

Addendum: Institutional accreditation information added to page ii. November 20, 2007.

Added: “The University of Texas at San Antonio is accredited by the Commission on Colleges of the Southern Association of Colleges and Schools to award baccalaureate, master’s, and doctorate degrees. Contact the Commission on Colleges at 1866 Southern Lane, Decatur, Georgia 30033-4097 or call 404-679-4500 for questions about the accreditation of The University of Texas at San Antonio.”

GRADUATE CATALOG

2007–2009

The Alma Mater

“Hail UTSA”

From our hills of oak and cedar
To the Alamo,
Voices raised will echo
As, in song, our praises flow.
Hail Alma Mater!
Through the years our loyalty will grow.
The University of Texas at San Antonio.

The Mascot

The roadrunner, a bird representative of the Texas Hill Country and the Southwest, was voted the UTSA mascot in 1977.

The School Colors

Official colors of The University of Texas System are orange and white. Upon recommendation from the UTSA Student Representative Assembly, the Board of Regents approved the addition of blue to the orange and white for UTSA’s school colors.

The University of Texas at San Antonio
May 2007

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CHAPTER 1

GRADUATE FACULTY



GRADUATE FACULTY

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CHAPTER 2

ADMISSION

ADMISSION

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PHILOSOPHY

Admission requirements for graduate study at UTSA are designed so that admitted students will have a high probability of success in graduate-level academic work. Graduate study is much more than a continuation of undergraduate work and should be considered only by those students with the capacity for independent thought and investigation. Graduate programs at UTSA use selective entrance requirements in their admission of students. In addition to the University-wide admission requirements listed below, each graduate degree program specifies additional admission requirements, including scores on the Graduate Record Examination (GRE) aptitude test, the Graduate Management Admission Test (GMAT), other standardized examinations, a portfolio, an audition, or other indicators of preparation for graduate study. Information on the GRE may be obtained from the Educational Testing Service, P.O. Box 6000, Princeton, NJ 08541-6000 or by calling 1-866-473-4373. GMAT information may be obtained from Graduate Management Admission Council, 5601 Green Valley Drive, Ste. 300, Bloomington, MN 55437 or by calling 1-800-717-GMAT. The institution code for UTSA is 6919, for both the GRE and the GMAT. UTSA Testing Services office also has information available on the GRE, GMAT, MAT, and other tests. Applicants should refer to individual degree descriptions for additional admission requirements.

Consistent with Texas Education Code, Section 51.842(b), any degree program that uses an applicant's performance on a standardized test, other than scores obtained on the Test of English as a Foreign Language (TOEFL) required of international applicants, to make decisions about admission or the award of competitive scholarships will compare the applicant's test score with those of other applicants from similar socioeconomic backgrounds. If an applicant's performance on a standardized test is used for that purpose, it will be considered together with other criteria when making an admission or competitive scholarship decision and will not be used as the sole criterion for consideration of the applicant or as the primary criterion to end consideration of the applicant.

CLASSIFICATIONS AND REQUIREMENTS

Classifications of graduate admission require approval by the Dean of the Graduate School, the administrative officer responsible for graduate education. The criteria for the various classifications of admission to UTSA are set forth below.

Graduate Degree-Seeking Students

A graduate degree-seeking student is one admitted to a graduate degree program. Admission as a graduate degree-seeking student may be unconditional, conditional, or conditional on academic probation.

Unconditional Admission

In order to be eligible for unconditional admission as a graduate degree-seeking student, an applicant normally must:

1. hold a baccalaureate degree from a regionally accredited college or university in the United States or have proof of equivalent training at a foreign institution;
2. have a grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours of coursework taken;
3. have completed at least 18 semester credit hours (12 of which must be at the upper-division level) in the area or areas in which the graduate degree is sought or in related areas as determined by the Graduate Program Committee for the proposed major;
4. be in good standing at the last institution attended; and
5. be recommended for admission by the Graduate Program Committee in the proposed major. The committee may examine a student on his or her previous preparation before a recommendation is made for the student to be admitted to the program.

Even though admission is based on the last 60 undergraduate hours attempted and all graduate and postgraduate coursework taken, students must list on the application for admission all colleges and universities attended and request that an official transcript from each institution be sent to the Graduate School. UTSA graduates only need to order transcripts from any institutions not listed on the UTSA transcript. The Graduate School will obtain the UTSA transcript from the Office of the Registrar.

Conditional Admission

An applicant who has insufficient preparation in his or her intended graduate degree program, or who lacks certain supporting documentation required for unconditional admission, may be admitted conditionally to the graduate degree program upon recommendation of the Graduate Program Committee in the proposed major and approval by the Dean of the Graduate School.

Conditions placed on admission may include:

1. submission of test scores or other indicators of preparation for graduate study that are unavoidably lacking at the time of admission;
2. completion of additional coursework or other study to remove deficiencies, with such makeup work to be in addition to the regular degree requirements; and
3. completion of a given number of semester credit hours and the achievement of a minimum grade point average, in no case lower than that required for a student to remain in the University as a graduate degree-seeking or special graduate student, if the student's grade point average is less than that specified for unconditional admission. (See section on Academic Standing in Chapter 3, General Academic Regulations.)

Any conditions placed on the student's admission are included in the notification of admission. If conditions placed on admission are not met within the time specified by the Graduate Program Committee and stated in the admission notice, the Dean will direct the Registrar to withdraw the student from the University. The student may petition for reinstatement under the provisions listed in this catalog. (See Petition for Reinstatement in Chapter 3, General Academic Regulations.)

Conditional Admission on Academic Probation

An applicant who fails to meet the requirements for unconditional admission and is admitted on a conditional basis may be admitted on academic probation, upon recommendation of the appropriate Graduate Program Committee and approval by the Dean of the Graduate School. Such admission requires that coursework taken during the first semester be completed with a grade point average of "B" (3.0 on a 4.0 scale) or better. Failure to earn this average results in academic dismissal.

Denial of Admission as a Graduate Degree-Seeking Student

If an applicant is not eligible for either unconditional admission or conditional admission, the applicant is denied admission as a graduate degree-seeking student. In such cases, the appropriate Graduate Program Committee may recommend the applicant's admission or denial of admission as a special graduate student.

Special Graduate Students

A special graduate student is one admitted to UTSA for the purpose of enrolling in master's-level and/or undergraduate courses without currently entering a degree program. An applicant who elects to enroll as a special graduate student normally must:

1. hold a baccalaureate degree from a regionally accredited college or university in the United States or have proof of an equivalent degree from a foreign institution;
2. have a grade point average of at least 3.0 (on a 4.0 scale) in the last 30 semester credit hours of coursework for the baccalaureate degree as well as in all graduate-level coursework previously taken;
3. be in good standing at the last institution attended; and
4. be recommended for admission as a special graduate student by the authorized representative of the discipline offering the graduate course or courses desired. The authorized representative of the discipline offering the course is the discipline Graduate Program Committee acting through its chair or through its graduate advisor of record. If there is no Graduate Program Committee for the discipline, the chair of the department offering the discipline is the authorized representative. If the program is interdisciplinary, the Associate Dean for Graduate Studies and Research of the appropriate college is the authorized representative.

Even though admission is based on the last 30 undergraduate hours attempted for the bachelor's degree and all graduate coursework taken, students must list on the application all colleges and universities attended. Students must request that an official transcript be sent to the Graduate School from all institutions attended. Also, official transcripts must be requested from the institution conferring the last degree, plus all the institutions where graduate hours were earned. UTSA graduates only need to order transcripts from any institutions not listed on the UTSA transcript. The Graduate School will obtain the UTSA transcript from the Office of the Registrar.

