught by outstanding master coaches with real-world coaching experience within business settings and School of Management faculty. Participants will be eligible to receive fifteen graduate credit hours upon completion of the graduate certificate. More information is available at <http://som.utdallas.edu/coaching>

Graduate Certificate in Executive and Professional Coaching

The graduate level certificate requires the successful completion of the following six courses specific to Executive and Professional Coaching, including two Coaching Practicums, OB 6253:

OB 6350 Introduction to Executive and Professional Coaching (3 semester hours) The class provides students with a study of the origins and structure of coaching. Topics include, the current status of coaching, the history of coaching as a profession, basic coaching principles, ethics and standards, the core competencies of coaching, and basic coaching techniques and practices. It also addresses the role of personal style in coaching and how to adjust coaching behavior to fit the coaching requirements of clients. (3-0) T

OB 6351 Coaching in the Business or Organizational Setting (3 semester hours) This class prepares coaches to work with individuals and teams in a corporate or business environment. Topics include: 1) coaching and organizational behavior theories and models that facilitate client change within an

organizational setting; 2) coaching executives with an emphasis on achieving business results; 3) coaching methods for teams and groups; and 4) coaching clients through career transitions. (3–0) T
OB 6352 Advanced Coaching Models and Methods (3 semester hours) The course provides students with advanced principles and practices for coaching individuals within the corporate setting. Topics include appreciative inquiry models and techniques, a survey of evidence-based coaching models, the use of language to promote change, research practices, the basics of clinical diagnosis and how to respond as a coach when clients display clinical symptoms.

OB 6253 Coaching Practicum (2 semester hours) Individual sessions with a supervising coach and small-group supervised sessions. For the individual sessions, students will be required to submit recordings for review or provide for real-time attendance by the supervising coach so that an evaluation of their coaching competence can occur. Feedback and guidance will help students develop their coaching skills. A comprehensive exam will be used to evaluate coaching competency. The exam will test for their knowledge, skills, and abilities as an executive and professional coach.

MAS 7200 Coaching Practice Lab (2 semester hours) Small group practice sessions for the purpose of applying and deepening the principles and techniques learned throughout the coaching classes. The purpose of this class is to engage in applied learning through peer-to-peer interaction with instructor feedback.

Master of Science in Management and Administrative Sciences with a Concentration in Organizational Behavior and Coaching

After completion of the certificate requirements, students can go on to complete a Master of Science in Management and Administrative Sciences by completing another 21 hours of graduate level courses, including the courses in the MS-MAS core curriculum.

The MS-MAS core is comprised of the following courses:

MS-MAS Core Curriculum:

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

OB 6301 Introduction to Organizational Behavior (3 semester hours)

Organizational Behavior and Coaching students take the executive MS-MAS core set, and then draw the remainder of their courses from the following list specific to the Organizational Behavior component of the curriculum.

Organizational Behavior Electives:

OB 6331 Power and Politics (3 semester hours)

OB 6307 Strategic Human Resource Management (3 semester hours)

OB 6326 Organizations and Organizing (3 semester hours)

OB 6332 Negotiation and Dispute Resolution (3 semester hours)

OB 6336 Motivational Leadership in Organizations (3 semester hours) On Campus Only

OB 6337 Coaching as a Leadership Behavior (3 semester hours) On Campus Only

Management Course Descriptions

Accounting and Information Management

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. May not be substituted for, or taken for program credit in addition to, AIM 6305 (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. May not be substituted for, or taken for program credit in addition to, AIM 6305 (2-0) S

AIM 6300 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 6305 Accounting for Managers (3 semester hours) Fundamental concepts in accounting and financial reporting are presented from the perspective of business managers. May not be substituted for, or taken for program credit in addition to, 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) This course is a continuation of topics in external financial reporting, including: issues related to the measurement and reporting of current liabilities and contingencies, bonds, leases, deferred taxes, pensions, stock-based compensation plans, shareholders equity, earnings per share, accounting changes, and cash flows. Current generally accepted accounting principles for financial reporting are analyzed as is their effect on the presentation of financial results by corporations and other entities. 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 accounting principles in complex settings is studied. Topics include accounting for business combinations, consolidated entities, partnerships, transactions in foreign currency, and translation of financial statements reported in foreign currency. Prerequisite: AIM 6332 or instructor consent. (3-0) S

AIM 6334 Auditing (3 semester hours) This course introduces the basic concepts, philosophy, standards, procedures, and practices of auditing. Topics include generally accepted auditing standards, the changing role of the independent auditor, professional conduct and ethics, 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) S

AIM 6336 (HMG 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 (MIS 6326) 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 Accounting Systems Integration and Configuration (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) R

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 (MIS 6308) System Analysis and Project Management (3 semester hours) Provides the student with an in-depth knowledge of object oriented systems analysis and design procedures. Software project management techniques will be introduced. At the end of the course, the student will be able to analyze business solutions and design computer based information systems using object-oriented methodologies. Co-prerequisite: MIS 6326. (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) R

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) S

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 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) R

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, supply chain management and high quality cost management systems, valuation of entrepreneurial firms, and real options analysis. Prerequisite: AIM 6202. May be repeated for credit as topics vary. (3-0) R

AIM 6349 (MIS 6302) Information Technology Strategy and Management (3 semester hours) This course explores the strategic management and control issues associated with information technology. It provides a framework to understand how IT strategy aligns with business strategy and focuses on developing an understanding of the key information requirements for developing an IT strategy and systems architecture. This includes conducting IT sourcing analysis, and managing IT investments effectively to maximize business value. The course will consist of a mix of real-world case studies on IT

strategy development across different industries. May not receive credit for both AIM 6349 and MIS 6302. (3-0) R

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 (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) Y

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 6371 Securities Law (3 semester hours) This class covers the federal laws that govern the sale of securities (i.e., stocks, bonds and other financial instruments) and the markets in which they are offered and sold. The class emphasizes the key federal statutes (such as the Securities Act of 1933, the Securities Exchange Act of 1934, and Sarbanes Oxley), the important Supreme Court decisions construing those laws, and SEC and other government regulation of products and markets. The class will discuss the various types of financial products, and the major accounting issues important to the sale and regulation of these products. The class emphasizes the historical development of the markets, including the major financial scandals and their impact on the markets and the law. (3-0) R

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. (3-0) S.

AIM 6378 (MIS 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, or similar software, as the primary learning tool.

Students will garner knowledge of operational, analytical, and collaborative CRM. (3-0) R

AIM 6379 (MIS 6379) SAP 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 (HMGT 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 6381 Accounting Theory (3 semester hours) Extensive investigations of underlying theoretical concepts of accounting; historical development of accounting theory; varying concepts of income measurement and asset valuation and current developments in accounting theory. (3-0) R

AIM 6382 (HMGT 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 Fraud Examination (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 6385 Managerial Accounting in Enterprise Systems (3 semester hours) This course will cover the complexity and functionality of managerial accounting systems within Enterprise Systems. Cost center accounting, profitability analysis, product costing, profit center accounting and reporting related to managerial decision-making will be covered. Use of SAP or similar software will be used to demonstrate concepts. Prerequisites: AIM 6 201 and AIM 6202. (3-0) R

AIM 6386 Governance, Risk Management and Compliance (GRC) (3 semester hours) Corporate Governance is concerned with the balancing of stakeholder interests. Reforms such as Sarbanes-Oxley, the rules of the Self Regulating Organizations, and the new rules of the SEC, have broadened the outlook of accounting professionals. In this course, the central role of risk management is examined, the linkage between risk management and compliance requirements is examined, and the connection between compliance requirements and their intended impact on reporting is considered. (3-0) Y

AIM 6387 Executive Compensation and Shareholder Returns (3 credit hours) Covers issues related to executive compensation and its impact on shareholder wealth. Students review the history of executive compensation and the relationship of executive pay to average employee pay, as well as data on whether there is alignment between current compensation methods and shareholder returns. This will include study of the corporate scandals which led to the Sarbanes-Oxley Act of 2002, the proliferation of golden parachutes, pending legislation and regulations such as "say on pay" and increasing federal involvement in compensation issues, e.g. the appointment of a federal "pay czar" at the Department of the Treasury to manage executive salaries at companies receiving federal bailout money. Prerequisites: None (3-0) Y

AIM 6390 Professional Accounting (3 semester hours) This course is designed to help students prepare for careers in professional accounting and professional examinations. May be repeated for credit as topics vary.(9 hours maximum). (3-0) R

AIM 6V99 Special Topics in Accounting and Information Management (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

AIM 7313 Contemporary Research in Accounting and Economics (3 semester hours) This course will

introduce analytical and empirical methods appropriate for addressing accounting questions in the capital markets arena. The emphasis will be to provide a foundation for research methods in accounting. Topics will include use of accounting information for valuation, value relevance, earnings management, accounting and audit as corporate mechanisms and some anomalies. Prerequisite: Consent of the instructor. May be repeated for credit as topics vary. (3-0) T

AIM 7314 Empirical Research in Financial Reporting (3 semester hours) Presents current areas of research in the area of financial reporting. Emphasis is ongoing and recently completed research studies, including understanding of their antecedents and research methodologies. Capital market based empirical research topics will be covered. In particular, the role of analysts as financial information intermediaries will be examined. Prerequisite: Consent of the instructor. May be repeated for credit as topics vary. (3-0) T

AIM 7323 Empirical Research in Accounting and Economics (3 semester hours) This course is designed to further the ability of the students to critically analyze completed research efforts, to provide insight into how a given stream of research (e.g. earnings return association studies, trading volume) develops over time and to further the students' knowledge of academic accounting research in the area of financial accounting / reporting. May be repeated for credit as topics vary. (3-0) T

AIM 7324 Empirical Research in Financial Accounting (3 semester hours) Presents a detailed study of past and current empirical research in the areas of financial accounting and other related fields. Emphasis is on a clear understanding of hypothesis formulation, research design, sample selection and statistical techniques used in these studies. Topics include financial reporting, valuation and analyst forecasts. May be repeated for credit as topics vary. (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. May be repeated for credit as topics vary. (3-0) T

AIM 7334 Research Foundations in Accounting (3 semester hours) Presents a detailed study of economics based research in financial accounting reporting. Emphasis is on providing an understanding of the current research in capital market based financial accounting. This course provides a platform for supplementing and integrating the students' knowledge of basic research methods and tools and requires the students to identify an accounting topic that they are interested in and to write a research paper in that topic. May be repeated for credit as topics vary. (3-0) T

AIM 7343 Empirical Research in Managerial Accounting (3 semester hours) Presents a detailed study of empirical research in the area of managerial accounting. Emphasis is on providing an understanding of the current research in managerial accounting. Topics covered include managerial incentives, design of compensation contracts, performance measurement and cost management. May be repeated for credit as topics vary. (3-0) T

AIM 7344 Advanced Research in Accounting (3 semester hours) This course exposes the students to a wide range of empirical research methodologies including large sample archival research. Emphasis is on providing a clear understanding of the research methods including the theoretical aspects that underlie. May be repeated for credit as topics vary. (3-0) T

Business Policy and Strategy

BPS 6250 Business Transformation Project I (2 semester hours) This two hour course will immerse the student in an initial examination and/or design of a substantial project within a corporation intended to raise corporate value by transforming the business. The emphasis will be on new uses of assets and resources, not the improved management of existing activities. This is intended to develop the executive capacity of the individual student. (2-0) Y

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 6310. May be repeated for credit as topics vary. (2-0) T

BPS 6301 The Environment of Business (3 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. (3-0) 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 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 6321 Contemporary Business Issues and Strategy (3 credit hours) This course focuses on the factors that affect economic growth, contractions and cycles and how they affect specific industries, firm profitability, security of investment, job growth and individual career opportunities. Students make connections between the fundamentals of the global economy, national corporate policy and companies' strategies. These strategies should determine long-term objectives, the adoption of courses of action and the allocation of corporate resources in an evolving complex competitive environment. Prerequisites: None (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 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 6379 Business Strategies for Sustainability (3 credit hours) The course introduces students to sustainable business practices. The role of legislation and its impact on business practices as well as

proactive business strategies firms use to differentiate themselves and obtain a competitive advantage will also be addressed. By viewing a firm through an environmental lens, managers find opportunities to reduce risks, drive down costs, and create intangible value. Further, firms can build stronger connections with a broad range of stakeholders. (3-0) Y

BPS 6385 (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 ENTP 6385 and only one of these may be counted toward a degree. Prerequisites: ENTP 6370 and BPS 6310 or consent of the instructor. (3-0) Y

BPS 6V99 Special Topics in Business Policy and Strategy (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

BPS 7300 Advanced Strategic Management Seminar I (3 semester hours) This is the first of a two-part series of Ph.D. seminars in strategic management that (1) expose students to various theories and topics in strategic management research, and (2) train students to become informed researchers who will be able to contribute to this literature. This seminar covers the major theories in current research addressing strategy formulation and implementation. Prerequisite: OB 7300. (3-0) T

BPS 7301 Advanced Strategic Management Seminar II (3 semester hours) This is the second of the two-part series of Ph.D. seminars in strategic management. Together the two seminars (1) expose students to various theories and topics in strategic management research, and (2) train students to become informed researchers who will be able to contribute to this literature. Seminar II focuses more on the empirical research in major topics such as strategic alliances, networks, competitive dynamics and knowledge management. Students learn to use the different theories introduced in the previous seminar as tools for analyzing strategic business phenomena. Prerequisite: BPS 7300 (3-0) Y

BPS 7302 Research Methodology (3 semester hours) The aim of this course is to lay the foundations for good empirical research in the social sciences and to introduce students to the assumptions and logic underlying social research. Students become acquainted with a variety of approaches to research design, and are helped to develop their own research projects and to evaluate the products of empirical research. (3-0) Y

BPS 7303 Doctoral Teaching and Writing Seminar (3 credit hours) Provides the tools necessary for beginning academics to think critically about teaching and writing to enable them to be successful researchers and effective teachers. Students will not only be exposed to research on effective writing and teaching, but will also work actively with classmates – both within and across areas – to improve their ability to write clearly and teach well. The course will require students to assess both their own writing and the writing of others. Students will practice putting together a syllabus, creating assignments for students, and presenting explanations of difficult concepts. (3-0) Y

Innovation and Entrepreneurship

ENTP 6315 (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 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 6316 (FIN 6316) Private Equity Finance (3 semester hours) This course will cover the investment of capital in the equity of private companies to fund growth or in public companies to take them private. This course includes the study of a broad spectrum of private equity investments, investing in established private firms, buyouts, financial restructuring of distressed firms, private equity financing by public firms. Prerequisite: FIN 6301 or consent of the instructor. (3-0) Y

ENTP 6350 SIFE Entrepreneurial Practice (3 Credit Hours) Students will develop entrepreneurial service and education program projects that focus on six core areas – (1) market economics, (2) entrepreneurship, (3) financial literacy, (4) success skills, (5) environmental sustainability, and (6) business ethics. The student teams and the target beneficiary organizations will jointly develop student project objectives and deliverables supervised by faculty. Students will then present project results to the community and will gather data on how much the target group learned from the project. The students will prepare presentations based on this data for the regional SIFE competition. 3-0, Y

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. Topics may vary. Prerequisites: AIM 6201 or consent of the instructor. (3-0) S

ENTP 6375 Technology and New Product Development (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: ENTP 6370 and OB 6301 or consent of the instructor.(3-0) Y

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: ENTP 6370 or consent of the instructor. (3-0) Y

ENTP 6380 (MKT 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: MKT 6301 and ENTP 6370 or consent of the instructor. (3-0) Y

ENTP 6382 – Professional Salesmanship (3 credit hours) Examines the theory and practical application of the principles and art of professional selling in the entrepreneurial environment. The course learning objectives include: 1) Understanding the role, needs, purposes, and processes of the sales function in entrepreneurial business strategy and the evolution of strategic and consultative selling; 2) Understanding client behavior and motivations for buying and the professional (non-stereotypical) methods for accommodating motivations, including building trust and relationship selling; 3) Recognizing and managing personality and communication styles and the psychological, social, and situational issues affecting the buyer's response to the sales presentation; 3) Appreciating and managing the social, ethical and legal issues impacting the selling process; 4) Learning how to prepare and deliver compelling and persuasive presentations, 5) Understanding how to manage customer concerns professionally and earn customer commitment effectively, 6) Learning to manage time effectively and network productively, 7) understanding the principles and approaches for managing existing customers and expanding client base, and 8) Understanding methodologies relating to recruiting, training, compensating, motivating and monitoring the sales force in entrepreneurial ventures. Prerequisite: ENTP 6370 (3-0) Y