Special graduate students are eligible to take any master's-level or undergraduate courses for which they have the necessary prerequisites, provided that space is available, and have the approval of the instructor in which the course is taught. Students who wish to take a graduate course in a discipline other than that for which they have been authorized upon admission must obtain the approval of the authorized representative (as defined above) of the discipline offering the course.

Special graduate students are advised that:

1. a maximum of 12 semester credit hours earned as a special graduate student may be applied toward a graduate degree, and then only when the student has been admitted as a graduate degree-seeking student and the credits earned for these courses have been evaluated and approved for this purpose by the appropriate Graduate Program Committee;
2. when teacher certification is involved, approval of the director of the College of Education and Human Development Advising and Certification Center is required before the student enrolls to ensure that credit earned as a special graduate student can be applied to a graduate-level teacher certification program; and
3. to continue at UTSA as a special graduate student in a subsequent semester, the student must meet the standards required to remain at UTSA as indicated in the section on Academic Standing.

Denial of Admission as a Special Graduate Student

An applicant who is denied admission as both a graduate degree-seeking student and a special graduate student may be eligible for admission as a special undergraduate student if admission requirements for that classification have been met. The applicant will need to submit an undergraduate application to be considered (see Special Students in Chapter 2, Admission, in *UTSA Information*).

Students holding bachelor's degrees who are admitted as special undergraduate students may enroll in undergraduate courses only. If they wish to take courses at the graduate level, they must obtain permission from the course instructor and the department chair on the form provided for this purpose or apply and be admitted as special graduate students. Students may not have active applications at the graduate and undergraduate levels for the same term and year.

Non-Degree-Seeking Graduate Students

An applicant who wishes to enroll for courses without pursuing a degree at UTSA should apply for admission as a non-degree-seeking graduate student. In order to qualify as a non-degree-seeking graduate student the applicant must:

1. hold at least a baccalaureate degree from a regionally accredited college or university;
2. have a grade point average of at least 3.0 (on a 4.0 scale) in the last 30 semester credit hours of coursework for the baccalaureate degree as well as on all graduate-level coursework taken;
3. be in good standing at the last institution attended; and
4. be recommended for admission as a non-degree-seeking graduate student by the authorized representative of the discipline offering the graduate course or courses desired. The authorized representative of the discipline offering the graduate course is the discipline Graduate Program Committee, acting through its chair or through its graduate advisor of record. If there is no Graduate Program Committee for the discipline, the chair of the department offering the discipline is the authorized representative. If the program is interdisciplinary, the Associate Dean for Graduate Studies and Research of the appropriate college is the authorized representative.

Even though admission is based on the last 30 undergraduate hours attempted for the bachelor's degree and on good standing at the last institution attended, students must list on the application for admission all colleges and universities attended. Students must request that an official transcript be sent to the Graduate School from all institutions attended.

Non-degree-seeking graduate students may register for any master's-level or undergraduate course for which they have the necessary prerequisites, provided that space is available and that they have the approval of the course instructor. Students who wish to take a graduate course in a discipline other than that for which they have been authorized upon admission must obtain the approval of the authorized representative (as defined above) of the discipline offering the course.

Non-degree-seeking graduate students are advised that:

1. credit earned as a non-degree-seeking graduate student will not count toward a degree at UTSA;
2. if the student plans to obtain a graduate degree at UTSA, an application for admission should be made as either a graduate degree-seeking student or a special graduate student; and
3. when teacher certification is involved, approval of the director of the College of Education and Human Development Advising and Certification Center is required before the student enrolls to ensure that credit earned as a non-degree-seeking graduate student can be applied to a graduate-level teacher certification program.

International Students

Applications from non-U.S. citizens or nonpermanent residents will be processed as international. This includes applications received from other countries.

Applicants must meet the following criteria:

1. Meet the graduate admission requirements.
2. Prove proficiency in the English Language by taking either the TOEFL (Test of English as a Foreign Language) or IELTS (International English Language Testing System) examinations. Scores must be sent directly to the Graduate School. Our institution code is 6919.

	TOEFL Internet	TOEFL Computer	TOEFL Paper	IELTS
English Language Assessment Program (ELAP) Exempt	100	250	600	7
Master's Admission Qualification*	61	173	500	5
M.S. in Environmental Science*		213	550	
Doctoral Admission Qualification	79	213	550	6.5

* The minimum score required on the TOEFL

TOEFL scores may be waived for international students from countries where English is the primary language of instruction and the principal language spoken in the home; or for noncitizens of the United States earning a bachelor's degree or higher in the United States or other English-speaking countries. Participation in UTSA's English Language Assessment Program (ELAP) before registration is required of students with TOEFL scores below 600 (paper version) or 250 (computerized version) or 100 (Internet based) or 7 (IELTS). Based on this assessment, students needing additional instruction in English are required to enroll in appropriate English for International Students (EIS) courses.

Applicants from the following countries are exempt from submitting the TOEFL or IELTS score:

American Samoa	Guyana
Australia	Ireland
Bahamas	Jamaica
Barbados	Liberia
Belize	New Zealand
Canada (except Quebec)	Sierra Leone

Dominica	Trinidad/Tobago
Grenada	United Kingdom
Grand Cayman	U.S. Pacific Trust

IELTS is jointly managed by University of Cambridge English for Speakers of Other Languages (Cambridge ESOL) Examinations, British Council, and IDP Education Australia: IELTS Australia. For more information visit www.ielts.org.

TOEFL is an examination written by the Educational Testing Service of The College Board. For more information visit www.toefl.org.

3. Submit a statement guaranteeing the student's ability to pay all expenses while a student at UTSA, if attendance under the F-1 (student) visa is anticipated. The statement may be sent from a parent or guardian when endorsed by a bank or other reliable institution, or from a U.S. citizen who will accept responsibility for the student's financial needs.
4. Have an application, nonrefundable application fee (\$80 online or \$85 paper), and supporting credentials on file in the Graduate School by the appropriate application deadline. The nonrefundable application fee is also charged upon reapplication for admission following academic dismissal. See Application Dates for deadlines.

The above criteria serve as guidelines for admission for international students. The credentials of each applicant are examined on an individual basis by the Graduate School and the appropriate Graduate Program Committee, with admission granted only to those who show promise of success in graduate study at UTSA.

Academic Fresh Start

An applicant who has earned a baccalaureate degree under the Academic Fresh Start statute, Texas Education Code § 51.931, will be evaluated on only the grade point average of the coursework completed for that baccalaureate degree and the other criteria stated herein.

Procedures for Teacher Certification or for Certificate Endorsements at the Graduate Level

An applicant who desires to work on teacher certification requirements and holds a bachelor's degree should apply either as a graduate degree-seeking student or special graduate student (not special undergraduate student) to the Graduate Program Committee for the M.A. in Education for certification and endorsement requirements other than endorsements in Bilingual Education and English as a Second Language. Applicants for these endorsements should apply for admission as either a graduate degree-seeking student or special graduate student to the Graduate Program Committee for the M.A. in Bicultural-Bilingual Studies. A student who is simultaneously seeking a master's degree in education should apply for admission to the M.A. in Education Program or the M.A. in Bicultural-Bilingual Studies Program.

When admission has been granted, the student should apply to the College of Education and Human Development Advising and Certification Center for an analysis of his or her transcripts and for an official outline of a program that will ensure meeting the requirements to obtain a teacher's certificate or a certificate endorsement. In some cases it may be possible to meet certification requirements within a degree program; in other cases the student may need to take additional work for the certificate beyond that required for the graduate degree. The completion of degree requirements does not guarantee completion of Texas certification requirements. The student's program advisor and the College of Education and Human Development Advising and Certification Center will assist the student in planning an appropriate program of study.

Any student seeking a teaching certificate in the state of Texas must pass the Texas Higher Education Assessment (THEA) test. For further information on the THEA requirement and exemptions for teachers, a student should contact the College of Education and Human Development Advising and Certification Center.

Recommendations for teacher certification (to the Texas Education Agency) are made by the College of Education and Human Development Advising and Certification Center only after all requirements have been met and the student has officially requested such recommendation.

A brochure summarizing education certificate and endorsement requirements is available from the College of Education and Human Development Advising and Certification Center.

Programs are subject to change without notice due to changes in the state's certification and/or program approval requirements.

Declaration of Previous College Work Attempted

Students are not at liberty to disregard previous college work attempted. All students transferring to UTSA must list all colleges attended on their UTSA application for admission. Failure to do so may result in the rejection of the application, withdrawal of any offer of acceptance, cancellation of enrollment, permanent dismissal from the University, or other appropriate disciplinary action. Students should consult the admission categories listed above to learn which transcripts they need to have sent to the Graduate School.

APPLICATION DATES

Master's Level

Applicants for admission as master's degree-seeking, special, or non-degree-seeking students may apply for admission as early as nine months before the beginning of the semester in which they wish to begin graduate study. Because of the time needed to prepare graduate summaries, students are encouraged to have their admission file completed at least one month before the application deadline. Application forms and instructions are available on the Graduate School Web site at www.utsa.edu/graduate/ or from the Graduate School. The completed application form, a nonrefundable application fee, and all required supporting documents must be on file with the Graduate School by the appropriate application deadline. Application fees are assessed as follows:

UTSA Graduate Nonrefundable Application Fees

	Online Application	Paper Application
UTSA graduates or degree candidates	\$30	\$35
Non-UTSA graduates	\$45	\$50
International applicants	\$80	\$85

International students are charged a nonrefundable application fee (\$80 online, \$85 paper). The completed application form, the nonrefundable application fee, and all required supporting documents must be on file with the Graduate School by the appropriate application deadline for international students.

The application deadlines for master's-level applicants are*:

Master's Domestic		Master's International	
Semester	Deadline	Semester	Deadline
Fall	July 1	Fall	April 1
Spring	November 1	Spring	September 1
Summer (Mini-mester)	April 1	Summer	March 1
Summer (first term and 10-week term)	May 1		
Summer (second term)	June 1		

*Some master's programs may have priority application deadlines. Please contact the graduate program department or visit the Graduate School Web site at www.utsa.edu/graduate/ for more information.

Doctoral Level

The deadline for doctoral applicants is February 1. Students enrolling in cooperative or joint programs between UTSA and other institutions must satisfy admission dates (and procedures) of the other institutions as well as those of UTSA. Applicants failing to submit all required admission documents by the doctoral admission deadline will need to reapply for the following year. Doctoral students are admitted during the Fall Semester only.

ADMISSION PROCEDURES

Each applicant for admission is responsible for ensuring that all required application materials (completed application form, nonrefundable application fee, test results, required transcripts, etc.) are on file in the Graduate School by the admission deadlines. Admission is not granted until the applicant's file is complete. Documents submitted in support of an application become the property of UTSA and cannot be returned.

Students who apply for admission to UTSA for any semester and do not register for courses within a year of being admitted must reapply for admission if they wish to enroll at a later date. Any subsequent application for admission must be in accordance with current admission requirements. New transcripts, test scores, and other supporting documents are required after one year, since files for admitted students who do not register for courses are not retained after that period. (See program descriptions in Chapter 7, Graduate Program Requirements and Course Descriptions, for specific program admission requirements.)

READMISSION

UTSA graduate students who have not been in attendance for two full years must file an application for readmission, along with a nonrefundable application fee (see application fee table), by the application deadline.

Former students returning to UTSA who have attended other institutions of higher education since they were last enrolled at UTSA must submit an official transcript from each institution. Eligibility for readmission of any former student depends on the student's academic status at the conclusion of the last UTSA semester of enrollment and performance on any subsequent college or university work attempted. Readmission must be recommended by the appropriate Graduate Program Committee.

Students who withdrew from the University to perform military service (not including Texas National Guard training exercises) will not have to requalify for admission and will be readmitted upon request made within one year of being released from active military service. A returning student may be eligible for the same financial assistance provided before the student's withdrawal.

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CHAPTER 3

GENERAL

ACADEMIC

REGULATIONS

GENERAL ACADEMIC REGULATIONS

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GENERAL ACADEMIC REGULATIONS

REGISTRATION PROCEDURES

Academic Advising

UTSA views sound academic advising as a significant responsibility in educating its students. Academic advisors assist students in developing intellectual potential and exploring educational opportunities and life goals. Many individuals within the UTSA community contribute to the advising process, including faculty and staff academic advisors. Students also are encouraged to develop mentoring relationships with faculty for additional information and support.

Students are responsible for seeking adequate academic advice, for knowing and meeting degree requirements, and for enrolling in appropriate courses to ensure orderly and timely completion of their degree programs. Frequent advisor contact provides students with current academic information and promotes progress toward educational goals.

For more information on academic advising in their departments, graduate students should contact the Graduate Advisor of Record.

Registration for Classes

Students who attend classes at UTSA must be officially registered or approved to audit a course. Registration instructions are online each semester in *ASAP* at www.utsa.edu. Questions regarding registration should be directed to the Enrollment Services Center or the Office of the Registrar.

UTSA does not guarantee the availability of particular courses or sections, and admission to classes is permitted only until the maximum number of students allowable in any section has been reached. UTSA reserves the right to cancel any course or section in which the number of registrants does not warrant its continuation.

A student is not permitted to register for classes offered in two consecutive time periods, one at the 1604 Campus and the other at the Downtown Campus, unless there is at least a 40 minute period of time between the end of the first class and the beginning of the second class or the student has received special permission from the Dean of the college of his or her major to register for the two consecutive classes. A student in violation of this policy will have the class scheduled in the second of two consecutive time slots automatically dropped by the University.

Late Registration

Late registration permits students who have been admitted to UTSA to register for classes during an allotted time just prior to and at the beginning of the semester as indicated each semester in the online registration instructions in *ASAP* at www.utsa.edu. Since many courses will have been closed at capacity, late registrants may need to select their courses from a reduced schedule. *Students are not permitted to register after the close of the late registration period, except in extenuating circumstances.* See the section Adding Courses After Late Registration.

Adding Courses After Late Registration

Adding a course after the late registration period requires the approval of the course instructor and the chair of the department offering the course. After the Census Date in any semester, students may not add courses except in extremely rare and extenuating circumstances as approved by the Dean of the college offering the course and by the Dean of the Graduate School. For information on Census Date and deadlines for adding classes, students should refer to the University Calendar in the online registration instructions for each semester.

Undergraduates seeking to register for or to add a graduate course in any of these time periods must obtain the special approvals specified in the section Enrollment in Graduate Courses in Chapter 1, Bachelor's Degree Regulations, of the *UTSA Undergraduate Catalog*.

Maximum Hours of Enrollment in Summer Terms

The Texas Higher Education Coordinating Board sets limits on the number of semester credit hours in which a student may enroll during a term where the courses are offered in a shortened format. Therefore, students may enroll in no more than 3 semester credit hours in a three-week summer term, no more than 4 semester credit hours in a four-week summer term, and no more than 6 semester credit hours in a five-week summer term. In particular, a student may enroll in no more than 3 semester credit hours in the May Mini-mester.