ENTP 6385 (BPS 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: ENTP 6370 and BPS 6310 or consent of the instructor. (3-0) Y

ENTP 6387 Forecasting Industry and Technology Futures (3 semester hours) Market disruptions occur at the intersection of markets and technology, industry, and social trends. This course will focus on the challenges of analyzing technology, social, and economic trends and forecasting the future performance of specific industries and technologies over time. The course will cover tools and techniques for the analysis of the historical evolution of key industry, technology, demographic, political, and social trends (such as Moore's law for semiconductor performance), and methodologies and information resources for extrapolating and forecasting the future state of industries and technologies. Industry convergence, standards, usage trends and network externalities will also be addressed. The product/market implications of industry trends and technology futures will be explored through the use of case studies and projects. Prerequisites: ENTP 6370 or consent of the instructor. (3-0) Y

ENTP 6388 Managing Innovation 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: OB 6301 and ENTP 6370 or consent of the instructor. (3-0) Y

ENTP 6390 Business Model Innovation (3 semester hours) A business model is more than a business concept, but less than a business plan. Business model development is a logical and internally consistent approach to the design and operations of a new venture, capturing the essence of how the business will be focused and providing a concise representation of how an interrelated set of decision variables will be addressed to create sustainable competitive advantage. This course will explore the range and diversity of existing business models and the analytical tools essential to their understanding, define a logical and internally consistent approach to the choice or development of an appropriate business model for a new enterprise and demonstrate the application of these tools and techniques through case studies and a semester project focused on an entrepreneurial startup. Prerequisite: ENTP 6370 or consent of instructor. (3-0) R

ENTP 6392 Entrepreneurship in the Social Sector (3 semester hours) This course will explore the role and importance of the non-profit sector and the unique place it occupies in 21st Century life. The course will develop theoretical and conceptual frameworks appropriate for understanding the processes and challenges of non-profit ventures in the social sector. Student teams will work with selected non-profits in the local community, focusing on the issues and challenges of mission definition, service delivery, business practices, fund-raising and governance. Prerequisite: none. (3-0) Y

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: ENTP 6370 and consent of instructor. May be repeated for credit as topics vary. (3-0) Y

ENTP 6398 The Entrepreneurial Experience (3 semester hours) This course is designed to provide student teams with practical experience in the investigation, evaluation and recommendation of technology and/or market entry strategies for a significant new business opportunity. Projects will be defined by the faculty and will generally focus on emerging market opportunities defined by new technologies of interest to a sponsoring corporate partner. Teams will be comprised of management and engineering graduate students, mentored by faculty and representatives of the partnering company. Evaluation will be based on papers, presentations and other deliverables defined on a case-by-case basis. Prerequisites: ENTP 6370 or consent of instructor (3-0) Y

ENTP 6V99 Special Topics in Entrepreneurship (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

Finance

FIN 6300 Personal Finance (3 semester hours) Examination of personal financial management and planning issues, with an emphasis on the integration of personal savings and investment decisions with life insurance programs and estate planning. Topics covered include the role of property, health, life insurance; tax-deferred investment vehicles, as well as fixed income and equity investment alternatives such as mutual funds. (3-0) Y

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: OPRE 6301 and AIM 6201, or consent of instructor. (3-0) S

FIN 6306 Quantitative Methods in Finance (3 semester hours) The objective of this course is to develop students' ability to use quantitative methods and software (particularly spreadsheet) in financial decision making. Pre-requisites: FIN 6301. (3-1) S.

FIN 6308 Regulation of Business and Financial Markets (3 semester hours) The objective of this course is to develop a student's understanding of the laws and regulations which govern businesses and financial markets. In addition, this course considers the ethical issues that financial analysts and financial planners face. Co-requisite: FIN 6301 and MECO 6303 (3-0) Y.

FIN 6310 Investment Management (3 semester hours) This course is intended 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. 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. Co-requisite: FIN 6306. (3-0) S.

FIN 6314 Fixed Income Securities (3 semester hours) Examines fixed income securities, their derivatives, and the management of fixed income portfolios. Prerequisite: FIN 6310. (3-0) Y.

FIN 6315 (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 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 6316 (ENTP 6316) Private Equity Finance (3 semester hours) This course will cover the investment of capital in the equity of private companies to fund growth or in public companies to take them private. This course includes the study of a broad spectrum of private equity investments, investing in established private firms, buyouts, financial restructuring of distressed firms, private equity financing by public firms. Prerequisite: FIN 6301 (3-0) Y

FIN 6320 Financial Markets and Institutions (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, and MECO 6303. (3-0) Y

FIN 6321 Introduction to Real Estate and Land Development (3 semester hours) Overview of various aspects of real estate markets, including a study of the participants, their roles, the regulation of land development, valuation techniques, and the marketing of real estate endeavors. Prerequisite: FIN 6301 (3-0) Y

FIN 6322 Real Estate Finance and Capital Markets (3 credit hours) A study of the instruments and methods used to finance real estate investment. Topics include real estate loans, syndication, securitization, and developments in capital market regulation that affect the financing of real estate investments. Prerequisite: FIN 6321(3-0) Y

FIN 6323 Real Estate Project Analysis and Management (3 credit hours) An in-depth course that

combines lectures and case studies to explore the sources of real estate value, appropriate strategies for financing, and the management of real estate assets. FIN 6321 and permission of the instructor. (3-0) Y

FIN 6330 Behavioral Finance (3 semester hours) This course describes how individuals and firms make financial decisions, how those decisions might deviate from those predicted by traditional financial or economic theory and the consequences of these deviations for financial markets. The course examines how the insights of behavioral finance complements the traditional finance paradigm. Students will gain an understanding of how individuals actually make financial decisions (descriptive) and guidance on how to improve financial decision making (prescriptive) in themselves and others. Prerequisite: FIN 6301 or consent of instructor (3-0) T

FIN 6340 Management of Financial Institutions (3 semester hours) Study of the financial management of commercial banks and other financial intermediaries, with special attention to risk management issues. Prerequisites: FIN 6320 or consent of instructor. (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. Topics may vary. (3-0) T

FIN 6352 Financial Modeling (3 semester hours) This course is an introduction to corporate financial modeling. The course is designed for students planning careers in areas such as corporate finance, private equity, venture capital, mergers and acquisitions, or corporate restructuring. The primary focus of the course is to relate the theory of finance to practical and usable spreadsheet models that will assist a financial manager with a firm's investment and financing decisions. Students will be introduced to both simulation and optimization models as well as various forecasting techniques. Pre-requisites: FIN 6306 or consent of instructor. (3-0) T

FIN 6355 Corporate Finance and Policy (3 semester hours) Cases involving financial situations encountered by managers that require the application of financial management skills. Special emphasis is placed on strategy. Prerequisites: FIN 6350 or consent of instructor. (3-0) Y

FIN 6356 Mergers and Acquisitions (3 semester hours) Examines mergers and acquisitions paying particular attention to how they are structured, valued, and financed. Prerequisite: FIN 6350 or consent of instructor. (3-0) T

FIN 6357 Corporate Restructuring and Turnarounds (3 semester hours) Examines the issues and strategies associated with restructuring a corporation to turn it around, either when in distress or in bankruptcy. Pre-requisite: FIN 6350 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 3. (3-0) T

FIN 6364 Advanced Investment 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. 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. Prerequisite: FIN 6310. (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 6320. 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 6310 or FIN6350, or permission of instructor. Topics may vary. (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 as topics vary. (3-0) T

FIN 6380 Practicum in Investment Management (3 semester hours) Requires permission of the area coordinator. For students involved in the practice of investment management. May be repeated for credit (9 hours maximum). (3-0) T

FIN 6381 Introductory Mathematical Finance (3 semester hours) Introduction to the mathematical methods of continuous time finance (Ito calculus, stochastic dynamic optimization, etc). Requires permission of the instructor. (3-0) T

FIN 6383 Financial Asset Pricing and Engineering (3 semester hours) Study of theoretical models of financial asset pricing and financial engineering. Prerequisite: FIN 6360 or FIN 6370. (3-0) T

FIN 6V99 Special Topics in Finance (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

FIN 7310 Seminar in Contemporary Finance (3 semester hours) Issues in current financial research. Prerequisite: consent of instructor. May be repeated for credit as topics vary. (3-0) T

FIN 7330 Topics in Theoretical Asset Pricing (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. Topics include utility theory, mean-variance portfolio analysis, state preference models, continuous time portfolio selection, and the term structure of interest rates. Prerequisites: MECO 6345 or its equivalent. (May be repeated for credit with the permission of the instructor) (3-0) T

FIN 7335 Topics in Empirical Asset Pricing (3 semester hours) Study of the methods used to empirically test asset pricing theories and/or models. Corequisite: FIN 7330. May be repeated for credit with permission of instructor. (3-0) T

FIN 7340 Topics in Theoretical Corporate Finance (3 semester hours) Advanced empirical and theoretical analysis of corporate financial decision making. Topics include the theory of the firm, initial public offerings, ownership and control, managerial incentives, risk management, and financing and investment decisions. Prerequisites: MECO 6345, or its equivalent. (May be repeated for credit with the permission of the instructor) (3-0) T

FIN 7345 Topics in Empirical Corporate Finance (3 semester hours) Study of the methods used to empirically test corporate finance theories and/or models. Corequisite: FIN 7340. May be repeated for credit with the permission of the instructor. (3-0) T

Healthcare Management

HMG 6320 The American Healthcare System (3 semester hours) Examines the structure, financing and operation of the US healthcare industry. It analyzes how priorities are established, how services are organized and delivered, factors that influence the cost, quality and availability of healthcare, and opposing positions on the future of healthcare reform. This course serves as an introduction for healthcare majors. (3-0) T

HMG 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. (3-0) T

HMG 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: either AIM 6201 or AIM 6202. (3-0) T

HMG 6323 (MIS 6317) Healthcare Informatics (3 semester hours) Examines the unique challenges of clinical and patient care delivery in the healthcare industry, including the role of data management, emerging data standards and information technology in improving the quality and cost associated with healthcare. The focus of the course will be on healthcare IT including issues related to governance, data integration, and selection and management of healthcare IT. This course is equivalent to MIS 6317 and only one of these may count toward a degree. (3-0) T

HMG 6324 (OB 6332) Healthcare 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 in the healthcare industry. 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

HMGT 6325 Healthcare Operations Management (3 semester hours) Explores how effectively managing and continuously improving the end-to-end health care supply chain provides a competitive advantage. Topics include supply chain fundamentals, key players in the health care supply chain and their challenges, how the health care supply chain works, impact of technology on supply chain performance, and lean six sigma methodology. Simulations and case studies will reinforce the learning. (3 – 0) T

HMGT 6327 Information and Knowledge Management in Healthcare (3 semester hours) Explores how effective information and knowledge management can leverage the intellectual capital in healthcare organizations and help them achieve technical superiority. It covers the key areas of knowledge management, from identifying knowledge in an organization to promoting and facilitating knowledge sharing and innovation. Using numerous case studies, the course surveys the technology, the strategies and the practice of knowledge management. (3-0) Y

HMGT 6329 Seminar 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, HIPAA regulation, and measuring quality in healthcare. Prerequisite: HMGT 6320. . May be repeated for credit as topics vary. (3-0) R

HMGT 6330 Healthcare Law, Policy and Regulation (3 semester hours) This course examines how healthcare laws and regulations are enacted and their impact on providers, payers, and patients. Topics include: Stark prohibitions on provider self-referral; federal regulations on fraud and abuse; the Emergency Treatment and Active Labor Act (EMTALA); and, the Health Insurance Portability and Accountability Act (HIPAA). It also examines the process by which Congressional legislation is transformed into day-to-day industry regulation. (3-0) Y

HMGT 6331 Healthcare Economics (3 semester hours) This course applies the tools of economic analysis to the challenges and opportunities faced by managers and policy makers in the health sector. Topics covered include: measuring the benefits of healthcare; the role of insurance in spreading risk and altering incentives; the production of healthcare; price and non-price competition among providers; international comparisons of healthcare systems; and, proposed policies that are intended to expand access and contain cost. (3-0) Y

HMGT 6332 Quality Improvement in Healthcare: Six Sigma and Beyond (3 Credit Hours) The course will explore applications of quality improvement measures to the healthcare environment. Applications including the Demming method, QI, and CQI will be studied. Application of other industrial quality improvement methodology including Six Sigma and Toyota Lean will be covered. Prerequisites: HMGT 6320. 3-0 Y

HMGT 6333 Ethics in Healthcare Management (3 credit hours) This course explores ethical issues specific to the healthcare industry including: fraud and abuse, rationing, uninsured treatment, the role of government, and end of life decisions. 3-0, Y

HMGT 6334 (MIS 6324) Business Intelligence Software and Techniques (3 semester hours) This course covers theories and applications of business intelligence. The focus is on extracting business intelligence from firm's business data for various applications, including (but not limited to) customer segmentation, customer relationship management (CRM), personalization, online recommendation systems, web mining and product assortment. The emphasis will be placed on the "know-how" –knowing how to extract and apply business intelligence to improve business decision making. Students will also acquire hands-on experience with several business intelligence software such as XL miner, SAS Enterprise Miner and SQL Server2008 (depending on availability). This class is required for the SAS certificate in data mining. Prerequisite: MIS 6326 (3-0) Y

HMGT 6336 (AIM 6336) Information Technology 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

HMGT 6380 (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

HMG 6382 (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.

Prerequisites: AIM 6334 or AIM 6380. (3-0) R

HMG 6V99 Special Topics in Healthcare Management (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

International Management Studies

IMS 6204 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 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 6302 Legal Aspects of 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 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 6320 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. Students who take this course may not also receive credit for FIN 6366. Prerequisites: IMS 5200 and FIN 6301, or consent of instructor. (2-0) Y

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 6370 Seminar in International Operations Management (3 semester hours) One of two capstone courses designed around a study tour to an international location where students attend courses at a local university with local students, interact with managers from local companies regarding business practices, and study the culture of the country they are visiting. Special department registration required. Prerequisite: completion of Project Management Core and Business Core course in Statistics, Financial Accounting, Managerial Accounting and Business Economics. (3-0) Y

IMS 6371 Seminar in International Strategic Management (3 semester hours) One of two capstone courses designed around a study tour to an international location where students attend courses at a local university with local students, interact with managers from local companies regarding business practices, and study the culture of the country they are visiting. Special department registration required. Prerequisite: completion of Project Management Core and Business Core course in Statistics, Financial Accounting, Managerial Accounting and Business Economics. (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

IMS 7301 International Business (3 semester hours) Current theories in international business. Formal and informal institutions affecting international business.