Three-Attempt Rule

The Texas Legislature has enacted legislation that does not allow universities to receive state funding for courses containing the same content attempted by a student more than twice at the same Texas state-supported institution of higher education. This regulation not only includes completing a class more than twice, but also includes classes where grades of "W" were earned by withdrawing from classes or dropping a class after the official semester Census Date (see the online registration instruction calendars for specific Census Dates for each semester).

There is now a monetary benefit if students complete classes prior to the third attempt; therefore, it is imperative that students make every effort to complete courses successfully the first time. Upon the third or subsequent attempt to take the same course at UTSA, a surcharge per semester credit hour will be assessed by UTSA for courses that fall into this category. This surcharge will be in addition to the regular in-state per semester credit hour tuition rate. Current tuition, fees, and charges schedules can be accessed on the Fiscal Services Web site at www.utsa.edu/fiscalservices/. The three-attempt rule applies to both undergraduate and graduate students. However, out-of-state students who pay the out-of-state rate would not be subject to the surcharge; out-of-state students with fee waivers or who are exempt from paying the out-of-state rate would be assessed the surcharge at the same rate as in-state students.

The Texas Legislature has mandated that students be held accountable for any courses they have taken beginning with the Fall 2002 Semester (this means that the "course count" begins with courses taken or dropped after Census Date beginning with the Fall 2002 Semester). However, certain classes will be exempt from this rule, such as master's thesis, dissertation, independent study, and special topics courses with differing content. Students who, in their final semester or term prior to graduation, must repeat one or more previously completed courses for the second or more times in order to meet graduation requirements, will be exempt from paying higher tuition for the repeated course(s) only in the semester or term prior to graduation and shall be permitted the exemption from paying higher tuition for the repeated course(s) for only one semester. Those students wishing to apply for this exemption need to go through the appeal process described below.

Graduate students wishing to appeal a charge because of the three-attempt rule may complete an appeal form available in the Graduate School.

Dropping Courses

Students may drop courses from their schedules for a limited time each semester. The University Calendar in the online registration instructions each semester indicates the deadlines for students to drop courses each term.

Courses officially dropped before the Census Date do not appear on a student's transcript. See the online registration instructions each semester for the Census Dates.

Students who drop courses between the Census Date and the Automatic "W" Date have a record of the courses on their transcripts with an automatic grade of "W." See the online registration instructions for the Automatic "W" Date. The change becomes official after it is processed by the Office of the Registrar.

It is the student's responsibility to drop a course by the appropriate deadline. If a student fails to drop a course, even if the student does not attend the course, he or she will receive a grade of "F" in the class.

Faculty and staff will not drop a student from a course automatically for nonattendance; the student must initiate the process and complete any necessary steps to ensure that the class is dropped.

Under certain circumstances, students may be dropped from courses administratively by college deans. Students who do not meet course prerequisites or who fail to attend a course prior to Census Date may be dropped from courses. If a dean determines that a student should be dropped from a course for these or other documented circumstances, the student will be notified by the college overseeing the course. Students cannot assume that they will be automatically dropped from any class for failure to attend or failure to pay tuition and fees. Students are still responsible for dropping courses by the official deadline or they will receive a grade of "F" in the class. Students are responsible for checking their schedules on *ASAP* and for checking their official UTSA email accounts to determine if they have been dropped from class.

After the Automatic "W" Date, a student may not drop a course except with the approval of the Dean of the college in which the course is offered and then only for urgent and substantiated, nonacademic reasons. Students who want to drop all classes after the semester begins should refer to the section Withdrawal from the University in this chapter.

Refer to section, Three-Attempt Rule, in this chapter for information about the financial consequences of receiving "W" grades.

Auditing Courses

UTSA students and nonstudents who wish to audit a course may do so with the approval of the instructor and the chair of the department in which the course is offered, provided there is space in the classroom after all registered students have been accommodated. The minimum enrollment in a course must be reached without auditors.

Auditing entitles a student to listen and observe. Participation of an auditor in class is at the discretion of the instructor. No UTSA credit is granted for courses that are audited; no official record is made of enrollment in classes on an audit basis. Due to the format of studio/laboratory use, auditors are not approved for art courses. Students not enrolled in courses at the University are not allowed to audit courses that require the use of the University computing system.

All auditors must submit an Audit Course Form to the Enrollment Services Center. A UTSA student pays an auditing fee of \$25 per course. Auditors who are not registered UTSA students must pay an auditing fee of \$50 per course. Persons over 65 years of age are permitted to audit without paying an auditing fee.

Permission to audit must be obtained and fees paid beginning the first day of class through the Census Date. Students who register for a course and later want to change the course to an audit must officially drop that course before submitting an Audit Course Form.

Nonstudent auditors who want library privileges may receive them by completing a Friends of the UTSA Library application at the circulation desk in the UTSA Library and paying a nonrefundable fee. There are limits on the services offered to the Friends of the UTSA Library cardholders; further details are available from the circulation desk.

Nonstudent auditors who want UTSA parking privileges must register their vehicles and purchase a parking permit. To purchase a parking permit, the nonstudent auditor should go to the University Parking and Transportation Services Office with their validated Audit Course Form.

Cancellation of Enrollment

Students who fail to fulfill admission, registration, or financial requirements, or who otherwise fail to adhere to academic regulations may have their enrollment for the semester canceled. Students may apply for readmission for a subsequent semester provided they have resolved the cause of cancellation.

Withdrawal from the University

Students who find it necessary to withdraw (drop all courses for which they are enrolled during a specific term) from the University after the term begins must complete a Withdrawal form at the Enrollment Services Center.

Students may not withdraw from the University later than the third class day preceding final examinations in the Spring and Fall Semesters. Students who officially withdraw from the University during the regular drop period, from the day after Census Date through the Automatic “W” Date, receive a grade of “W” in all classes. See the online registration instructions each semester for the Automatic “W” Date. Students who officially withdraw after the regular drop period receive a grade of “W” for each class they are passing at the time of withdrawal and a grade of “F” for each class they are not passing. Refer to section, Three-Attempt Rule, in this chapter for information about the financial consequences of receiving “W” grades.

Students who withdraw from all classes are subject to the UTSA’s academic probation and dismissal regulations. Students withdrawing should refer to the regulations on refunds of tuition and fees, readmission policies, and requirements for maintaining registration.

Medical and/or Mental Health Withdrawal from the University

Students who find it necessary to withdraw from the University or reduce their course loads (drop some of their courses) after the term begins due to a medical or mental health issue may write a letter requesting the withdrawal or course load reduction and provide appropriate supporting documentation (for example, a letter from a physician or psychologist, hospital, or other medical professional who is already familiar with the student’s condition). The documentation should be submitted to Health Services for medical conditions and Counseling Services for mental health conditions. Once supporting documentation is reviewed by the service in question, that service will provide the documentation with recommendations to the Dean of Undergraduate Studies if the student is an undergraduate student, or the Dean of the Graduate School if the student is a graduate student.

A student granted a medical and/or mental health withdrawal or course load reduction will be assigned grades of “W” in the affected courses, unless the effective date of the withdrawal or course load reduction is on or before Census Date, in which case no record of the courses appears on the student’s transcript. Any refund of tuition and fees will follow the University’s Refund Policy for Withdrawal or Dropped Courses (Chapter 3 of *UTSA Information*) at the time of the effective date of the withdrawal or course load reduction.

English Language Assessment Procedure

The English Language Assessment Procedure (ELAP) is a mandatory UTSA assessment for incoming international students whose Test of English as a Foreign Language (TOEFL) scores are between 500 and 600 (paper version), 61 and 100 (internet version), or 173 and 250 (computerized version). ELAP tests academic language skills in the areas of reading, writing, listening, and speaking. The test is administered during orientation week at no charge to the student. A registration hold is placed on students until the test is successfully completed.

Students who are required to take English for International Students (EIS) classes and do not register for them or drop them before they are successfully completed will be withdrawn from the University and will jeopardize their visa status. Once students successfully complete the EIS classes, the registration hold is removed from their record.

RECORDS AND CLASSIFICATION OF STUDENTS

Classification Terms

Graduate Degree-Seeking Student. A student who is admitted to a graduate degree program, unconditionally, conditionally, or conditionally on academic probation.

Special Graduate Student. A student who is admitted to UTSA for the purpose of enrolling in graduate and/or undergraduate courses in one or more colleges of the University without entering a degree program.

Non-Degree-Seeking Graduate Student. A student who registers for courses but does not intend to work toward a degree at UTSA.

Note: A graduate student who wishes to work on a program to meet the requirements for teacher certification or for a certificate endorsement must be admitted as a graduate degree-seeking student or special graduate student (not a special undergraduate student). He or she must apply to the College of Education and Human Development Advising and Certification Center for an official analysis of the requirements that must be met before he or she can be recommended for certification.

Time Status Terms

Graduate Time Status	Number of Credit Hours Enrolled	
	Fall/Spring	Summer
Full time	Nine or more semester credit hours	Five or more semester credit hours
Three-quarter time	Six to eight semester credit hours	Not Applicable
Half time	Four to five semester credit hours	Three to four semester credit hours
Less than half time	Fewer than four semester credit hours	One to two semester credit hours

Verification of Enrollment and Degree

UTSA student enrollment and degree verifications are reported by the National Student Clearinghouse (NSC). For students on financial aid this means that UTSA electronically submits enrollment verification statuses to the NSC at several key periods during the semester to keep their enrollment status up to date with loan guarantors, services, or lenders. The NSC also provides enrollment status and deferment information to the Department of Education's National Student Loan Data System. This service provides for more efficient processing of enrollment information for financial aid loans.

The NSC also provides enrollment and degree verification for nonlending institutions, such as travel agencies, health care companies, and prospective employers. Students who do not want to have their directory information, such as enrollment and degree status, verified in this manner should contact the Office of the Registrar to request that this information be kept confidential.

Transcripts

Official transcripts of all coursework taken at UTSA may be requested at the Enrollment Services Center, by mail, or online. See the UTSA Web site at www.utsa.edu/registrar/transcripts.cfm for details on how to request a transcript.

Transcripts from other institutions submitted to UTSA become the property of the University and are not reproduced or mailed to other institutions, agencies, or individuals as an official transcript.

Official transcripts will not be issued for students who have a financial obligation or other commitment outstanding to the University until the obligation is cleared.

Release of Academic Records

All official certifications with regard to the academic performance or status of a student or former student of UTSA are made by the Office of the Registrar.

UTSA transcripts and other information from a student's academic records are released by the Office of the Registrar only upon written request from the student or other person authorized by law under the Family Educational Rights and Privacy Act

(FERPA) of 1974. Exceptions may be made in response to a subpoena or court order, under other circumstances as allowed under FERPA, or as provided in the policy on releasing directory information set forth in Chapter 5, Administrative Policies and Procedures, of *UTSA Information*.

Catalog of Graduation

Graduate students have six years from their term of original registration as degree seeking to complete a graduate degree program under the catalog in effect at the time of initial registration at UTSA, provided they are continuously enrolled at UTSA. If a student drops out for one or more long semester (Spring or Fall), he or she has the option of reenrolling under a subsequent catalog. These students will have six years to complete degree requirements under the new catalog. In the event that certain required courses are discontinued, substitutions may be authorized or required by the appropriate Graduate Program Committee.

Change of Major, Degree, or Classification

Students who wish to change their majors, degree objectives, or classifications can access the required forms on *ASAP*. The change is not official until the student is admitted to the new degree program or certification program. Classification changes (e.g., special graduate to degree-seeking) requested during any semester will not be effective until the following semester. A fee of \$5 is assessed each student changing their major to defray administrative processing costs.

Change of Name

A student's name on official records at UTSA is the name under which the student applied for admission, unless a Name and Social Security Number Change Form has been processed through the Office of the Registrar. The official University transcript will carry the current name and the most immediate previous name, if any. Name and Social Security Number Change Forms should be supported by appropriate legal documentation.

Change of Address

Currently enrolled students who have changed their addresses *must* notify the Graduate School on the appropriate form or on the UTSA Web site in *ASAP* at www.utsa.edu. Official notification of change of address is necessary for proper identification of student records and for accurate mailing of correspondence and information pertaining to graduation requirements. Students who are applying for graduation will specify on the Application for Graduation the address where their diploma is to be mailed. This does not change the official mailing address with the University.

COURSES

Course Numbering System

All courses are designated by four-digit numbers following a two- or three-letter abbreviation of the subject of the course. The first digit indicates the level of the course. Courses beginning with "0" are developmental education courses and may not be counted toward a degree. Courses beginning with "1" or "2" are lower-division (freshman and sophomore level). Courses beginning with "3" or "4" are upper-division (junior and senior level). Courses beginning with a "5" or higher are graduate-level courses.

The second and third digits in the course numbers are used within the colleges by each department to distinguish individual courses. The fourth digit indicates the semester-credit-hour value of each course.

The number of lecture and laboratory contact hours per week are provided in parentheses in the course description sections of the UTSA Graduate Catalog immediately following the course number and title. For example, (3-0) indicates three hours of lecture and zero hours of laboratory per week.

Prerequisites

Prerequisites are stated for many courses listed in this catalog. Prerequisites advise students of the background expected of all students in the course. It is the student's responsibility to be sure that all prerequisites are met before enrolling in any course. When a student has not met the specific prerequisites listed, he or she may, under special conditions, obtain permission to register from the instructor of the course. Some colleges and schools may also require the permission of the Department Chair and the Associate Dean. Students who do not meet prerequisites for a course and do not have the appropriate permissions to register may be dropped from the course.

Extended Education Courses

The Office of Extended Education develops and presents seminars, online courses, conferences, and programs for the general public, professionals, governmental agencies, and businesses. It also provides specialized training to businesses, government agencies, and nonprofit organizations needing customized programs for their employees. These courses are not offered for academic credit. For information, contact the Office of Extended Education.

Distance Learning Courses

UTSA participates in the UT TeleCampus. Degree-seeking UTSA students taking courses through this system, that are not hosted by UTSA, must still meet all UTSA residence requirements. For information on the UT TeleCampus, see Chapter 6, Academic Resources and Student Services, of *UTSA Information* or the UT TeleCampus Web site at www.telecampus.utssystem.edu.

Independent Study Courses

No more than six hours of independent study courses, regardless of discipline, will apply toward a degree.

GRADES

Explanation of Credit, Grading System, and Symbols

Hours Attempted. The number of hours attempted is the total number of semester credit hours for which a student has enrolled and received grades of "A," "B," "C," "D," "F," "W," or "CR" except as provided for repeated courses. Refer to section, Three-Attempt Rule, in this chapter for information about the financial consequences of receiving "W" or "F" grades.

Hours Earned. The hours earned by a student are the number of semester credit hours in which grades of "A," "B," "C," "D," or "CR" have been received.

Grade Point Average. The UTSA grade point average is determined by dividing the number of grade points earned at UTSA by the number of for-credit semester credit hours attempted at UTSA. Credits and grades for work completed at other institutions or credits earned by examination are not included in the UTSA grade point average.

Students who are in a UTSA-hosted degree program through the UT TeleCampus and declare UTSA as their home institution will have the courses taken at other institutions through the UT TeleCampus listed on their UTSA transcript and counted in their UTSA grade point average. Other credit courses taken through the TeleCampus count as transfer credit and apply to a UTSA degree as determined by the student's academic advisor.