IMS 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

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. May be repeated for credit as topics vary. ([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 global economy. Prerequisite: IMS 5200 or consent of instructor. May be repeated for credit as topics vary. ([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 global economy. Prerequisite: IMS 5200 or consent of instructor. May be repeated for credit as topics vary. ([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. May be repeated for credit as topics vary. ([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. May be repeated for credit as topics vary. ([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. May be repeated for credit as topics vary. ([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. Topics may vary. ([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. May be repeated for credit. Topics may vary. ([2, 3, or 6]-0) T

IMS 8V80 Research Series in International Business (2, 3, or 6 semester hours) May be repeated for credit. Topics may vary. ([2, 3, or 6]-0) T

IMS 8399 Dissertation (3 semester hours) May be repeated for credit. Topics may vary. (3-0) S

Management Information Systems

MAS 6101 Legal Considerations in Project Management (1 credit hour) This course provides an overview of legal issues encountered during the life of a project. Includes discussion of civil and criminal law; OSHA, safety, environmental and real estate law. Special department registration required. (3-0) 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 (AIM 6349) Information Technology Strategy and Management (3 semester hours) This course explores the strategic management and control issues associated with information technology. It provides a framework to understand how IT strategy aligns with business strategy and focuses on developing an understanding of the key information requirements for developing an IT strategy, the systems architecture, conduct IT sourcing analysis, and manage IT investments effectively to maximize business value. The course will consist of a mix of real-world case studies on IT strategy development across different industries. May not receive credit for both AIM 6349 and MIS 6302. (3-0) R

MIS 6308 (AIM 6340) System Analysis and Project Management (3 semester hours) Provides the student with an in-depth knowledge of object oriented systems analysis and design procedures. Software project management techniques will be introduced. At the end of the course, the student will be able to analyze business solutions and design computer based information systems using object-oriented methodologies. Co-prerequisite: MIS 6326. (3-0) R

MIS 6309 Business Data Warehousing (3 semester hours) The course will discuss data warehousing principles and techniques and introductory business intelligence. It will focus on SAP business warehousing and reporting. Students will learn how to develop and implement queries that mine existing data which reside in the SAP Business Warehouse. (3-0) Y

MIS 6314 Systems Reengineering (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 Data Communications (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 6317 (HMG 6323) Healthcare Informatics (3 semester hours) Examines the unique challenges of clinical and patient care delivery in the healthcare industry, including the role of data management, emerging data standards and information technology in improving the quality and cost associated with healthcare. The focus of the course will be on healthcare IT including issues related to governance, data integration, and selection and management of healthcare IT. This course is equivalent to HMG 6323 and only one of these may count toward a degree. (3-0) T

MIS 6318 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 Planning (3 semester hours) Examines the role of enterprise systems in organizations. It will focus on business processes, business process integration, and information technology for enabling the integration. The course also covers 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. (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. (3-0) Y

MIS 6324 (HCMT 6334) Business Intelligence Software and Techniques (3 semester hours) This course covers theories and applications of business intelligence. The focus is on extracting business intelligence from firm's business data for various applications, including (but not limited to) customer segmentation, customer relationship management (CRM), personalization, online recommendation systems, web mining and product assortment. The emphasis will be placed on the "know-how" –knowing how to extract and apply business intelligence to improve business decision making. Students will also acquire hands-on experience with several business intelligence software such as XL miner, SAS Enterprise Miner and SQL Server2008 (depending on availability). This class is required for the SAS certificate in data mining. 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 (AIM 6337) 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. Student may not receive credit for both AIM 6337 and MIS 6326 (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 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. Topics may vary. (3-0) Y

MIS 6330 Information Technology Security (3 semester hours) With the advances in information technology, security of information assets has become a keenly debated issue for organizations. While much focus has been paid to technical aspects of the problem, managing information security requires more than technology. Effective information security management demands a clear understanding of technical as well as socio-organizational aspects of the problem. The purpose of this course is to prepare business decision makers who recognize the threats and vulnerabilities present in current information systems and who know how to design and develop secure systems. This course (i) uses lectures to cover the different elements of information security, (ii) utilizes business cases and academic research studies to discuss information security issues faced by today's businesses, (iii) keeps in touch with the security market and practices through webcasts, and (iv) presents strategies and tools to develop an information security program within the organization. Prerequisite: None. (3-0) Y

MIS 6332 Advanced ERP: Sales and Distribution (3 semester hours) The class focuses on advanced

process and configuration issues related to ERP implementation. The functional side of sales, distribution, delivery and billing as well as integration with materials management and financial accounting is emphasized. SAP is currently used to discuss and provide hands-on experience with key ideas.

Prerequisite: MIS 6319 or consent of the instructor. (3-0) Y

MIS 6334 Advanced Business Intelligence (3 credit hours) This course is SAS based and is part of the 4-course curriculum for the SAS data mining certificate program. It will cover the topics as required by the SAS certificate program including data manipulation, imputation, variable selection, SAS/STA, SAS/ETS, SAS/QC (DOE) and various SAS stat modules. Students will also learn various advanced business intelligence topics including business data analytics, model analytics, customer analytics, web intelligence analytics, business performance analytics and decision making analytics. Tools to be used include SAS, Weka and spreadsheet modeling. Prerequisite: OPRE 6301, MIS6324 (3-0) Y

MIS 6344 Web Analytics (3 credit hours) The course examines the technologies, tools, and techniques to maximize return from web sites. The course includes topics related to web site design issues, web data collection tools and techniques, measurement and analysis of web traffic, visitor tracking, search engine optimization, visitor acquisition, conversion and retention, key performance indicators for web sites, and measurement of online marketing campaigns. The use of web analytics tools such as Google Analytics will be an integral part of the course. Prerequisites: None. (3-0) Y

MIS 6352 Web Systems Design and Development (3 semester hours) Provides an in depth examination of web application design evaluation practices and web application development techniques. A Rich Internet Application (RIA) is developed using an agile, team based, software development methodology leveraging a combination of CSS, HTML, JavaScript, XHR, DOM, PHP, and MySQL. Emphasis is given to hands on application of course material through development of a web application prototype under conditions simulating a business environment. Prerequisites: None. (3-0) Y

MIS 6355 Information Technology for E-Business (3 semester hours) The objective of this class will be to gain an understanding of the Information Technologies (IT) that support and drive E-business. The emphasis in the class will be on the IT architecture of an E-business. Specifically we will study technologies that underlie the Internet and Web, together with client-side and server-side computing. Issues pertaining to the design of optimal E-business systems, including web capacity planning, and optimal web server design will be briefly discussed. Prerequisite: MIS 6323 and MIS 6326. (3-0) Y

MIS 6360 Software Project Management (3 semester hours) Provides an in depth examination of project management principles and modern software project management practices. The five process groups and nine knowledge areas of the Project Management Institute Body of Knowledge (PMI BOK) are examined in the context of the systems development lifecycle. Portfolio management and the use and application of software project management tools are also discussed. Prerequisites: None (3-0) Y

MIS 6362 Web Services and Service Oriented Architecture (3 semester hours) Examines the service orientation of technology to serve business. The course will explore Service Oriented Architecture (SOA) fundamentals from Application as well as Infrastructure perspective and study its impact to business. The course will examine the evolution of service orientation over computing eras leading up to current practices and cutting edge trends in global industry. Prerequisite: None. (3-0) Y

MIS 6369 (OPRE 6369) Supply Chain Software (3 semester hours) The course teaches planning and execution of supply chains with software such as SAP's ERP (R3) and Advanced Planning & Optimization (APO). This software is used in lab exercises that provide students with hands-on, experimental learning. The focus is on the supply planning function of supply chain management. Topics include: introduction to ERP and SAP, master and transaction data, MRP, forecasting, supply and demand matching, and integration of ERP and APO modules. This course is intended for graduate students with interests in software-based supply chain management. No SAP experience is required. Prerequisites: OPRE 6301 and OPRE 6302 or the permission of the instructor. (3-0) R

MIS 6372 Managing Outsourced IT-Enabled Services (3 Credit Hours) The purpose of this course is to examine and explain how organizations engage and manage their global sourcing of business and IT services throughout the outsourcing lifecycle. The course covers topics related to the sourcing strategies and models, due diligence and supplier selection processes, configuration fit and operational effectiveness concepts and different ITO delivery models. It also focuses on organizational, technological and economical aspects associated with the outsourcing of IT services and functions. Students will learn how to manage outsourcing initiatives and globally dispersed teams effectively. Prerequisite: None. (3-0) Y

MIS 6378 (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, or similar software, as the primary learning tool. Students will garner knowledge of operational, analytical, and collaborative CRM. (3-0) R

MIS 6379 (AIM 6379) SAP 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 on 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

MKT 6380 (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 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: MKT 6301 and ENTP 6370 or permission of the instructor. (3-0) T

MIS 6V99 Special Topics in Management Information Systems (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

MIS 7310 Advanced Topics in Knowledge Management (3 semester hours) The course will discuss knowledge representation and reasoning techniques. It will focus on (i) conceptual models of knowledge in IT-based systems, (ii) automated reasoning mechanisms that are enabled by such representations, and, (iii) automated discovery of knowledge from data. Applications in decision support systems, expert systems, and personalization and recommendation systems will be discussed. Necessary background in data models and information theory will be provided. (3-0) T

MIS 7220 Colloquium in Management Information Systems (2 credit hours) Issues in current information systems research. Prerequisite: Permission of instructor. May be repeated for credit as topics vary. (2-0) R

MIS 7330 MIS Teaching Practicum (3 semester hours) Individual sessions with a supervising coach. The student will have responsibility for handling all of the instructional duties for a course, including designing the syllabus, and all assessment. Feedback and guidance will help the student develop their teaching skills. Prerequisite: Permission of department. May be repeated for credit as topics vary. (3-0) S

MIS 7340 Independent Study in MIS (3 semester hours) The student studies in depth a topic of interest to them in MIS under the guidance of an instructor. Prerequisite: Permission of the instructor. May be repeated for credit as topics vary. (3-0) S

MIS 7420 Seminar in Management Information Systems (4 semester hours) Survey of theoretical issues and research in information systems. Prerequisite: Permission of instructor. May be repeated for credit as topics vary. (4-0) R

Managerial Economics and Analysis

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 Applied Econometrics and Time Series Analysis (3 semester hours) A survey of the econometric methods used to examine cross-sectional and times series data with an emphasis on their applications. Prerequisites: MECO 6201 or MECO 6303, 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. Topics may vary. (3-0) Y

MECO 6320 Econometrics (3 semester hours) Estimation and testing of multivariate econometric models; sets of regression relationships; simultaneous equation systems; applications of methods and models in the analysis of business and economic data. (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 6360 Topics in Industrial Organization (3 semester hours) Issues in current research on the operation of firms and markets. Prerequisite: consent of instructor. (May be repeated for credit.) (3-0) T

MECO 6V99 Special Topics in Managerial Economics (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

MECO 7320 Advanced Econometrics (3 semester hours) Rigorous treatment of traditional econometrics methods, and introduction to both modern time-series econometrics and advanced non-linear models. Prerequisite: MECO 6320. (3-0) T

MECO 7360 Topics in Econometrics (3 semester hours) Issues in current econometric research and practice. Prerequisite: consent of instructor. (May be repeated for credit.) (3-0) T

Marketing Management

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 OPRE 6301, or consent of instructor. (3-0) Y

MKT 6310 Consumer Behavior (3 semester hours) An exposition of the theoretical perspectives of consumer behavior along with practical marketing implications. Study of psychological, sociological and behavioral findings and frameworks with reference to consumer decision making. Topics will include the consumer decision making model, individual determinants of consumer behavior and environmental influences on consumer behavior and their impact on marketing. Prerequisite: MKT 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: MKT6301 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 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 6330 Brand Management (3 semester hours) To study the role and philosophy of brand management in the strategic marketing process and the resulting effects on strategic and marketing decisions. Topics will include the strategic brand building process, segmentation and positioning for building brands, consumer behavior, brand information systems, building brand equity and the application of brand management using marketing principles. Prerequisite: MKT 6301 or consent of instructor.(3 – 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 6333 Channels and Retailing (3 semester hours) This course will study the design and implementation of channels of distribution, with particular emphasis on retailing, including electronic retailing. Topics covered will include channel coverage strategies, pricing and promotion in channels, retail services, location decisions, franchising and legal issues in channels. Prerequisites: MKT 6301 and OPRE 6301 (3 – 0) T

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 6337 Marketing Analytics using SAS (3 credit hours) This course is designed for a career in marketing analytics in which students analyze data from large databases to make important marketing decisions. These methods are commonly employed in online marketing, in grocery stores, and in financial markets. Students will acquire knowledge about the tools and software that are used to understand issues such as who the profitable customers are, how to acquire them, and how to retain them. The tools can also be used to manage brand prices and promotions using scanner data as is done in supermarkets. Prerequisite: MKT 6301. (3-0) Y

MKT 6338 Customer Relationship Management (3 credit hours) Increasing emphasis on customer relationship management makes it imperative for managers to understand the methods and metrics (including the tools and software) that are used to measure customer lifetime value, acquire and manage profitable customers. This course highlights the profit implications of different acquisition and retention strategies. The focus is on implementing a complete customer relationship management strategy. Prerequisite: MKT 6301. (3-0) Y

MKT 6339 Capstone Marketing Decision Making (3 Credit Hours) This is a simulation based course where students form groups and compete for market share, profits, and stock price in a competitive fictional market. Teams make tactical decisions about production quantity, price, advertising, sales force allocation and develop new product specifications to compete with other teams for different segments in

the market place. The course provides a hands-on experience in marketing decision making and allows students to integrate the knowledge they learned to make more effective decisions. Prerequisite: MKT 6301. (3-0) Y

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 6360 Services Marketing (3 semester hours) To study the growing field of services marketing as a separate and distinct area of marketing thought and practice and its influence in competitive markets. The focus will be on three main services marketing areas, the service customer, the service company and the integration of marketing, human resources and operations within the service system. The course is intended to help analyze and judge the merits of services marketing strategies and assist in making strategic decisions in both business and consumer services industries. Topics will include: relationship marketing and the customer mix, understanding the service customer, external service quality: service design and delivery, the service brand, service strategy: technology and innovation, international services marketing, pricing and promotion of services. Prerequisite: MKT 6301 or consent of instructor (3-0) Y

MKT 6362 Marketing Engineering (3 semester hours) To study the field of marketing engineering from the perspective of quantitatively-based marketing models, with an emphasis upon those related to marketing mix variables and new product forecasting. This course will also examine the historical development of quantitatively based marketing models and their use and application in marketing decision-support systems. Companies are increasingly using and applying the modeling approach to marketing decision making. This course will examine the practical & theoretical foundations of Marketing engineering. Topics will include: introduction of marketing models, product diffusion models, advertising and communication models, salesforce allocation and sizing models, stochastic models of brand choice, etc. Prerequisite: MKT 6301 or consent of instructor.(3-0) Y

MKT 6363 Advanced Marketing Research with SAS (3 semester hours) An overview of marketing research with an emphasis on statistical analysis of marketing data sets using the SAS statistical package. This course will provide fundamental grounding in the interface between the SAS data step, which is the environment for accessing, structuring, formatting and manipulating data, and SAS procedures, including: summarize, analyze, and display. Special attention will be given to marketing data collection and analysis with an emphasis on demand forecasting and customer segmentation. (3-0) Y

MKT 6380 (ENTP- 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: MKT 6301 and ENTP 6370 or consent of the instructor. (3-0) T

MKT 6V99 Special Topics in Marketing (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

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 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 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: OPRE 6301 and MKT 6301, or consent of instructor. (3-0) T

MKT 7317 Marketing Models IV (3semester hours) Advanced study of mathematical models used in the analysis of markets and marketing problems including use of game theory and modeling uncertainty. Prerequisites: OPRE 6301 and MKT 6301, or consent of instructor. (3-0) T

MKT 7318 Marketing Models V (3semester 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: OPRE 6301 and MKT 6301, or consent of instructor. May be repeated for credit as topics vary. ([3 or 4]-0) T

Operations Research

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: OPRE 6301 (3-0) S

OPRE 6311 Game Theory (3 semester hours) Two person zero-sum and nonzero-sum games; Nash equilibrium; use of LP and Complementarities, N-person games; core, nucleolus, stable sets, etc. Applications to market equilibrium problems. (3-0) R

OPRE 6332 Spreadsheet Modeling (3 semester hours) This course introduces the basic concepts of model building and encourages students to take an analytic view of business decision making. The electronic spreadsheet is used as the principal device for building models, and the course covers the concepts of effective spreadsheet design and use. With that background, students acquire knowledge about specific decision making techniques for business, such as optimization and simulation, and build spreadsheet models to identify choices, formalize trade-offs, specify constraints, perform sensitivity analyses, and analyze the impact of uncertainty. Applications in finance, economics, marketing, and operations are examined in depth. Prerequisite: OPER6301 or OPER6302 or with the 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 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: None. (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-Holn models. Prerequisite: OPRE 6302 or consent of instructor. (3-0) R

OPRE 6364 Lean Six Sigma (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: OPRE 6301. (3-0) R

OPRE 6365 Managing Inventory (3 semester hours) This course teaches students to view inventory control as a competitive strategy. The emphasis is on analysis and application of deterministic and simple stochastic inventory models. Students learn concepts through a combination of theory, problem solving, and case discussion. Prerequisite: OPRE 6302 or consent of instructor. (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: 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. Topics may vary. (3-0) T

OPRE 6369 (MIS 6369) Supply Chain Software (3 semester hours) The course teaches planning and execution of supply chains with software such as SAP's ERP (R3) and Advanced Planning & Optimization (APO). This software is used in lab exercises that provide students with hands-on, experimental learning. The focus is on the supply planning function of supply chain management. Topics include: introduction to ERP and SAP, master and transaction data, MRP, forecasting, supply and demand matching, and integration of ERP and APO modules. This course is intended for graduate students with interests in software-based supply chain management. No SAP experience is required. Prerequisites: OPRE 6301 and OPRE 6302 or the permission of the 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 6302 or consent of instructor. (3-0) T

OPRE 6371 Purchasing and Sourcing Management (3 semester hours) Basic concepts and processes in purchasing and sourcing management are introduced in this course. It teaches global sourcing techniques and the application of various management tools and quality tools in purchasing. Focus is on the proactive and planned analysis of supply markets and the selection of suppliers, with the objective of delivering solutions to meet pre-determined and agreed organizational needs. (3-0) Y

OPRE 6377 Demand and Revenue Management (3 semester hours) Taking a collaborative view between marketing, operations and other business functional areas, this course teaches the theory, techniques and best practices of how to effectively manage the overall supply chain processes by simultaneously aligning their demand with supply, capacity, and inventory positions to better manage market share and enhance revenues and gross margin. (3-0) T

OPRE 6378 - Information Enabled Supply Chains: (3 semester hours) The success of a product in today's global marketplace depends, to a large extent, on activities of firms in the product's supply chain and their processing of information. This course will focus on the value of information and technology, and effective ways to use that information in optimizing global operations and information. The course will cover some analytical methods to quantify the costs and benefits of information and the technology used to obtain information in supply chain improvement initiatives or supply-chain restructuring opportunities.

Case studies will be used to discuss the role of information technology (e.g., RFID) and innovative processes, (e.g.CPFR), in functional areas such as new product development, manufacturing outsourcing, and distribution operations. Prerequisites: Permission of instructor. (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 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 6302, STAT 5352, or consent of instructor. Topics may vary. (3-0) Y

OPRE 6V99 Special Topics in Operations Research (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

OPRE 7310 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. Permission of instructor required. (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. (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 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 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 its 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. Students should have 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

OPRE 7351 Seminar in Operations Management (3 semester hours) This seminar covers topics of current research in the area of operations management. Research papers are presented on a variety of topics including: supply chain management, inventory models, production planning and control, design and scheduling of cellular manufacturing systems, and decision and risk analysis. (3-0) Y

OPRE 7352 Teaching Practicum in Operations Management (3 semester hours) Under the supervision of a faculty member, student assumes all instructional responsibilities for a course, including: developing the syllabus, delivering the lectures, and grading. Pass/Fail only. (3-0) Y

OPRE 7372 Advanced Topics in Supply Networks – Advanced Risk Analysis (3 semester hours) This course will focus on probabilistic, statistical and optimization techniques needed in risk analysis and decision making. The domain is in full development and appropriate for active research. The methods are

generic and applicable in finance as well as in operations management. Prerequisites: OPRE 6302, OPRE 6330 and OPRE 6366 or consent of the instructor.(3-0) R

Organizational Behavior

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 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 6301, or consent of instructor. (3-0) T

OB 6331 Power and Politics in Organizations (3 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 6332 (HMG T 6324) 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 6334 Foundations of Organizational Development (3 Semester Hours) Explores the foundations and role of organizational development. Topics include emergence and development of the field and its role in 21st Century organizations; major macro-level organizational concepts such as organizational strategy, structure, culture, innovation, and globalization; and the role of OD in change management, intervention strategies, and group process. (3-0) R

OB 6335 Organizational Development Process and Practice (3 semester hours) Explores the functions and practices of organizational development. Topics include: establishing vision and mission and strategic alignment; conducting inquiry and addressing resistance; engaging leaders and supporting participants; and, small scale change - individuals and groups. Pre-requisite: OB 6334 or consent of instructor (3-0) R

OB 6336 Individual Difference, Self-Motivation and Employee Development (3 Credit Hours) This course starts with a survey of personality theories with a special emphasis on cognitive models of learning and motivation at work. Relevant topics of personality psychology and social psychology will be introduced to clarify the applied concepts which are useful in employee and organizational development. This will prepare students and practicing managers to be more effective in areas such as general management, consulting, self-development, coaching & mentoring, team building and organizational development. This course will take students one level above what is covered under OB6301 and also gives them a deep grounding in social and cognitive psychology of organizational behavior. Special attention will be given to Humanistic / Existential theories and Cognitive Social Learning theories and will relate this to our current understanding of organizational neuroscience. Prerequisite: OB 6301. (3-0) Y

OB 6337 Motivational Leadership in Organizations (3 Credit Hours) Analyzes the types of behaviors which lead to high performance within healthcare organizations. Topics include individual behavior and motivation, behavioral job requirements and job/person matching,, the differences between leadership and managerial behavior; and how to establish and maintain a high performance work climate. (3-0) Y

OB 6338 Coaching as a Leadership Style (3 Credit Hours) Develops highly effective coaching skills for fostering positive change in both individuals and teams. Topics include developing an effective coaching relationship through intelligent listening and authentic feedback, assessing an individual's readiness for change and helping to increase colleagues' personal and professional effectiveness. (3-0) Y

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 6354 Organizations and Environments (3 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. (3-0) R

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 6V99 Special Topics in Organizational Behavior (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. ([1-4]-0) S

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 7302 Organization Behavior (3 semester hours) This course is designed to expose students to a variety of Organizational Behavior/Human Resource Management (OB/HRM) topics and data gathering techniques. Different procedures for gathering research data, usually within the context of the papers will be critiqued and a term paper is mandatory. (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. Topics may vary. (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. Topics may vary. (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

OB 7312 Social Network Theory (3 semester hours) Social network theory focuses on structural relations among people and organizations. As one of the fastest growing paradigms originated from anthropology and sociology, it has gained enormous popularity within the broad field of organizational management. This Ph.D. level course intends to provide a systematic introduction to social network theory by reviewing its basic history, philosophy, theories, and methodologies. We will also explore how social network theory can be applied to addressing various management issues such as knowledge diffusion, social capital, strategic alliance, and network dynamics. (3-0) R

Systems Engineering and Management

SYSM 6311 Systems Project Management (3 credit hours) Systems project management is the discipline of planning, organizing and managing resources to bring about the successful completion of specific project goals and objectives. The course will cover critical path methods for planning and controlling projects including time and cost tradeoffs, resource utilization, organizational design, conflict resolution and stochastic considerations. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6312 Engineering Economics and Finance (3 credit hours) This course is intended to develop capacity to both (1) recognize the relevant costs of engineering/Systems projects for investment decision purposes, and (2) measure the true economic value (to be) created, including consideration of associated project and system risks. We will deal with the relationship of project risk to those of the entire firm, with performance indicators that are used by investors and managers, and with costs of capital that are affected by funding choices and project risk. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6313 Negotiating Deals & Resolving Conflict Within the Organization (3 credit hours) The major focus of this course will be on negotiating deals and resolving conflict in business situations, and understanding human behavior in organizational settings, and its causes and consequences e.g., how the individual is affected by and affects the structure of the organization; how reward structures and leadership processes are related to organizational goals; and how all of these and other factors impact managerial effectiveness in the organization. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6314 Manufacturing & Service Systems Planning & Analysis (3 credit hours) Manufacturing & Service Systems Planning & Analysis is the study of management related to transforming inputs to outputs for both manufacturing and service organizations. Its fundamental purpose is the adding of value to inputs - materials, labor, capital and management - to create outputs - products or services which customers want - throughout the supply chain. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6315 Entrepreneurship (3 credit hours) this course teaches entrepreneurship, with an emphasis on identifying, evaluating and developing new venture opportunities in complex systems. 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. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6316 Innovation within the Corporation (3 credit 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 student 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. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6317 The Management of High Tech Products (3 credit hours) Building on the premise that successful product management involves getting the right product to the right customer at the right price at the right time, the course will teach techniques in product definition and requirements; product development; management of internal resources, including manufacturing, sales and management; costing and pricing decisions; product planning and winning the right design win. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6318 Marketing Management, Marketing Systems Analysis (3 credit hours) the basic objective of this course is to help executives and managers develop relevant marketing skills and philosophies and to examine the trends and applicable techniques in the area of marketing management. This course should enhance understanding of marketing problems, the setting in which marketing decisions are made, the tools available to facilitate these decisions, and the impact of the decisions for the firm and the "larger marketplace." Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6319 Business Economics (3 credit hours) this course provides 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. Prerequisites: none. Special Registration required with department. (3-0) Y

SYSM 6320 Strategic Management (3 credit 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: none. Special Registration required with department. (3-0) Y

General Course Descriptions

MAS 6V00-6V10: Special Topics (1-4 semester hours) May be lecture, readings, or individualized study. May be repeated for credit. Topics may vary. ([1-4]-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 (1-3 semester hours) May be lecture, seminar, readings or individualized study. May be repeated for credit. Topics may vary. ([1-3]-0) S

MAS 8V00 Management Science
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) Topics may vary. ([2-3]-0) 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. Topics may vary. ([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 8V40-8V52 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. Topics may vary. ([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. Topics may vary. ([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. Topics may vary. (3-0) S

MAS 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

SCHOOL OF NATURAL SCIENCES AND MATHEMATICS

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://www.utdallas.edu/nsm/biology/>

Faculty

Professors: Hans Bremer (emeritus), Lee A. Bulla, Santosh R. D'Mello, Rockford K. Draper, Juan E. González, Donald M. Gray, Stephen D. Levene, Betty S. Pace, Lawrence J. Reitzer, C. S. Rupert (emeritus), Li Zhang, Michael Zhang

Associate Professors: Gail A.M. Breen, John G. Burr, Jeff L. DeJong, Ernest M. Hannig, Dennis L. Miller, Stephen Spiro

Assistant Professors: Tianbing Xia, Zhenyu Xuan

Senior Lecturers: Irena Borovkov, Mehmet Candas, Vincent P. Cirillo, Wen-Ju Lin, Robert Marsh, Ruben Ramirez, Scott A. Rippel, Illya Sapoznikov, Wen-ho Yu

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 (required for Ph.D.-track students).

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.

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.

Dennis 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.

Stephan Spiro, Regulation of bacterial gene expression by environmental signals; genetic and physiological adaptation to stress.

Tianbing Xia, Molecular recognition; RNA structure and RNA-protein interaction; conformational dynamics; femtochemistry

Zhenyu Xuan, Computational biology and bioinformatics

Li Zhang, Molecular mechanisms of cell signaling, heme signaling and oxygen sensing, genomics, and systems biology

Michael Zhang, Computational biology; gene regulation and epigenomics

Facilities

Major items of equipment used by the faculty and available for graduate student research include a Leica TCS SP2 AOBs confocal microscope system, complete Spectra-Physics femtosecond laser system, Becton Dickson fluorescence activated cell sorter, Veeco MultiMode SPM atomic force microscope, Molecular Dynamics PhosphorImagers, 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 20.

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.

A Master of Science Degree in Biotechnology is also offered through the Department of Molecular and Cell Biology.

In addition to the above Master of Science Degrees, 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 and BIOL 5440 [and, in addition, two laboratory rotations, 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 (MSEN 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: BIOL 3361 (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. Prerequisites: MATH 2417 (Calculus and PHYS 1301 (General Physics)). (4-0) Y

BIOL 5440 (MSEN 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

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 once every other year.

Topics in Biochemistry

(Bulla, DeJong, González, Gray, Hannig, Levene, Miller, Reitzer, Spiro, L. Zhang, M. Zhang)

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 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]-0) 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, Hannig, Levene, Miller, Pace, Reitzer, Spiro, L. Zhang, M. Zhang)

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. Prerequisites: STAT 1342 (Introductory Statistics) and MATH 1325 and MATH 1326 (2 semesters of calculus)(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 look at the molecular level at microorganisms that live at the expense of higher eukaryotes. Emphasis will be given to the latest scientific literature describing these important pathogenic interactions. Therapeutic treatments and preventive methods will also be covered. (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 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 6358 (MSEN 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. (3-0) R

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 DNA structures, protein structures, the folding and stability of domains, and the binding of proteins to DNA. Methods used to investigate the relation of structure to function are emphasized. Types of protein structures whose structure and function are considered include transcription factors, proteinases,

membrane proteins, proteins in signal transduction, proteins of the immune system, and engineered proteins. ([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, Pace, L. Zhang)

General Electives

BIOL 6340 Developmental Neurobiology (3 semester hours) The course will cover the molecular and cellular mechanisms underlying key processes in the development of the vertebrate nervous system such as neural induction, morphogenesis of the neural tube, patterning of the brain, differentiation and migration of neurons, axon guidance, synaptogenesis and the regulation of neuronal survival. The 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 Basis of Acquired Immune Deficiency Syndrome (3 semester hours) Topics include an analysis of the molecular basis of the infection of target cells by HIV, the intracellular replication of retroviruses, with special attention given to the HIV *tat* and *rev* genes, and an analysis of the roles of the HIV accessory genes: *vif*, *vpr*, *vpu* and *nef*. The immunological response of the host to HIV is considered, as is the biological basis for the ultimate failure of the immune system to contain this virus, with attendant immune collapse. The molecular basis of a variety of existing and potential anti-retroviral therapies is considered. (3-0) Y

BIOL 6351 Cellular and Molecular Biology of the Immune System (3 semester hours) Innate and adaptive immunity. Structure and function of immunoglobulins and MHC molecules, and their role in the adaptive immune response. Function of the primary and secondary lymphoid tissues, and the role of professional antigen presenting cells. The molecular basis for the generation of diversity during cellular development of B and T lymphocytes. The role of complement in innate immunity, and details of T cell and B cell mediated immunity. (3-0) Y

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) Properties of cancer cells, *in vivo* and *in vitro*. Telomeres and cellular immortality. The role of DNA and RNA viruses in human cancers. Molecular biology of chronic leukemia retroviruses and the acutely transforming retroviruses. Retroviral oncogenes; the role of mutation, amplification, and chromosomal translocation of cellular oncogenes in human cancer. Regulation of the eukaryotic cell cycle, and the role of tumor suppressor genes. The role of oncogenes in growth hormone signal transduction. The role of apoptosis, and developmental signaling pathways in cancer. ([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 5V95 Advanced Topics in Molecular and Cell Biology (Individual instruction) (1-6 semester hours) May be repeated for credit with permission of the graduate advisor ([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 Advanced Topics in Molecular and Cell Biology (Individual instruction) (1-6 semester hours) May be repeated for credit with permission of the graduate advisor ([1-6]-0) Y

Special Electives

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. (P/F grading) (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. (P/F grading) (1-[4-10]) 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 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. P/F grading only. Maybe repeated for credit (4 hours maximum.) (1-0) Y

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 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 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 6356 Eukaryotic Molecular and Cell Biology (3 semester hours) Regulation of cellular activities in eukaryotic cells; structural and molecular organization of eukaryotic cells; molecular basis of cell specialization; membranes and transport. For students who have not had undergraduate cell biology. (3-0) S

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 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. For students who have not had undergraduate genetics ([3-4]-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 8V50 Internship in Biotechnology/Biomedicine (3-6 semester hours) Provides faculty supervision for a student's internship. Internships must be in an area relevant to the student's coursework for the MS in Biotechnology. ([1-6] - 0) R

BIOL 8V98 Thesis (3-9 semester hours) (May be repeated for credit.) ([3-9]-0) S

BIOL 8V99 Dissertation (1-9 semester hours) (May be repeated for credit.) ([1-9]-0) S

Department of Chemistry

<http://www.utdallas.edu/dept/chemistry/>

Faculty

Robert A. Welch Chair in Chemistry; Professor of Chemistry: Ray H. Baughman
Cecil and Ida Green Distinguished Chair in Systems Biology; Professor of Chemistry: A. Dean Sherry
Professors: Kenneth J. Balkus, Jr., Rockford K. Draper (Biology), John P. Ferraris, Bruce E. Gnade (Electrical Engineering), Inga H. Musselman,
Associate Professors: Michael C. Biewer, Gregg R. Dieckmann, Jinming Gao (UT Southwestern), Warren J. Goux, Paul Pantano, John W. Sibert
Assistant Professors: Jung-Mo Ahn, Mihaela C. Stefan, Steven O. Nielsen, Jie Zheng
Affiliated Professors: Lee A. Bulla (Biology), Anvar A. Zakhidov (Physics)
Research Professors: Garry E. Kiefer, Duck Joo Yang
Emeritus Professors: Richard A. Caldwell
Senior Lecturers: Sergio Cortes, Sandhya R. Gavva, Claudia Taenzler

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.