The following table explains UTSA grade symbols.

Grade Symbol	Grade Points	Meaning of Grade Symbol
A	4	<i>Outstanding</i>
B	3	<i>Above Average</i>
C	2	<i>Average</i>
D	1	<i>Below Average</i> (see Academic Probation)
F	0	<i>Failure</i> (see Academic Dismissal)
CR	0	<i>Credit</i> . Indicates successful credit by examination (see Credit by Examination) or through faculty evaluation of selected internships and practica.
NC	0	<i>No Credit</i> . Indicates unsatisfactory progress.
W	0	<i>Withdrawal</i> . Indicates that the student was passing at the time of withdrawal or drop.
IN	0	<i>Incomplete</i> . Assigned at the discretion of the instructor; see details below.
NR	0	<i>No Report</i> . Assigned only by the Registrar when unusual circumstances do not allow a student's grade to be entered by the deadline for processing grades. It is replaced with the official grade as soon as possible.
EX	0	<i>Expelled</i>
RP	0	<i>Research in Progress</i> . Used to denote research in progress only for MOT 6933, MUS 6903, MUS 6913, and Master's Thesis and Doctoral Dissertation courses. When the project, thesis, or dissertation is complete, the "RP" grades will be changed to letter grades up to the maximum number of semester credit hours approved for the specific degree.

Credit/No-Credit. Students may earn "CR" or "NC" grades only for specific courses listed in this catalog as graded on a credit/no-credit basis.

Incomplete. The grade "IN" is given by an instructor to indicate that some part of the work of a student in a course has, for good reason, not been completed, while the rest of the student's work in the course was satisfactorily completed. The Incomplete allows a student to complete the course without repeating it. A grade of Incomplete may not be assigned when a definite grade can be given for the work done. The student must have been in attendance at least three-fourths of the term to receive a grade of "IN."

Whenever a grade of Incomplete is assigned, the instructor is required to submit requirements for removal of the incomplete. During the regular grading period this is done electronically. After the grade submission deadline, a Requirements for Removal of Incomplete form must be submitted to the Dean's office. The Dean's office will then submit the form to the Office of the Registrar.

Incomplete work must be made up no later than the end of the final examination period one year from the semester the Incomplete was received and before the student's graduation. If the work is not completed within this time, the "IN" remains on the student's record, and credit may be earned only when the student reenrolls in the course and completes the entire course satisfactorily. The time limit does not apply to graduate-level thesis, internship, or dissertation courses, except that an "IN" cannot be removed after a degree is awarded. The time limit does apply to all other graduate courses, including special problems and independent study courses.

IN NO CIRCUMSTANCES WILL GRADES BE CHANGED AFTER ONE CALENDAR YEAR.

Repeating Courses

Courses designated “may be repeated for credit” in the catalog may be repeated with both semester credit hours and grade points earned being counted. Otherwise, students at the graduate level may not elect to repeat courses for the purpose of raising a grade. However, when a course was taken more than six years ago, or upon the recommendation of the appropriate Graduate Program Committee, the course may be repeated; in such cases, both grades in the course appear on the transcript and both are counted in the student’s grade point average. Only semester credit hours for the repeated course may be counted toward the degree.

Administrative Procedures

Reporting of Grades by Faculty

Final grades are reported by course instructors every term and are due 48 hours after the final examination. Final grades cannot be withheld nor can reporting of them be deferred.

Grade Reports

The Office of the Registrar compiles final grades after the close of each semester and each summer term. Grades are available in *ASAP* via UTSA’s Web site, www.utsa.edu. Students who are removed from, placed on, or continued on academic probation and students who are dismissed from UTSA will receive notification from the Office of the Registrar.

Transcripts may be withheld from any student who owes tuition and fees to the University.

Change of Grades

Individual faculty members retain primary responsibility for assigning grades and evaluations. The faculty member’s judgment is final unless compelling evidence shows discrimination, differential treatment, or factual mistake. Under unusual circumstances, however, grades may be assigned or changed by someone other than the faculty member. Grades may be changed or assigned through administrative channels in the following procedure:

1. *Circumstances when an assigned grade of “A,” “B,” “C,” “D,” or “F” might be changed.* In this case, the formal appeals process stated in the catalog must be initiated by the student. Because a grade change of this type is related directly to issues of academic freedom, a committee composed of qualified faculty should be appointed by the appropriate Graduate Program Committee to assess the academic merits of the appeal. The committee report should weigh heavily in the subsequent administrative review by the Department Chair, College Dean, and Graduate School Dean. Grades may be changed only if compelling evidence demonstrates discrimination, differential treatment, or factual mistake.
2. *Circumstances when an assigned grade of “IN” or “NC” might be changed.* Under unusual circumstances, a faculty member of record may be unable to assign grades in a timely manner. Examples include death or incapacitation of a faculty member; a faculty member who permanently leaves the University and refuses or fails to respond; and a faculty member who is on leave and cannot be reached.

IN NO CIRCUMSTANCES WILL GRADES BE CHANGED AFTER ONE CALENDAR YEAR.

Class Participation Policy

Students are expected to regularly attend and participate in all meetings of courses for which they are registered. The instructor is responsible for communicating the participation requirements for each course to students. With the exception of UTSA policies on class absences related to observance of religious holy days, active military service, or attendance at an official University sanctioned student activity, the instructor determines classroom participation requirements and policies on making up work missed during an absence.

Students may be excused from attending classes or other required activities, including examinations, to attend an official University sanctioned student activity (as defined in the Handbook of Operating Procedures) or for the observance of a religious holy day, including travel for that purpose. A religious holy day is a day observed by a religion whose places of worship are exempt from property taxation under § 11.20, Tax Code. A student whose absence is excused for attending an official University sanctioned student activity or for religious holy day reasons may not be penalized for the absence and shall be allowed by the instructor to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

Students may be excused from attending classes or engaging in other required activities, including examinations, in order for the student to participate in active military service to which the student is called, including travel associated with the service. A student whose absence is excused under the Texas Education Code, § 51.9111, may not be penalized for the absence and shall be allowed by the instructor to complete an assignment or take an examination from which the student is excused within reasonable time after the absence.

If a student has to miss class excessively due to illness or other unforeseen circumstances, it is his or her responsibility to notify the instructor as soon as possible. A student who enrolls in a course and does not attend is considered absent from class until they officially drop the course. A student who does not attend class and fails to drop the course by the specified deadline listed in the online registration instructions will receive a grade of "F." Refer to section, Three-Attempt Rule, in this chapter for information about the financial consequences of receiving "W" or "F" grades.

Grade Grievance Procedure

In resolving any student grievance regarding grades or evaluations, the student must first make a serious effort to resolve the matter with the faculty member with whom the grievance originated. Individual faculty members retain primary responsibility for assigning grades and evaluations. The faculty member's judgment is final unless compelling evidence shows discrimination, differential treatment, factual mistake, or violation of a relevant University policy. If the matter is not resolved, the student may file a formal grade grievance, in writing, with the Department Chair. The student must file the grievance with the Department Chair within 90 calendar days from the end of the term in which the grade was assigned.

The Department Chair will communicate his or her decision to the student and forward a copy to the Dean of the College. The student may appeal the decision to the Associate Dean for Graduate Studies and Research of the college and then to the Dean of the Graduate School. Appeals to the Dean of the Graduate School must use the Student Academic Grievance Form. The decision of the Dean of the Graduate School is final.

IN NO CIRCUMSTANCES WILL GRADES BE CHANGED AFTER ONE CALENDAR YEAR.