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: 270 MHz (2), and 500 MHz multi-nuclear FT-NMR spectrometers; a powder x-ray diffractometer; assorted spectrophotometers utilizing fluorescence, phosphorescence and absorption; three protein synthesizers; gel permeation chromatographs; workstations with molecular modeling software; and scanning tunneling and atomic force microscopes. Chemistry also participates in the Alan G. MacDiarmid 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, 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), 250 (computer test), or 100 (internet test) are admitted only in special circumstances.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 (12 hours)

CHEM 5314 Advanced Physical Chemistry
CHEM 5331 Advanced Organic Chemistry I
CHEM 5341 Advanced Inorganic Chemistry I
CHEM 5355 Analytical Techniques I

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 12-hour core listed above may be satisfied in one of the two ways listed below.

1. Presentation and defense of a written master's thesis. The student must complete, as a minimum, 15 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.
2. Completion of an approved internship in an industrial or governmental laboratory. The student must complete, as a minimum, 18 credit hours of research, chemistry internship or other graduate electives.

Three of the graduate semester hours beyond the core may be fulfilled by taking an approved graduate elective course.

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 12-semester hour core course requirements listed above, students seeking the Ph.D. degree must take two upper level elective courses that are approved by the student's faculty research advisor and the Chemistry Graduate Advisor. Ph.D. students are expected to complete these six required courses within the first two years of their enrollment. CHEM 8399 is also 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

All Ph.D. students must take the qualifying examination. 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

Students have the option of completing a thesis Master's degree as part of their doctoral candidacy preparation, unless this requirement has been satisfied at the time of admission. The doctoral research project may be conducted in the same laboratory as the Master's degree research or, in order to gain a broader research experience, in another laboratory. A manuscript embodying a substantial portion of the Ph.D. 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 and the Graduate Dean conclude the requirements for the Ph.D.

Representative Research Areas

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, solar cells, 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 and bionano chemistry, 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 monooxygenation, molecular modeling; and catalysis).

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 3322 or equivalent. (3-0) Y

CHEM 5331 (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. Prerequisite: CHEM 2325 or equivalent. (3-0) Y

CHEM 5333 (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: CHEM 5331. (3-0) R

CHEM 5340 (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

CHEM 5341 (MSEN 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 (MSEN 5355) Analytical Techniques I (3 semester hours) Study of fundamental analytical techniques, including optical spectroscopic techniques, mass spectrometry, and microscopic and surface

analysis methods. (3-0) Y

CHEM 5356 (MSEN 5356) Analytical Techniques II (3 semester hours) Study of chromatography (GC, LC, CZE), statistical methods (standard tests and ANOVA), chemical problem solving, and modern bio/analytical techniques such as biochips, microfluidics, and MALDI-MS. Prerequisite: CHEM 5355 or MSEN 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.) May be repeated for credit (9 hours maximum). ([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: CHEM 5314 or 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: CHEM 5341 or 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: CHEM 5355 or consent of instructor. ([1-9]-0) R

CHEM 6V69 Special Topics in Biochemistry (1-9 semester hours) Subject matter will vary. May be repeated for credit (9 hours maximum). 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

CHEM 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

Department of Geosciences

Faculty

Professors: Carlos L. V. Aiken, David E. Dunn (emeritus), William I. Manton, George A. McMechan, Richard M. Mitterer, John S. Oldow, Emile A. Pessagno, Jr. (emeritus), Dean C. Presnall (emeritus), Robert H. Rutherford (emeritus), Robert J. Stern

Associate Professors: Thomas H. Brikowski, James L. Carter (emeritus), John F. Ferguson

Senior Lecturers: William R. Griffin, Ignacio Pujana

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 energy, mining, or environmental industries, 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 Economic, Political and Policy 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

Departmental research facilities include: digital imaging petrographic microscope, rock preparation and mineral separation facilities, electronics shop and machine shop. Separate research facilities for computing, hydrology, thermal ionization mass spectrometry, and geophysics are described below.

Computing Facilities

The Geosciences Department has a large number of networked Windows/PC and unix/linux workstations in several laboratories accessible to the students and faculty. A number of laser printers are available, including a color printer. A large format HP 2500CP printer/plotter is available for creating maps and posters. A variety of software licenses are supported for GIS, remote sensing, image processing, geophysical data processing, graphics and visualization. Large scale computing is supported by two state of the art linux clusters, one with 10 and one with 32 64-bit processors, and 13 terabytes of disk. A GeoWall visualization facility permits immersive interaction with 3-D data.

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 WMS, 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 Windows and linux workstations.

Geochemical Laboratories

A Perkin-Elmer 6100 DRC ICP-MS and Perkin-Elmer 3300DV ICP-OES are used for determining concentrations of a wide range of elements in materials. A Finnigan MAT 261 equipped with 9 collectors and a secondary electron multiplier is 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, geochronology, environmental Pb, and evolution of marine Sr.

Geophysics Facilities

Geophysical research is supported by two Scintrex CG5 Gravimeters a Micro-g FG5 absolute gravimeter; a variety of surveying instruments including a Nikon theodolite and data collector, a TOPCON GPT 3005LW total station electronic distance meter and theodolite, two Laser Atlanta Advantage CI reflectorless laser rangefinders, a Riegl LMP 3800 laser scanner and a Riegl LSM Z620 laser scanner, six dual frequency Leica 530 RTK GPS systems (4 receivers), three dual frequency Topcon HyperLite RTK GPS systems (6 receivers), nine dual frequency Leica SR9500 GPS receiver systems with choke-ring antennas, a Trimble GeoXT GPS system, a Trimble GeoHT GPS system and GPS post-processing software including Leica SKI and Trimble Pathfinder Office. A Geometrics proton-procession total field magnetometer system, An AGI SuperSting R1/IP DC resistivity and induced polarization system is available for near surface electrical conductivity mapping. 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, 800 W Campbell Rd, Richardson, TX, 75080, 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. 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 20.

Additional requirements are specified below for each degree.

Graduate Certificate in Remote Sensing

The Remote Sensing Certificate is supported by the Department of Geosciences and the School of Economic, Political and Policy Sciences.

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/admissions

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, GISC 7366 Applied Remote Sensing and GEOS 7327 or GISC 7367 Remote Sensing Workshop.

Master of Science in Geosciences

Thesis Option

All students seeking the Master of Science degree (thesis option) must satisfactorily complete the following requirements (a minimum of 36 graduate semester hours):

- GEOS 5307, GEOS 5327, GEOS 5375, and GEOS 5387
- A minimum of 15 hours of additional graduate courses.
- 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 (thesis option) must submit, no later than the second semester of enrollment, an acceptable degree plan and a research proposal to their 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 including the specified Geosciences courses below.

- GEOS 5307, GEOS 5327, GEOS 5375, and GEOS 5387
- A minimum of 21 hours of additional graduate courses, to be selected in consultation with the graduate advisor.
- Research: An 8000 level, 3-hour research course.

In addition to the above requirements, students seeking the M.S. degree (non-thesis option) must submit, no later than the second semester of enrollment, an acceptable degree plan.

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 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 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 the School of Economic, Political and Policy 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 5307, GEOS 5327, GEOS 5375, and GEOS 5387
- A minimum of 30 hours of Geosciences graduate courses to be specified by the student's research supervisory committee and the Graduate Advisor.
- A minimum of 40 hours of additional graduate courses or research.
- A minimum of nine semester hours of thesis research including GEOS 8399 and submit an acceptable dissertation.

In addition to the above course requirements, students seeking the Ph.D. degree must submit an acceptable degree plan and 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 20. 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 Economic, Political and Policy 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.)

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. (3-0) R

GEOS 5303 Computing for Geoscientists (3 semester hours) Application of computer techniques in solving geological problems. Includes instruction in the MATLAB (r) 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. (3-0) 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 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 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. May be repeated for credit as topics vary. ([1-3]-[0-3]) R

GEOS 5100 Introductory Graduate Seminar (1 semester hour) Presentations of current research by the Geosciences faculty members and orientation for new graduate students. (1-0) Y

GEOS 7V00 Research and Literature Seminar (1 or 2 semester hours) Presentations and critical analysis of independent work and of the recent literature. Pass/Fail only. (May be repeated for credit.) ([1-2]-0) Y

Geology Courses

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 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. (3-0) Y

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. (3-3) Y

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

Hydrogeology-Environmental Geosciences Courses

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 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 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 5315 The Earth: An Overview (3 semester hours) Nucleosynthetic processes, condensation of the solar system and the formation of the Earth-Moon system. Tectonic and magmatic processes driven by internal heat. The minerals of igneous rocks. Modes of emplacement and eruption of igneous rocks. Rock weathering and the external, sun-driven processes of erosion, transport and deposition. Biogenic sediments. Continental collisions, mountain building, rock deformation and metamorphism. Methods of dating and correlating rocks. A history of the Earth through time. Current problems and trends in the geosciences. Field trip. (3-0) Y

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

Computing, Remote Sensing, GIS, and GPS Courses

GEOS 5303 Computing for Geoscientists (3 semester hours) Application of computer techniques in solving geological problems. Includes instruction in the MATLAB (r) 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. (3-0) Y

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 5325 (GISC 6325) 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. (2-3) T

GEOS 5326 (GISC 7365) 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. (3-0) T

GEOS 5329 (GISC 7366) 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 (GISC 6325/GEOS 5325). (3-0) T

GEOS 5330 Geospatial Applications in Earth Science (3 semester hours) Application of geospatial techniques in solving earth science problems. Emphasis will be placed on the use of the Global Positioning System in survey and geodetic applications, airborne and ground-based LiDAR (Light Detection and Ranging), and digital acquisition and analysis techniques. Case histories will be considered and supplemented by hands-on exercises using a broad range of digital acquisition and analysis equipment and tools. (3-0) Y

GEOS 5322 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 based 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 5324 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 photogrammetry and digital cameras. (3-0) T

GEOS 7327 (GISC 7367) 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(3-0) Y

GEOS 8V21 Research in Remote Sensing, GIS and GPS (1-9 semester hours) May repeat for credit. ([1-9]-0) S

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 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 sea water. Radiometric age dating as applied to the solution of geologic problems. (3-0) R

GEOS 8V50 Research in Geochemistry (1-9 semester hours) (May repeat for credit.) ([1-9]-0) S

Geophysics and Seismology 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 5387 Applied Geophysics (3 semester hours) This is the Geosciences core graduate course in geophysics. Emphasis is on the application of geophysical methods to the solution of geological problems and the connection between geophysical measurements and the physical properties of Earth materials. Topics include seismology; gravity; magnetics; electromagnetics; resistivity; ground penetrating radar; and well logging. Case histories will be considered in addition to the technical aspects of data collection, processing and interpretation. (3-0) Y

GEOS 5395 Satellite Geophysics and Applications (3 semester hours) This course concerns both the theory and application of observing geophysical fields from space-borne platforms. The observation procedures including orbital mechanics are introduced and signal propagation, errors and uncertainties will be addressed. Concepts of current satellite missions such as radar and laser altimetry, space gravimetry and magnetometry, and synthetic aperture radar will be discussed. Applications of satellite geophysical observations in tectonics, geodynamics, ocean and ice surface monitoring, hydrology, and terrain modeling will be introduced through student projects and presentations. (3-0) Y

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 5490 Applied Geophysics (4 semester hours) The theoretical basis and practical aspects of the collection, processing and interpretation of geophysical data. A broad range of methods will be discussed including: gravity, magnetic, electrical and seismic. Applications to geologic problems at a variety of scales from the near surface to continental will be considered. A laboratory will feature geophysical data acquisition and interpretation for a specific local geological target. (3-3) Y

GEOS 5484 Near-Surface Geophysical Imaging (4 semester hours) This course concerns 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 complementary behaviors of seismic and radar waves. An integration of both seismic and radar data

is emphasized in interpretation. A background in calculus (MATH 2417) and general physics (PHYS 1301) 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 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 current computer cluster and switch 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 8V80 Research in Geophysics (1-9 semester hours) May be repeated for credit. ([1-9]-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

GEOS 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

Department of Mathematical Sciences

<http://www.utdallas.edu/nsm/math/>

Faculty

Professors: Larry P. Ammann, Michael Baron, Sam Efromovich, M. Ali Hooshyar, Wieslaw Krawcewicz, Patrick L. Odell (Emeritus), Istvan Ozsvath, Viswanath Ramakrishna, Ivor Robinson (Emeritus), Robert Serfling, Janos Turi, John W. Van Ness (Emeritus), John Wiorowski

Associate Professors: Pankaj Choudhary, Mieczysław Dabkowski

Assistant Professors: Yan Cao, Tobias Hagge

Adjunct Professors: Jose Carlos Gomez Larranage, Adolfo Sanchez Valenzuela

Affiliated Faculty: Herve Abdi (BBS), Raimund J. Ober (EE), Alain Bensoussan (SOM), Thomas Butts and Titu Andreescu (SME)

Senior Lecturers: Frank R. Allum, Malgorzata Dabkowska, Nermine El Sissi, Anatoly Eydelzon, Bentley

Garrett, Yuly Koshevnik, David L. Lewis, Charles R. McGhee, , Joanna R. Robinson, William Scott, Paul Stanford

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 20.

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.

Master of Science in Bioinformatics and Computational Biology

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. The BCBM program seeks to answer the demand for a new breed of scientist that 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) participate in the Bioinformatics and Computational Biology program, with the Mathematical Sciences Department serving as the administrative unit. Both departments 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

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.

Doctor of Philosophy

The University's general degree requirements are discussed on page 20.