Student Study Days

At the end of each Fall and Spring Semester, two days prior to the beginning of the final examination period are designated as Student Study Days. Classes do not meet during Student Study Days. Furthermore, Student Study Days are not to be used as dates on which papers are to be turned in, examinations are to be given, quizzes are to be scheduled, review sessions are to be held, or for any other class-related activities, other than office hours. Also, the scheduling of examinations and quizzes, with the exception of laboratory examinations, is prohibited during the last three class days preceding finals during the Fall and Spring Semesters.

ACADEMIC STANDING

A student's academic standing, whether the student is a graduate degree-seeking student, a special graduate student, or a non-degree-seeking graduate student, is defined as either good standing, academic probation, or academic dismissal.

Good Standing

Good standing is the absence of any contingency that would result in the student's being on academic probation or academic dismissal.

Academic Probation

Academic probation describes the standing of a student at the graduate level who is in one of the following categories:

1. A student who fails to achieve a grade point average in any term at UTSA of 3.0 or higher, irrespective of level of courses taken.
2. A student who received a grade of "D" in any course in a term.
3. A student who does not meet all requirements for unconditional or regular admission and who, by special action, is admitted on academic probation.
4. A student who has been reinstated following academic dismissal.
5. To graduate, all graduate students must have a grade point average of at least a 3.0 (on a 4.0 scale).

Academic probation is cleared only when none of the above criteria apply and when the student achieves an overall grade point average of 3.0 as a graduate student at UTSA. Students on academic probation are encouraged to discuss their status with their academic advisors.

Academic Dismissal

Academic dismissal occurs:

1. when a student at the graduate level earns a grade point average of less than 2.0 in any term
2. when a student at the graduate level earns a grade of "F" in any course
3. when a student at the graduate level who is on academic probation during a term would again be placed on academic probation under the provisions of academic probation set forth above. If, however, the student's UTSA grade point average for the term is at least 3.0, he or she will continue on academic probation.

Petition for Reinstatement

A student who has been dismissed academically may petition for reinstatement. Normally, such reinstatement is requested after a student has remained out of school one long semester; however, under exceptional circumstances, a petition may be considered earlier. A letter containing all explanations, recommendations, or doctors' statements in support of the student's request for reinstatement should be submitted to the Dean of the Graduate School on or before June 15 for Fall Semesters, October 15 for Spring Semesters, or March 15 for Summer Semesters.

The appropriate Graduate Program Committee will review the petitioner's letter and academic record and make a recommendation concerning reinstatement to the Dean of the Graduate School. If the Petition for Reinstatement is disapproved, the student may not file another petition until the following semester.

GRADUATION

Graduation Dates

Degrees are awarded at the end of each Spring, Summer, and Fall Semester. Commencement ceremonies are held in May and December at the end of the Spring and Fall Semesters. With the exception of doctoral students, students who graduate at the end of the Summer Semester may participate in either the May or December Commencement ceremonies. Information regarding Graduation and Commencement is available in the Office of the Registrar or the Registrar's Web site at www.utsa.edu/registrar/.

Applying for the Degree

It is the student's responsibility to apply officially for his or her degree by submitting an Application for Graduation no later than October 1 for the Fall Semester, February 15 for the Spring Semester, or June 1 for the Summer Semester. Applications for graduation are to be submitted online through *ASAP*. Students must read and follow instructions carefully to ensure the application is accurate and successfully submitted. Students will receive a confirmation number when the application has been accepted. Students who have problems submitting the application should contact Graduation Coordination at (210) 458-8000. A student who completed all degree requirements but failed to apply for the degree may obtain a Letter of Degree Completion from Graduation Coordination after the close of the semester in which all degree requirements are met.

Students who apply for the degree in a given semester but do not fulfill all requirements must file a new degree application on or before the appropriate deadline for the next semester in which they intend to graduate.

ACADEMIC HONESTY

Ethical Standards

The University can best function and accomplish its objectives in an atmosphere of high ethical standards. All students are expected and encouraged to contribute to such an atmosphere in every way possible, especially by observing all accepted principles of academic honesty. It is recognized, however, that a large university will include a few students who do not understand, appreciate, or practice these principles. Consequently, alleged cases of academic dishonesty involving UTSA students will inevitably occur.

Academic or scholastic dishonesty includes, but is not limited to, cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student, or the attempt to commit such acts. Academic dishonesty is a violation of the Student Code of Conduct and is addressed in *UTSA Information*, Appendix B, Sec. 203.

Fraudulent Degrees

Under Chapter 61, Subchapter G, of the Texas Education Code, it is illegal to use a fraudulent or substandard degree for gaining admission into an educational program, presenting oneself to the public as an expert, gaining employment or promotion, or gaining a governmental position with authority over others. Violation of this subchapter is a misdemeanor and falls under the Deceptive Trade Practices Act.

CHAPTER 4

CERTIFICATE PROGRAMS



CERTIFICATE PROGRAMS

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CERTIFICATE PROGRAMS

Certificate programs provide opportunities for postgraduate training to those with undergraduate degrees. Certificate programs are narrower in scope and shorter in duration than master's degrees. Certificate programs are not "degree" programs.

Admission Requirements

Students who are currently enrolled in a graduate degree program and who wish to earn a certificate in addition to their degree or students who are not currently enrolled in a graduate degree program are eligible for admission to a certificate program.

Students who are currently enrolled in a graduate degree program have already met University requirements for admission. In this case, no formal application process is necessary. The student should contact the Certificate Program Advisor and complete a form requesting permission to enter and complete the certificate program. If the request is approved, this form will be signed by the Certificate Program Advisor and the Dean of the College or Director of the Center in which the certificate program is housed. A copy of this form will be sent to the Graduate Advisor of Record for the student's degree program, the department in which the student's program is housed, and the Graduate School.

Students who are not currently enrolled in a graduate degree program will be required to apply for admission to UTSA as a special (non-degree-seeking) graduate student and to indicate their intent to seek admission into a certificate program. Applicants will be required to meet University admission requirements for special graduate students. Once admitted as a special graduate student, the student should contact the Certificate Program Advisor and complete a form requesting permission to enter and complete the certificate program. The form will be signed by the Certificate Program Advisor and the Dean of the College or Director of the Center in which the certificate program is housed. A copy of this form will be sent to the Graduate School.

If it is determined by the Certificate Program Advisor that a student requires prerequisite background courses to adequately prepare for the courses included in the certificate program, this will be noted in the student's file. The student will be notified that the prerequisite courses must be taken before enrolling in certificate program coursework.

Any student who is admitted into a certificate program without being currently enrolled in a graduate degree program is considered to be a special graduate student. If the student wishes to enter a degree program, they will be required to apply to that program as a degree-seeking student. Admittance into or completion of a certificate program is not considered to be qualification for entry into a graduate degree program.

Students who are pursuing a certificate as special graduate students will not be eligible for financial aid.

Students who are admitted into a certificate program while also pursuing a graduate degree will be classified as degree-seeking students.

Course Restrictions

All courses offered in a certificate program must be approved graduate-level courses. See individual certificate program descriptions for program-specific requirements. Currently, the following graduate certificate programs are offered:

Certificate of Professional Development in Geographic Information Science
Graduate Certificate in Creative Writing

Completion of Requirements for Certificate

Completion of a certificate program, with or without completion of a degree program, will be recorded on the student's transcript if the following conditions are met:

1. The student's Certificate Program Advisor has prepared a Certificate Degree Plan, which will be sent to the Office of the Registrar prior to the end of the semester in which the student completes the requirements of the certificate.
2. The student has applied officially for the certificate in the Office of the Registrar no later than October 1 for the Fall Semester, February 1 for the Spring Semester, or June 1 for the Summer Semester. The application of any student applying for a certificate after the established deadlines will be processed the following semester.