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 in accordance with the U.T. Dallas policy memorandum (87-III.25-48). 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 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) May be repeated for credit as topics vary (9 hours maximum). (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 4301/4302 or Math 5301-53022); 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 (MATH 4301/4302) or MATH 5301-5302. (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) May be repeated for credit as topics vary (9 hours maximum). (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) May be repeated for credit as topics vary (9 hours maximum). (3-0) R

MATH 8V02 Individual Instruction in Mathematics (1-6 semester hours) Topics may vary. May be repeated for credit. ([1-6]-0) S

MATH 8V04 Topics in Mathematics (1-6 semester hours) May be repeated for credit. ([1-6]-0) R

MATH 8V07 Research (1-9 semester hours) Open to students with advanced standing subject to approval of the Graduate Adviser. May be repeated for credit. ([1-9]-0) S

MATH 8V98 Thesis (3-9 semester hours) May be repeated for credit. ([3-9]-0) S

MATH 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

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 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 5390 Topics in Statistics (3 semester hours) May be repeated for credit as topics vary (9 hours maximum).(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 renewal processes and queuing theory. Measure theory not required. Prerequisite: STAT 5351. (3-0) T

STAT 6331 Statistical Inference I (3 semester hours) Introduction to fundamental concepts and methods of statistical modeling and decision making. Basic distribution theory. Decision theory. Exponential families of models. Sufficiency. Estimation and hypothesis testing. Likelihood methods and optimality, Large sample approximations . Prerequisites: STAT 5352 or equivalent and MATH 5302 or equivalent. (3-0) Y

STAT 6332 Statistical Inference II (3 semester hours) Elementary and advanced asymptotic methods, treating sample quantiles, U-statistics, differentiable statistical functions and influence curves, the MLE, L-statistics, M-statistics, and the bootstrap. Advanced aspects of statistical inference, likelihood-based inference, robust statistics. General forms of Neyman-Pearson lemma. Metrics on spaces of probability distributions. Prerequisites: STAT 6331 Pre-/Co-Requsite: STAT 6344. (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, regression diagnostics, balanced and unbalanced analysis of variance, analysis of covariance, and log-linear analysis of multiway contingency tables. Prerequisites: MATH 2418 and STAT 5352 or STAT 6331. (3-0) T

STAT 6338 Advanced Statistical Methods II (3 semester hours) This course continues STAT 6337. Topics include oneway and multiway analysis of variance, fixed, random, and mixed effects models, nested designs, repeated measures designs, fractional designs, Latin squares, diagnostics, and implementation of statistical methods in SAS.. 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, QR decomposition and least squares regression, SV decomposition and multivariate data, statistical programming languages, 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 substantial 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 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 6365 Statistical Quality and Process Control (3 semester hours) Statistical methodology of monitoring, testing, and improving the quality of goods and services is developed at the intermediate level. Topics include control charts for variables and attributes, assessment of process stability and capability, construction and interpretation of CUSUM, moving average charts and V-masks, optimal sampling techniques, and evaluation of operating-characteristic curves and average time to detection. Prerequisite: STAT 5351 or equivalent. (3-0) T

STAT 6390 Topics in Statistics (3 semester hours) May be repeated for credit as topics vary (9 hours maximum). Topics selected from but not limited to choices such as spatial statistics, nonparametric curve estimation, functional data analysis, statistical learning and data mining, actuarial science, sampling theory, statistical quality and process control, sequential analysis, survival analysis, longitudinal data analysis, categorical data analysis, and clinical trials, for example. (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 5302 or equivalent, and STAT 6331. (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 and robust methods. Prerequisite: STAT 6331 or equivalent. (3-0) T

STAT 7334 Nonparametric and Robust Statistical Methods (3 semester hours) Topics chosen from Order statistics, ranks, L-statistics, M-statistics, R-statistics. One- and multi-sample location and scale problems. Nonparametric ANOVA. Pitman asymptotic relative efficiency. Minimax asymptotic variance and minimum bias criteria for robust estimation. Robust confidence limits. Optimal influence curves. Nonparametric/robust density and regression curve estimation. Nonparametric and robust methods for multivariate data. 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 model fitting, correlation analysis and regression. Prerequisite: STAT 6331 or equivalent. (3-0) T

STAT 7345 Advanced Probability and Stochastic Processes (3 semester hours) Taught as a continuation of STAT 6344. 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, stationary processes, and the empirical process. Prerequisite: STAT 6344. (3-0) T

STAT 7390 Topics in Statistics (3 semester hours) May be repeated for credit as topics vary (9 hours maximum) Topics selected from but not limited to choices such as spatial statistics, nonparametric curve estimation, functional data analysis, statistical learning and data mining, actuarial science, sampling theory, statistical quality and process control, sequential analysis, survival analysis, longitudinal data analysis, categorical data analysis, and clinical trials, for example. (3-0) R

STAT 8V02 Individual Instruction in Statistics (1-6 semester hours) May be repeated for credit. ([1-6]-0) S

STAT 8V03 Advanced Topics in Statistics (1-6 semester hours) May be repeated for credit. ([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. May be repeated for credit. ([1-9]-0) S

STAT 8V98 Thesis (3-9 semester hours) May be repeated for credit. ([3-9]-0) S
STAT 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

Department of Physics

<http://www.utdallas.edu/physics>

Faculty

Professors: Roy C. Chaney , Austin J. Cunningham, Gregory D. Earle, Ervin J. Fenyves, Robert Glosser, Roderick A. Heelis, Robert Hilborn, John H. Hoffman, Joseph M. Izen, Xinchou Lou, Wolfgang A. Rindler, Myron Salamon, Brian A. Tinsley, B. Hobson Wildenthal, Anvar A. Zakhidov

Associate Professors: Phillip Anderson, Yuri Gartstein

Assistant Professors: Mustapha Ishak-Boushaki, Anton Malko

Senior Lecturers: Paul MacAlevey, Beatrice Rasmussen

Affiliated Faculty: Cyrus D. Cantrell (Engineering), John P. Ferraris (Chemistry), Matt Goeckner (Engineering), Wenchuang Hu (Engineering), Stephen Levene (Biology), Larry Overzet (Engineering), Dean Sherry (Chemistry), Duck-Joo Yang (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 students 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 industrial and high technology environments.

Admission Requirements

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

The Graduate 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 1200, with at least 700 on the quantitative part, is advisable based on past 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), 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.

Financial Support

A limited number of assistantships are awarded to those students displaying the most promise in teaching or research. Specific decisions regarding TA awards are made on an individual basis. Students who wish to be considered for financial support are encouraged to submit completed applications by February 1st for admission in the fall semester. Admission for the spring term is possible, but opportunities for financial support in such cases are extremely limited. Teaching assistantship awardees are required to complete 12 graduate physics courses (not including research courses) during the first 24 months in residence. Continuation of support requires achievement of a minimum GPA of 3.3, and a satisfactory record in teaching or research assignments.

Financial support is preferentially provided to students in the MS/PhD track, and is generally not available for students in the Applied Masters program.

Specializations

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; Astrophysics/Cosmology/Relativity; Condensed Matter Physics/Materials Science; and High Energy Physics. Further details on the current research topics in these areas are provided below.

Astrophysics, Cosmology and Relativity

This research group studies fundamental problems in theoretical astrophysics, contemporary cosmology, and relativity. These research efforts typically 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 specific 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 William 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. Most students 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.utdallas.edu/research/spacesciences>.

High Energy Physics And Elementary Particles

The UTD High Energy Physics Group collaborates on the Atlas experiment at the CERN Large Hadron Collider (LHC) and the BaBar experiment, at the PEP-II asymmetric b factory located at the Stanford Linear Accelerator Center (SLAC). Atlas will search for the Higgs boson, believed to be responsible for electroweak symmetry breaking, for new physics beyond the standard model such as supersymmetric partners to known particles, and for new hadrons. Atlas data-taking will begin in 2009. BaBar measures 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. The group explores both charmonia and a class of unexpected particles with charm-anticharm quark content with properties that are quite different from conventional charmonium. BaBar has completed data-taking and is analysing its data. The group's research is funded by the U.S. Department of Energy. The UTD High Energy Physics group specializes in high performance computing, simulation production, and data analysis while contributing to the commissioning and operation of experiments. Additional information can be found at: <http://www.utdallas.edu/~joe/hepweb/utdhep.html>

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 (nanotech.utdallas.edu) and Electrical Engineering Clean Room. Research in Materials Science involves both experiment and theory with emphasis on the physical aspects of solid state materials, optical properties of solids, Raman scattering, physical properties of thin films, and carbon nanotubes. Various nanoscale and synthetic materials are being studied for their optical, electronic, magnetic and transport properties, as well as applications in photonics, spintronics 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. Unconventional superconductivity and superconducting nanostructures are also under investigation.

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.

Degree Requirements

The University's general degree requirements are discussed on page 20.

All candidates for graduate degrees in physics must satisfy general University degree requirements. Well prepared students may demonstrate by examination adequate knowledge of the core and basic course material. In addition to the general university graduation requirements, graduation in physics requires a grade of B or better in all core courses in the MS, Applied MS, and Ph. D. programs

Master of Science

A minimum total of 32 graduate hours is required, including the core courses listed below.

1. MS Core courses (12 hours)

PHYS 5301 Mathematical Methods of Physics I
PHYS 5311 Classical Mechanics
PHYS 5320 Electromagnetism I
PHYS 6300 Quantum Mechanics I

2. MS Elective courses (20 hours)

In addition to the core courses, 20 hours of additional graduate level physics courses must be successfully completed by MS candidates in physics, with prior approval from the Graduate Advisor. Up to 6 hours of elective credit may be satisfied through approved industrial internships, supervised research, or the satisfactory completion of an MS thesis. Prior approval for these options must be obtained from the Graduate Advisor.

Master of Science in Applied Physics (MSAP)

The MSAP degree is intended as a terminal degree that does not lead to the Ph. D. track. A minimum of 32 graduate credit hours are required for the MSAP degree. Students in this degree plan must successfully complete a minimum of 16 semester credit hours of MSAP core courses, including PHYS 5301. All core courses in the MS/PhD track are acceptable MSAP core courses, as are courses from the Augmented MSAP Core Courses List provided below. Approved elective credit hours in the MSAP program include any graduate level physics courses, as well as approved graduate-level courses in electrical engineering, computer science, biology, geosciences, chemistry, and operations research. Specific courses should be chosen with the guidance of the graduate advisor for the MSAP program

Augmented MSAP Core Course List

PHYS 5305 Monte Carlo Simulation Method and its Applications
PHYS 5315 Scientific Computing
PHYS 5316 Applied Numerical Methods
PHYS 5317 Atoms, Molecules and Solids
PHYS 5318 Atoms, Molecules and Solids II
PHYS 5321 Experimental Operation and Data Collection Using Personal Computers
PHYS 5371 Solid State Physics
PHYS 5372 Solid State Devices

Doctor of Philosophy

A minimum of 24 credit hours in the graduate core sequence are required for the Ph. D. degree, plus additional courses specified by the student's thesis committee chair. The required core courses must include Phys 5301, 5302, 5311, 5313, 5320, 5322, 6300, and 6301. Students in space sciences must also take Phys 6383.

A candidate must also take a minimum of 3 elective courses, 1 from within his/her area of specialization and 2 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. A minimum of one year residency after admission to the doctoral program is required.

Ph. D. students are required to take a comprehensive qualifying examination. The first opportunity to take the exam is in the fall semester of the first year of graduate study – taking advantage of this opportunity allows the qualifier to be attempted up to 3 times. Students who choose not to take the qualifier in their first semester are required to take it in the second fall semester in residence. Satisfactory performance on the qualifier allows continuation with financial support beyond the second fall term. Students who fail the

qualifier in the second fall semester and wish to remain in the graduate program are required to retake the exam in the subsequent spring semester – failure to pass the qualifier on this attempt will result in loss of financial support from the university in subsequent semesters, and ineligibility to complete the remaining Ph. D. degree requirements.

After a student has completed the required course work with the minimum GPA of 3.3, passed the qualifier examination, and 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.

Core Course listing for Doctor of Philosophy (24 credit hours required, 27 for Space Science.)

PHYS 5311 Classical Mechanics
PHYS 5313 Statistical Physics
PHYS 5320 Electromagnetism I
PHYS 5322 Electromagnetism II
PHYS 5301 Mathematical Methods of Physics I
PHYS 5302 Mathematical Methods of Physics II
PHYS 6300 Quantum Mechanics I
PHYS 6301 Quantum Mechanics II
PHYS 6383 Plasma Science (Space Science students only)

Physics Course Descriptions

PHYS 5V49 Special Topics In Physics (1-6 semester hours) Topics may vary from semester to semester. (P/F grading. May be repeated for credit to a maximum of 9 hours.) ([1-6]-0) R

PHYS 5301 Mathematical Methods of Physics I (3 semester hours) Vector analysis and index notation; Orthogonal coordinates; Sturm-Liouville theory; Legendre & Bessel Functions; Integral Transforms: Differential Equations (including Green Functions) (3-0) Y

PHYS 5302 Mathematical Methods of Physics II (3 semester hours) Functions of a Complex Variable (including contour integration and the residue theorem); Tensor Analysis; Gamma and Beta functions; Probability. (3-0) Y

PHYS 5303 Mathematical Methods of Physics III (3 semester hours) Continuation and extension of topics from PHYS 5301 and PHYS 5302 with applications related to problems and techniques encountered in physical sciences. (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 (MATH 2417), Statistics (MATH 1342), C (CS 3335) or FORTRAN programming languages. (3-0) T

PHYS 5311 Classical Mechanics (3 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, Poincaré'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. (3-0) Y

PHYS 5313 Statistical Physics (3 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. (3-0) Y

PHYS 5315 Scientific Computing (3 semester hours) An introduction to computational methods for solving systems of ordinary and partial differential equations using numerical techniques. (3-0) Y

PHYS 5316 Applied Numerical Methods (3 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 5301 or equivalent, and proficiency in a programming language. (3-0) Y

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: MATH 2451, PHYS 2325, and PHYS 2326, or PHYS 2327. (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) R

PHYS 5320 Electromagnetism I (3 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. (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 5322 Electromagnetism II (3 semester hours) Fields and Potentials, Gauge transformations and

the Wave 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 5320 or equivalent. (3-0) 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 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 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 5371 (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 5301 and 5320 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) R

PHYS 5376 (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. (3-0) R

PHYS 5377 (MSEN 5377) Computational Physics of Nanomaterials (3 Semester hours) This course introduces atomistic and quantum simulation methods to study nanomaterials. Three main themes are covered: structure-property relationship of nanomaterials; atomistic modeling for atomic structure optimization; and quantum simulations for electronic structure study and functional property analysis. (3-0) T

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) R

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 (MSEN 5383 and EEMF 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. (3-0) Y

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 6300 Quantum Mechanics I (3 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 5311 or consent of the instructor. (3-0) Y

PHYS 6301 Quantum Mechanics II (3 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 6300. (3-0) Y

PHYS 6302 Quantum Mechanics III (3 semester hours) Advanced topics in quantum mechanics. Prerequisite: PHYS 6300 and PHYS 6301. (3-0) R

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 5301. (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 Z⁰ 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 chromodynamics; quark-quark interactions; grand unification theories; proton decay, magnetic monopoles, neutrino oscillations and cosmological aspects; supersymmetries. (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) R

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) R

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 (MSEN 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 (MSEN 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. Polarons, bipolarons 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 6377 (MSEN 6377) Physics of Nanostructures: Carbon nanotubes, Fullerenes, Quantum wells, dots and wires (3 semester hours) Electronic bands in low dimensions. 0-d systems: fullerenes and quantum dots. Optical properties, superconductivity and ferromagnetism of fullerenes. 1-d systems: nano-wires and carbon nanotubes (CNT). Energy bands of CNTs: chirality and electronic spectrum. Metallic versus semiconducting CNT: arm-chair, zigzag and chiral tubes. Electrical conductivity and superconductivity of CNTs, thermopower. Electromechanics of SWCNT: artificial muscles. Quantum wells, FETs and organic superlattices: confinement of electrons and excitons. Integer and fractional quantum Hall effect (QHE). (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.) (3-0) R

PHYS 6383 (EEMF 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 5320 or equivalent. (3-0) T

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 5320, 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) S

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

PHYS 8V10 Research In High Energy Physics And Elementary Particles (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V20 Research in Astrophysics and Cosmology (3-9 semester hours) (P/F grading) (May be repeated for credit) ([3-9]-0) S

PHYS 8V30 Research In Quantum Electronics (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V40 Research in Applied Physics (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V49 Advanced Research In Physics (1-3 semester hours) (P/F grading) (May be repeated for credit.) ([1-3]-0) S

PHYS 8V50 Research In Atomic And Molecular Physics (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V60 Research In Optics (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V70 Research In Materials Physics (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V80 Research In Atmospheric And Space Physics (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8V90 Research In Relativity (3-9 semester hours) (P/F grading) (May be repeated for credit.) ([3-9]-0) S

PHYS 8398 Thesis (3 semester hours) (May be repeated for credit.) (3-0) R

PHYS 8399 Dissertation (3 semester hours) (May be repeated for credit.) (3-0) S

PHYS 8V99 Dissertation (1-9 semester hours) May be repeated for credit. ([1-9]-0) S

Department of Science and Mathematics Education

<http://www.utdallas.edu/scimathed/>

Faculty

Professors: Robert C. Hilborn (chair), Thomas R. Butts, Frederick L. Fifer, Jr.(emeritus), Russell Hulse, Cynthia Ledbetter, Lynn Melton

Associate Professors: Titu Andreescu, Homer Montgomery, Mary L. Urquhart

Assistant Professor: Phillip Kisunzu

Science Education Specialist: Barbara A. Curry

Clinical Professor: Bill Neal, Bill Gammons

Affiliate Faculty: John Burr, Matthew Goeckner, John Hoffman, Scherry Johnson, Robert Stern

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 sciences. Designed for individuals with significant ability in a science 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. 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.

(Mathematics teachers 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 program.) Students taking at least 18 graduate hours in mathematics content courses as part of the degree program can meet the minimal mathematics requirements for teaching at a community college.

Facilities

The Department has a dedicated classroom that can be configured for different teaching styles and facilities for producing teaching materials. The University's new Mathematics, Science, Engineering Teaching/Learning Center will provide additional facilities for teaching in different environments and for carrying out science and mathematics education research. 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

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

Science Education

Admission to the Graduate Program in Science Education requires, in addition to general University requirements, at least 24 credit hours in science. Students with strong backgrounds in an area of specialization are encouraged to discuss alternate plans with the Science Education Graduate Adviser. A student without the required science content background will be required to correct the deficiencies and should apply initially as a non-degree-seeking student. Appropriate course programs for such students will be developed in consultation with the Science Education Graduate Adviser. The M. A. T. Science Education program can be completed with traditional classes, entirely with online classes, or with a mix of online and traditional classes.

Mathematics Education

Admission to the Graduate Program in Mathematics Education requires, in addition to the general University requirements, 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 program. Consult the Mathematics Education Graduate Adviser for details.

For both Science Education and Mathematics Education programs, opportunities may arise for students to work directly in local schools. Be advised that public schools and many private schools in 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.

Degree Requirements

The University's general degree requirements are discussed on page 20.

Additional requirements for each M.A.T. degree are described below. No more than 9 hours will be accepted for transfer credit. Under special circumstances, the Department Head may permit exceptions for portions of these requirements.

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) with a grade of B or better:

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

Statistics (3 hours)

SCE 5340 Statistics in Science/Mathematics Education or HCS 6312 (ACN 6312) Research Methods in Behavioral and Brain Sciences - Part I (or acceptable equivalent) is a prerequisite to enrolling for thesis research hours.

Science Content Courses (18 hours)

A minimum of four graduate 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 two graduate courses (minimum six semester hours) in one specialty area other than the chosen specialization

Thesis Research (6 hours)

A minimum of six semester hours in thesis research, SCE 8398, and
Submission of an acceptable thesis which warrants publication in peer-reviewed journals, scholarly books, monographs or the equivalent.

In addition to the above requirements, students must establish a thesis supervisory committee and must submit, no later than the second semester of enrollment, an acceptable research proposal to that 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 student's thesis supervisory committee.

Science Education (Non-Thesis)

The M.A.T. degree in Science Education requires a minimum of 36 graduate 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 graduate hours in biology, chemistry, geosciences, or physics.
Secondary Area: 6-8 graduate hours in biology, chemistry, geosciences, or physics.

Electives (3-12 hours)

Three to twelve hours of electives are taken to complete the required minimum of 36 hours. These elective hours, chosen in consultation with the Science Education Graduate Advisor, may include additional graduate science, mathematics, engineering, computer science, education and science education courses.

SCE 5301, 5305, and 5308 must be completed with a grade of B or better. No more than two of the four courses required for a primary area may be taken during a summer field trip.

Mathematics Education

The M.A.T. degree in Mathematics Education requires 36 graduate semester hours, distributed as follows:

Mathematics Content 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 Mathematics Education Graduate Adviser

Students wishing to emphasize computer science may substitute appropriate courses for those in the Mathematics Education Core as approved by the Mathematics Education Graduate Adviser.

Students interested in teaching in a community college will need at least 18 graduate semester hours in mathematics content. They should consult with the Mathematics Education Graduate Adviser about their course programs.

Mathematics Education Course (3 hours)

EMTH 5310 Seminar: The Teaching of Mathematics and Computer Science.

Guided Electives (18 hours)

Six graduate courses in mathematics, computer science or other area involving applications of mathematics or pedagogy (approval by Mathematics Education Graduate Adviser required). MTHE 5320 (which may be repeated up to six times) is highly recommended.

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. (Offered through the MAT-SE online strand only.) (3-0) 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 5334 Instructional Strategies in Science (3 semester hours) 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

SCE 8398 Thesis Research (3 to 6 semester hours) May be repeated. (3-0) Y

SCI 5319 Energy and the Environment (3 semester hours). This course addresses the issues of human impact on the environment and how we, as stewards, can make sound technical decisions about strategies to ameliorate those effects. Topics will include -- from the perspective of both energy supply and environmental effects -- global climate change, energy basics and conservation, fossil fuels, nuclear energy, and alternative sources of energy (solar, wind, hydroelectric, biomass). (3-0) Y

SCI 5320 Astrobiology (3 semester hours) 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 semester hours) 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 5323 Laboratories and Demonstrations for Middle School Science Teachers (3 semester hours). This course will emphasize ways that laboratory work and demonstrations help pre-high school students to acquire lasting understanding of concepts in chemistry and physics. Through a variety of laboratory exercises and demonstrations, teachers will be encouraged to select appropriate materials for their curriculum. Development of laboratory and demonstration presentation skills as well as new modules will be included in the course work. (2-3) Y

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 5326 Astronomy: Our Place in Space (3 semester hours) This course focuses on developing student understanding of how 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 semester hours) 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 us about our own solar system and home world. (2-3) T

SCI 5328 Marine Science (3 semester hours) 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 Conceptual Physics I: Force and Motion (3 semester hours) 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 an inquiry-based approach and examples of physics in the everyday world. Foundational concepts of forces, Newton's laws, energy, and momentum will be covered. (3-0) T

SCI 5332 Conceptual Physics II: Energy in Motion (3 semester hours) 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 an inquiry-based approach and examples of physics in the everyday world and connections to other fields of science. The second class in the Conceptual Physics series will build on concepts from the first in an exploration of transfers of energy and forces within and between systems of particles. Topics will include states of matter, fluids, waves and sound, and thermodynamics. (3-0) T

SCI 5333 Conceptual Physics III: Physics in the Modern World (3 semester hours) The primary focus of the class will be deepening the participants' conceptual understanding of physics, always with the added component of critical thinking with regard to applications to the pre-college classroom. We will use an inquiry-based approach and examples of physics in the everyday world and connections to other fields of science. The third class in the Conceptual Physics series will build on concepts from the prior two in explorations of interactions between particles of matter. Topics will include inter- and intra-molecular forces, light, electricity and magnetism, and the nature of the atom. (3-1) T

SCI 5334 Instructional Strategies in Science (3 semester hours) 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 semester hours) 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 be repeated for credit to a maximum of 9 hours. (3-0) Y

SCI 5340 Statistics in Science/Mathematics Education (3 semester hours) Understanding and application of statistical techniques needed in the design and interpretation of research in Science/Mathematics Education. Includes descriptive and inferential statistics, regression, computer-based tools, and other appropriate topics. (3-0) Y

SCI 5425 Integrated Science for Teachers (4 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 applications. Courses are offered online only. (May be repeated to a maximum of 12 hours as topics cycle through earth, life and physical sciences.) (4-4) 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

Mathematics Education Course Descriptions

EMTH 5310 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 8-12, 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

MTHE 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 18 semester hours.) (May not be counted as credits toward the M.S. or Ph.D. degrees in Mathematical Sciences.) (3-0) S

MTHE 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) R

MTHE 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) R

INTERDISCIPLINARY PROGRAMS

Master of Science in Biotechnology

Faculty

The following faculty members work with and teach students in the M.S. in Biotechnology degree program:

Professors: Larry P. Ammann (Mathematics), Ray H. Baughman (Chemistry), Lee A. Bulla (Molecular and Cell Biology), Santosh R. D’Mello (Molecular and Cell Biology), Rockford K. Draper (Molecular and Cell Biology), Sam Efromovich (Mathematics), Steven R. Goodman (Molecular and Cell Biology), Donald M. Gray (Molecular and Cell Biology), Donald A. Hicks (EPPS), M. Ali Hooshyar (Mathematics), Stephen D. Levene (Molecular and Cell Biology), Betty S. Pace (Molecular and Cell Biology), Lawrence J. Reitzer (Molecular and Cell Biology)

Associate Professors: Mark C. Anderson (SOM), Gregg R. Dieckmann (Chemistry), Gail A. Breen (Molecular and Cell Biology), Ovidiu Daescu (Computer Science), David L. Deeds (SOM), Ernest M. Hannig (Molecular and Cell biology), Warren J. Goux (Chemistry), Robert L. Kieschnick (SOM), J B Lee (Electrical Engineering), Dennis L. Miller (Molecular and Cell Biology), Paul Pantano (Chemistry)

Assistant Professors: Wenchuang Hu (Electrical Engineering), Jung-Mo Anh (Chemistry), Yan Cao (Mathematics), Pankaj K. Choudhary (Mathematics), Mięczysław K Dabkowski (Mathematics), Ying Liu (Computer Science), Nirup M. Menon (SOM)

Senior Lecturers: Joseph C. Picken (SOM), Robert L. Robb (SOM)

Objectives

The M.S. degree in biotechnology is intended to prepare students for careers in biotechnology and biomedicine and to assist currently employed professionals in enhancing their career opportunities.

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

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 5376 Applied Bioinformatics, or CS 6325 Introduction to Bioinformatics, BIOL 5381 Genomics, BIOL 6373 Proteomics, and BIOL 6384 Biotechnology Laboratory. Students enrolled in the M.S. in Biotechnology M.S. program 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 will not be admitted to the MS in Biotechnology program if they require more than two courses in order to be ready to take the core courses.

Every student admitted 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 6384 Biotechnology Laboratory is a skills based course. Students must show that they have adequate laboratory skills in order to enroll in BIOL 6384.

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 5V00-06A (Biology Preparation – MS in Biotechnology I), BIOL 5V00-06M (Biology Preparation – MS in Biotechnology II), and MATH 5V06-06M (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 5V00-06M (Biology Preparation – MS in Biotechnology II), and MATH 5V06-06M (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 UTD graduate course that is approved by the advisor as being relevant to the student's tailored degree plan may be taken as an elective for the Biotechnology M.S. program. Students should consult the program advisor for the current list of recommended 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.

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

CS 6325 Introduction to Bioinformatics (3 semester hours) This course aims to introduce graduate students to the new field of bioinformatics. This area has arisen from the needs of biologists to utilize and help interpret the vast amounts of data that are constantly being gathered in biomedical research. This course provides an overview of the basic concepts in molecular cell biology and molecular genetics, outlines the nature of the existing data, and describes the kind of computer algorithms and techniques that are necessary to understand biomedical data. Prerequisite: CS5343 Data Structure or permission of instructor (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

BIOL 6373 Proteomics (3 semester hours) Protein identification, sequencing, analysis of post-translational modifications, understanding protein interactions, and changes in content by mass spectrometry; and determination of function using protein chip microarrays. (3-0) Y

BIOL 6384 Biotechnology Laboratory (3 semester hours) Laboratory instruction in LC/MS/MS mass spectral analysis of protein sequence, ICAT (isotope coded affinity tag) reagents, and MS analysis of cellular proteomes, PCR and DNA Sequencing, and DNA microarray analysis; fluorescence and confocal microscopy and fluorescence activated cell sorting. Instructor may require students to demonstrate adequate laboratory skills in order to enroll. (1-2) Y

Electives

A sampling of electives available to students in the Biotechnology M.S. program follows:

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 8V50 Internship in Biotechnology/Biomedicine (3-6 semester hours). Provides faculty supervision for a students internship. Internships must be in an area relevant to the students coursework for the MS in Biotechnology. ([1-6] - 0) R

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 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 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 6372 Biological Database Systems and Datamining (3 semester hours) This course emphasizes the concepts of database, data warehouse, data mining and their applications in biological science. Topics include relational data models, data warehouse, OLAP, data pre-processing, association rule mining from data, classification and prediction, clustering, graph mining, time-series data mining, and network analysis. Applications in biological science will be focused on Biological data warehouse design, association rule mining from biological data, classification and prediction from microarray data, clustering analysis of genomic and proteomic data, mining time-series gene expression data, biological network (including protein-protein interaction network, metabolic network) mining. Prerequisite: CS 6325 Introduction to Bioinformatics or BIOL 5376 Applied Bioinformatics (3-0) Y.

ENTP 6370 Entrepreneurship (3 semester hours) This course is designed to provide an introduction to entrepreneurship for management and non-management students. There are no prerequisites for the course. The course emphasizes the development of new ventures including technology-based ventures, addressing opportunity identification and evaluation, market assessment, startup strategies, business plan development, venture financing, and startup management. Case studies and guest lectures by practicing entrepreneurs and investors provide a real-world perspective. The major deliverable of this course is business plan (including an early stage feasibility analysis) of a venture of the student's choosing. This course is available to all graduate students enrolled at UTD (3-0 credit hours). 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. Co-requisites: STAT 5311 or OPRE 6301 and AIM 6201, or consent of instructor. (3-0) S

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) Y

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

SCI 5V06/POEC 7329/HMG 6326 Special Topics - Biomedical Ventures in the DFW Region. This course explores the industrial and commercial opportunities at the intersection of biomedical/bioengineering research and clinical activity and North Texas' industrial strengths in information and communication technologies (ICT). The course is organized around guest presenters representing key sectors, technologies and organizations in the emerging DFW bio-economy. Students will study how to assess the potential payoffs, measured in terms of expanded economic activity and improved patient outcomes, of adding ICT-enhanced "precision" biomedical/health services delivery to its existing industrial strengths. Students may enroll either for graduate course credit or certificate credit. (3-0) Y

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.

Degree Requirements

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

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.

Doctor of Philosophy in Geospatial Information Sciences

<http://www.gis.utdallas.edu>

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), Denis J. Dean (Economic, Political and Policy Sciences), Daniel Griffith (Economic, Political and Policy Sciences), Paul Jargowsky (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), Fang Qiu (Economic, Political and Policy Sciences), Michael Tiefelsdorf (Economic, Political and Policy Sciences)

Assistant Professors: Yongwan Chun (Economic, Political and Policy Sciences), Karen Hayslett-McCall (Economic, Political and Policy Sciences), Weili Wu (Computer Science)

Clinical Assistant Professors: Stuart Murchison (Economic, Political and Policy Science)

Powerful technologies have emerged in recent years to collect, store, manage, analyze, and communicate 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 remote sensing, are used in many ways, including the production of digital maps in vehicles, the management and maintenance of city infrastructure, agriculture and forestry, the policing of communities, and the conduct of modern warfare. The PhD in Geospatial Information Sciences aims 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 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 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). These students may choose to pursue research projects that advance existing geospatial information sciences practices within that application area. Alternatively, students may opt to pursue research that expands the technological or theoretical base of all the geospatial information sciences.

Mission and Objectives

The mission of the Doctor of Philosophy in Geographic Information Sciences program is to cultivate innovative researchers capable of advancing the frontiers of knowledge in the geospatial information sciences through improved theories, new technologies, innovative methodologies, sophisticated quantitative analyses, and integrative applications. UT Dallas Doctoral graduates will find employment in research departments of public and private organizations and in major academic institutions. Specifically, program graduates will:

- demonstrate their knowledge of the fundamental theories and concepts underlying the geospatial sciences.
- master the advanced methodologies and/or quantitative analyses used in at least one of three geospatial specialization areas: [a] computing and information management, spatial analysis and modeling, or [c] remote sensing and satellite technologies.
- produce innovative research that advances theory or methodology in the geospatial sciences.
- participate at academic conferences, publish in peer-reviewed journals and find employment in research departments of public and private organizations and in major academic institutions.

Facilities

Students have access to state-of-the-art GIS computing facilities housed in the School of Economic, Political and Policy Sciences and at 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 computer workstation is available for every student. All major industry-standard GIS and remote sensing software is available. The University is 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. An analytical writing score of at least 4.5 in the GRE is considered 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 6317 *Computer Programming for GIS*, CS 6301 and CS 6311 *Computer Science I & II*, MIS 6322 *Developing Business Applications with Visual Basic*, MIS 6323 *Object Oriented Systems*, or their equivalents, and (iii) at least one course in inferential statistics through to regression analysis equivalent to GISC 6301 *Geospatial Data Analysis Fundamentals*, EPPS 7313 *Descriptive and Inferential Statistics*, or GEOS 6313 *Data Analysis for Geoscientists*. Graduate courses taken at UT Dallas to meet these prerequisites may be counted as electives toward the 75 credit hours required of 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.

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. Students generally will not have a faculty advisor when they first enter the Ph.D. program, but every student is required to select (with consent of the potential advisor) an advisor from the advising faculty before they complete 20 credits after admission.

Degree Requirements

The University's general degree requirements are discussed on page 20.

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 75 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)

Students must earn a minimum grade point average (GPA) of 3.0 across the following five courses:

- GISC 6381 GIS Fundamentals
- GISC 6382 Applied GIS
- GISC 6384 Spatial Analysis and Modeling
- GISC 6385 GIS Theories, Models and Issues
- GISC 7310 Regression Analysis with Spatial Applications

Geospatial Specialization Area

Students must select from one of the following, with a minimum of 15 SCH. Courses selected must include at least three at successively advanced levels.

I. Geospatial Computing and Information Management

- CS 6359 Object Oriented Analysis and Design
- CS 6360 Database Design
- CS 6364 Artificial Intelligence
- CS 6366 Computer Graphics
- CS 6375 Neural Nets and Machine Learning
- CS 6378 Advanced Operating Systems
- CS 6V80 Spatial Data Management
- CS 6381 Combinatorics and Graph Algorithms
- CS 6384 Computer Vision
- GISC 6317 Computer Programming for GIS
- GISC 6388 GIS Application Software Development
- GISC 7363 Internet Mapping and Information Management
- *MISC 6326 Database Management Systems

II. Spatial Analysis and Modeling

- CS 6312 Data Structures
- *ECON 6309 Econometrics I
- *ECON 6310 Econometrics II
- *ECON 6314 Structural Equation and Multilevel (Hierarchical) Modeling
- *ECON 6315 (POEC 7370) Time Series Econometrics
- *ECON 6316 Spatial Econometrics
- EPPS 7364 Demographic Analysis and Modeling
- EPPS 7368 Spatial Epidemiology
- *GEOS 6313 Data Analysis for Geoscientists
- *GISC 6311 (ECON 6311) Statistics for Economists
- GISC 7360 GIS Pattern Analysis
- GISC 7361 Spatial Statistics
- *EPPS 7313 Descriptive and Inferential Statistics
- *EPPS 7316 Advanced Regression Analysis

III. Remote Sensing and Satellite Technologies

- GEOS 7322 GPS Surveying Techniques
- GEOS 7324 3-D GIS Data Capture and Ground Lidar
- GISC 6325 (GEOS 6325) Introduction to Remote Sensing
- GISC 7366 (GEOS 7366)/ Applied Remote Sensing
- GISC/7365 (GEOS 7365) Remote Sensing Digital Image Processing
- GISC 7367 (GEOS 7327) Remote Sensing Workshop
- EE 6360 Digital Signal Processing
- 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.

* may not be used in conjunction with certain other courses. Consult GIS Doctoral Program Director

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 UT Dallas 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 (Variable SCHs)

All students must complete the following two classes as part of the research and dissertation requirement

GISC 7387 GIS Research Design
GISC 7389 GIS PhD Research Project Qualifier

In addition, students must complete sufficient additional research and dissertation credit hour to bring the total number of SCHs they have earned within the UTDallas doctoral program (or transferred into the UTDallas doctoral program) to 75, the minimum required to earn a doctoral degree. Additional research and dissertation SCHs above and beyond those required to reach the 75 credit hour minimum may be required at the discretion of the student's Ph.D. advisor. Additional research and dissertation SCHs can be earned through any of the following classes:

GEOS 8V29 Research in GIS
GISC 6387 GIS Workshop
GISC 6389 GIS Masters Project
GISC 7367/GEOS 7327 Remote Sensing Workshop
GISC 8V29 Research in GIS
*EPPS 6310 & 6342 Research Design I & II
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 their advisor or the GIS Doctoral Program Director.

Exams and Qualifiers

- **Ph.D. Research Project Qualifying Class**

Doctoral students must complete **GISC 7389 Geospatial Information Sciences PhD Research Project Qualifier** according to uniform guidelines established by the GIS program.

- **Qualifying Examination and Defense of Proposal**

After meeting the Research Project Qualifier, doctoral students 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.

- **Grade Point Qualifier**

Doctoral students must have GPAs 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.

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 6301 Geospatial Data Analysis Fundamentals (3 semester hours) Focuses on data handling techniques and applying basic statistical methodology to spatial research questions. Concepts of statistical data analysis including descriptive statistics, exploratory methods, sampling theory, statistical inference and correlation analysis are reviewed from a Geo-Information Sciences perspective. Regression analysis and basic methods of spatial pattern analysis are introduced. A prior course in statistics (such as SOCS 3405) is strongly recommended. (3-0) Y

GISC 6317 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)Y

GISC 6311 (ECON 6311) Statistics for Geospatial Science (3 semester hours) Introduces calculus-based statistical analysis and probability theory, providing background for econometric and spatial modeling of simple stochastic processes. Covers standard probability distributions including Bernoulli, binomial, negative binomial, hypergeometric, Poisson, normal, gamma, beta, t and F distributions; estimation and hypothesis testing; introductory asymptomatic theory, including the Law(s) of Large Numbers and the Central Limit Theorem; real-world applications of probability theory, as time permits. (3-0) Y

GISC 6325 (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) Y

GISC 6326 Geovisualization (3 semester hours) Examines the theoretical concepts and practical applications of cartographic and geographic visualization. Topics covered in lectures include concepts for

geographic data representation, symbolization and map design, and methods for geographic visualization and display. 3D visualization, cartographic animation, and web based mapping may also be included. Lab sessions explore the implementation of cartographic and geographic visualization with industry standard GIS software. Prerequisite: GISC 6381 or equivalent knowledge. (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. (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 6380 Spatial Concepts and Organization (3 semester hours) Examines the recurring patterns of physical and human objects on the Earth's surface, the flows of circulations among them, and the spatial concepts and theories which have been advanced to help understand and explain these spatial arrangements. Provides a fundamental understanding of spatial processes, concepts, and theories. (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 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 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 GIS Theories, Models and Issues (3 semester hours) Provides an understanding of the underlying theories, mathematical and geometric tools, and their computational implementations that establish GIS capabilities to handle and analyze geo-referenced information. Associated issues (such as uncertainty, spatial analysis and spatial data management) highlighted. Prerequisite: GISC 6381 and 6382, or equivalent with instructor's permission. (3-0) Y

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 Software 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 6317, 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 7310 Regression Analysis with Spatial Applications (3 semester hours) The specification, interpretation and properties of the multiple linear regression model including spatial and aspatial regression diagnostics are examined. Extensions to the logistic and Poisson regression models and spatial heterogeneity are provided. A review of the key concepts of matrix algebra and simulation techniques is given. Practical data analysis for large datasets is exercised by coupling statistical software with GIS environments. Prerequisite: GISC 6301 or GISC/ECON 6311 or equivalent. (3-0) Y

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: GISC 6381 or GISC 6311 and GISC 6301 or equivalent. (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: GISC 7310 or EPPS 7316 or equivalent; GISC 7360 recommended. (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 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: EPPS 7313. (3-0) R

GISC 7365 (GEOS 5326) 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. (3-0) Y

GISC 7366 (GEOS 5329) 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, land 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. Prerequisite: GISC 6325/GEOS 5325 (3-0) Y

GISC 7367 (GEOS 7327) 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/GEOS 5326. (3-0) Y

GISC 7387 GI Sciences Research Design (3 semester hours) Examines issues relative to the conduct of effective and valid research in geospatial information sciences and related fields. (3-0) Y

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 immediately 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) Y

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 6V98 Master's Thesis (3-9 semester hours) Provides faculty supervision of a student's master's thesis research. Prerequisite: Consent of GIS Program Head and instructor. (May be repeated for credit.)

[[3-9]-0) S

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

GISC 8V99 Dissertation (1-9 semester hours) Provides faculty supervision of a student's dissertation research. Prerequisite: Consent of instructor. (May be repeated for credit.)[[1-9]-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

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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 the planning or occurrence of specific 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. Moreover, any hazing offense that causes the death of another person is a state jail felony. 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 an organization." Any person who reports a specific hazing incident involving a student to the Dean of Students is immune from civil or criminal liability that he/she might otherwise incur as a result of the report. Any persons who have further questions about hazing or activities that may be considered hazing should call the Dean of Students office at (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:
 - that the charges of discrimination are without basis,
 - that further investigation is required ,
 - that campus action shall be initiated to alleviate a discriminatory situation, or

- 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. Emergency Response, Fire Safety, and Security

Emergency Response: In the event of an emergency or natural disaster the campus community will be notified as prominently as possible through several means of communication. This includes Campus Alert E-mail, the University's website, campus and local media, text-messaging, Fire Alarm Systems, Indoor Warning System and Outdoor Warning System. For policies and procedures, and reporting requirements please visit <http://www.utdallas.edu/ehs/emergency/>.

Fire Safety: The entire U.T.Dallas campus fire alarm system is being monitoring 24-7 via a SimplexGrinnell Information management system. This IMS operates on a fiber optic loop connected to every building fire panel on the Richardson campus. All 30 of UTD's buildings have primary reporting to the University Police and secondary reporting to EHS and EMS. For policies and procedures please visit <http://www.utdallas.edu/ehs/firelifesafety/>

Gang-free Zones: Premises owned, rented or leased by The University of Texas at Dallas, and areas within 1,000 feet of the premises are "gang-free" zones. Certain criminal offenses, including those involving gang-related crimes, will be enhanced to the next highest category of offense if committed in a gang-free zone by an individual 17 years or older. See Texas Penal Code, Section 71.028.

Missing Student Notification: The purpose of the UTDallas Missing Persons Policy is to establish procedures for the University's response to reports of missing students as required by the Higher Education Opportunity Act of 2008. This policy applies to students who reside in on-campus housing. For purposes of this policy, a student may be considered a "missing person" when he or she is absent from the University for more than 24 hours without any known reason. A student may also be deemed missing when his/her absence is contrary to his/her usual pattern of behavior and/or unusual circumstances may have caused the absence. Such circumstances could include, but not be limited to, a report or suspicion that the missing person may be the victim of foul play, has expressed suicidal thoughts, is drug dependent, or has been with persons who may endanger the student's welfare. All residential students will have the opportunity to designate a confidential contact to be notified by the University no more than 24 hours after the student is determined missing. Instructions will be provided on how to register that person's contact information. All reports of missing students shall be directed to the UT Dallas Police Department, which shall investigate each report and make a determination about whether the student is missing. NOTE: If a missing student is under the age of 18, and is not emancipated, the University will contact the designated confidential contact, but is also required to contact the legal guardian or parent.

G. 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

Section

21.21 Authority and Purpose

21.22 Definitions

21.23 Effective Date of this Subchapter

21.24 Determination of Resident Status

21.25 Information Required to Initially Establish Resident Status

- 21.26 Continuing Resident Status
- 21.27 Reclassification Based on Additional or Changed Information
- 21.28 Errors in Classification
- 21.29 Waiver Programs for Certain Nonresident Persons
- 21.30 Residence Determination Official

21.21 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.

21.22 Definitions.

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 to be completed by a person and used by an institution to determine if the person is a Texas resident. For enrollments prior to the 2008 - 2009 academic year, institutions may use the core questions developed and distributed by the Board in 1999 or later, including the core questions included in the Texas Common Application, or the core questions set forth in current Board rules or posted on the Texas Higher Education Coordinating Board web site. The core questions to be used for enrollments for and after the 2008 - 2009 academic year shall be the core questions in the Texas Common Application or core questions posted on the Board web site.
- (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 by the United States Citizenship and Immigration Services (USCIS) showing that his or her I-485 has been reviewed and has not been rejected.
- (7) **Established a domicile in Texas** — A person has established a domicile in Texas if he or she has met the conditions shown in §21.24(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) **Financial need** — An economic situation that exists for a student when the cost of attendance at an institution of higher education is greater than the resources the family has available for paying for college. In determining a student's financial need an institution must compare the financial resources available to the student to the institution's cost of attendance.
- (10) **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.
- (11) **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; Sam 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, §61.003(3).
- (12) **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, §61.003(8).
- (13) **Legal guardian** — A person who is appointed guardian under the Texas Probate Code, Chapter 693, or a temporary or successor guardian.
- (14) **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 §21.24(e) of this title (relating to Determination of Resident Status).
- (15) **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.
- (16) **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 §21.29 of this title (relating to Waiver Programs for Certain Nonresident Persons).
- (17) **Nontraditional secondary education** — A course of study at the secondary school level in a nonaccredited private school setting, including a home school.
- (18) **Parent** — A natural or adoptive parent, managing or possessory conservator, or legal guardian of a person. The term does not include a step-parent.

- (19) **Possessory conservator** — A natural or adoptive parent appointed by court order issued under the Texas Family Code, Title 5.
- (20) **Private high school** — A private or parochial school in Texas.
- (21) **Public technical institute or college** — The Lamar Institute of Technology or any campus of the Texas State Technical College System.
- (22) **Regular semester** — A fall or spring semester, typically consisting of 16 weeks.
- (23) **Residence** — A person's home or other dwelling place.
- (24) **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.
- (25) **Resident tuition** — The amount of tuition paid by a person who qualifies as a Texas resident under this subchapter.
- (26) **Temporary absence** — Absence from the State of Texas with the intention to return, generally for a period of less than five years.
- (27) **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.

21.23 Effective Date of this Subchapter.

Each institution shall apply these rules beginning with enrollments for the Fall Semester, 2006.

21.24 Determination of Resident Status.

- (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, including the successful completion of a nontraditional secondary education; 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 §21.22(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.

21.25 Information Required to Initially Establish Resident Status.

- (a) To initially establish resident status under §21.24 of this title (relating to Determination of Resident Status):
 - (1) a person who qualifies for residency under §21.24(a)(1) of this title shall provide the institution with:
 - (A) a completed set of Core Residency Questions; or
 - (B) a copy of supporting documentation along with a statement of the dates and length of time the person has resided in this state, as relevant to establish resident status under this subchapter and a statement by the person that the person's presence in this state for that period was for the purpose of establishing and maintaining a domicile in Texas.
 - (2) a person who qualifies for residency under §21.24(a)(2) or (3) of this title shall provide the institution with a completed set of Core Residency Questions.
- (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 III, 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 the core questions, Section H.
- (c) If a person who establishes resident status under §21.24(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 II 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.

21.26 Continuing 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 previous state fiscal year and who was classified as a resident of this state under Chapter 54, Subchapter B, 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 following fall semester. If an institution acquires documentation that a person is a continuing student who was classified as a resident at the previous institution, no additional documentation is required. The person is not required to complete a new set of Core Questions.

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 §21.25 of this title (relating to Information Required to Establish Resident Status), and satisfy all the applicable requirements to establish resident.

21.27 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 III, which is incorporated into §21.25(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.

21.28 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.

21.29 Waiver Programs for Certain Nonresident Persons.

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 web site at 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 may be allowed 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.

- (H) A student awarded a competitive scholarship prior to fall 2009 that entitled him or her to pay resident tuition in the 2009-2010 academic year is entitled to continue paying resident tuition in subsequent semesters if awarded competitive scholarships in keeping with this paragraph and if the student remains enrolled in the same certificate or degree program. This provision expires August 1, 2014.

(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. 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.
- (I) Persons Eligible for Federal Education Benefits for Veterans, their Spouses and Children. Persons eligible for benefits under the federal Post 9/11 Veterans Educational Assistance Act of 2008, or any other federal law authorizing educational benefits for veterans, are eligible to pay the resident tuition rate without regard to the length of time they have been in the state, as are their spouses and children (including stepchildren), if they meet the following conditions:
- (i) file a letter of intent with their institution to establish residency in Texas;
 - (ii) reside in this state while enrolled in the institution;
 - (iii) if qualifying as a child, be 25 years of age or younger on the first day of the term in which the person is registering unless meeting the hardship provisions described in clause (iv) of this subparagraph; and
 - (iv) if the child applying for an exemption under this provision is 25 years of age or older but can provide proof to the institution of severe illness or other debilitating condition that affected the person's ability to use the benefit before reaching that age, the child's period of eligibility to use the waiver shall be extended for a length of time equal to the period of illness or incapacity.
- (11) Program for the Center for Technology Development and Transfer. Under agreements authorized by Texas Education Code, §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.

21.30 Residence Determination Official.

(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;
- (2) and attend at least one training or workshop provided by the Coordinating Board regarding these rules and the applicable statutes in each state fiscal year.

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 or 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 than 10 hours of driving should be completed during any one day. Trips requiring more than 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://www.utsystem.edu/bpm/16.htm>.
- **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 be 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.