It is the responsibility of the student to meet with the Certificate Program Advisor during the last semester of certificate coursework in order to determine that all requirements of completion are met. It is also the responsibility of the student to apply to the Office of the Registrar for the certificate by the established deadline.

The student's completion of a certificate program, with or without completion of a degree program, will be recorded on the student's transcript.

CHAPTER 5

MASTER'S

DEGREE

REGULATIONS

MASTER'S DEGREE REGULATIONS

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DEGREE REQUIREMENTS

University-wide Requirements

In order to receive a master's degree from UTSA, the following minimum requirements must be met:

1. The student must be admitted as a graduate degree-seeking student for the degree sought.
2. The student must remove all conditions of admission, if any were assigned at the time of admission.
3. Subject to the six-year time limitation, the student must complete satisfactorily all coursework as specified in their discipline's program of study, and, if Option I is selected, must complete satisfactorily the thesis as outlined in the Options for Master's Degrees section of this chapter.
4. The student must formally apply for the degree in the Office of the Registrar no later than the deadline for the semester in which they intend to graduate (for deadlines, see the online registration instructions).
5. The student must complete satisfactorily the comprehensive examination, except as provided by the M.B.A. degree.
6. The student must meet the grade point average requirement of 3.0 or higher (on a 4.0 scale) in all work counted as part of the degree program.
7. No courses in which grades of less than "C" (below 2.0 on a 4.0 scale) were earned may be applied to a graduate degree, nor may courses for which the grade of "CR" was earned by examination be applied to minimum degree requirements. Credit for selected internships and practica in which a grade of "CR" was earned may be applied to minimum degree requirements upon approval of the Graduate Program Committee.
8. To graduate, all graduate students must have a grade point average of at least a 3.0 (on a 4.0 scale).

Detailed descriptions of each of the above requirements are included in this catalog.

Comprehensive Examination

A candidate for a master's degree (other than candidates for the M.B.A. degree, who are required to complete MGT 5903 with a grade of "B" or better) must, in addition to other requirements, pass a comprehensive examination which may be oral, written, or both. Students must be registered during any semester or term in which they are taking required examinations.

Comprehensive examinations are given only to those students who have complied with the following requirements:

1. completion of all conditions of admission, if any were assigned at the time of admission
2. completion of all special admission requirements for the degree program, if any
3. be in good standing
4. have an acceptable program of study in the discipline in which the degree is sought
5. if a thesis is to be written, selection of supervising professor and thesis committee and acceptance of thesis topic
6. enrollment in 6961, Comprehensive Examination, in the semester the comprehensive examination is taken, if registered for no other courses that semester.

Supervising Committee

Each comprehensive examination is developed, administered, and scored under the guidance of a supervising committee with two or more members, one of whom is designated as chair. The chair must be a member of the Graduate Faculty in the major area of study.

In general, all committee members must be members of the Graduate Faculty in the major area of study. Occasionally, scholars who hold nontenured or tenure-track faculty appointments at the University, such as research professors or adjunct faculty members, or off-campus scholars, are appointed because their expertise would be valuable to the student. The composition of the committee is subject to approval by the Dean of the Graduate School.

The supervising committee is responsible for the quality, depth, and balance of the comprehensive examination.

Options for Master's Degrees

Two options are available for most master's degree programs. Refer to specific program requirements in Chapter 7, Graduate Program Requirements and Course Descriptions, to determine whether a program offers both options.

Thesis Option (Option I)

The candidate for a master's degree under Option 1 is required to complete the required number of semester credit hours in coursework approved by the appropriate Graduate Program Committee, including 6 semester credit hours for a thesis. The thesis is subject to approval by the student's program advisor, Thesis Committee, graduate advisor, and the Dean of the Graduate School.

No more than six semester credit hours of thesis can be applied toward a master's degree.

Students receiving advice and assistance from a faculty member in the preparation of a thesis must enroll in the appropriate thesis course (if necessary, for multiple semesters) until final approval of the completed thesis has been given and three copies have been filed with the Dean of the Graduate School.

Requirements for Thesis. The following steps for completing a thesis as part of a master's degree are the responsibility of each degree candidate selecting Option I:

1. Secure the approval of the supervising professor, who is also Chair of the Thesis Committee. The Thesis Committee consists of the Thesis Chair and two additional members of the Graduate Faculty appointed by the College Dean. The student is expected to work closely with the Thesis Chair in selecting the thesis topic and in completing other details of their study.
2. Submit a preliminary draft for approval by the Thesis Chair no later than 45 calendar days before final examinations of the semester in which the degree is to be awarded. The first draft should demonstrate the student's understanding of the preparation guidelines and it is understood the text is still being modified. The format of the thesis must follow University regulations. The detailed requirements and thesis and dissertation deadlines are available on the Graduate School's Web site at www.utsa.edu/graduate/.
3. Secure approval of the draft by the Thesis Committee. This step is intended to ensure that the thesis meets the required standards for content, expression, format, spelling, and accuracy. Candidates are responsible for meeting the standards of those reading and approving the thesis.
4. Submit the final copy of the thesis to the supervising professor and Thesis Committee no later than 20 calendar days before final examinations of the semester in which the degree is to be awarded. This copy of the thesis must be the original and, if acceptable, must be signed by the Thesis Chair and members of the Thesis Committee. Before submission of the thesis to the Graduate School through the Dean of the College for final acceptance, the Graduate School must certify that it conforms to the format prescribed in the *Guide for the Preparation of a Master's Thesis* and approve the method of duplication.
5. File three unbound copies, including the original, of the approved thesis with the Graduate School at least 10 days before the last day of classes of the semester in which the degree is to be awarded. The copies are transmitted by the Graduate School to the library, where they are bound. Two copies will be filed in the library and one copy will be sent to the student's program office. The student will be notified by the library when personal copies are available for pickup. (A fee of \$10 per copy will be charged for binding the official copies of the thesis.)
6. It is customary that copies of the thesis be presented to the Thesis Chair and members of the Thesis Committee. Arrangements and expenses for binding of copies are the responsibility of the student. Copyright is optional and may be arranged by the student and will be at their expense.
7. Copies of theses and dissertations are available to the general public through the UTSA Library.

Nonthesis Option (Option II)

For a master's degree under Option II, a student can meet requirements without writing a thesis. Instead, the student is required to complete a program of coursework, as indicated by specific program requirements in Chapter 7, Graduate Program Requirements and Course Descriptions, approved by the Graduate Program Committee.

Thesis credits may not be applied to the program of coursework for a master's degree under Option II.

At the beginning of the student's master's degree program, they should, in consultation with their program advisor, select the option most suitable to their needs. Should a student elect to change options, they should consult with the program advisor.

Limitation on Repeating Courses for Credit

Many independent study, thesis, special problems, special topics, directed research, seminar, dissertation, and other similar courses may be repeated for credit; however, limitations exist on the number of semester credit hours that may be applied toward a degree. Refer to the individual course descriptions for specific details on these limitations and consult the appropriate graduate advisor.

Catalog of Graduation

Graduate students have six years from the semester of original registration as degree seeking to complete a graduate degree program under the catalog in effect at the time of initial registration at UTSA, provided they are continuously enrolled at UTSA. If a student drops out for one or more long semester (Spring or Fall), they have the option of reenrolling under a subsequent catalog. These students will have six years to complete degree requirements under the new catalog. In the event that certain required courses are discontinued, substitutions may be authorized or required by the appropriate Graduate Program Committee.

Additional Master's Degrees

A student who holds a master's or higher degree may pursue an additional master's degree at UTSA only under the following conditions:

1. The additional master's degree opens up an additional area, field, or concentration.
2. The proposed second master's degree is approved by the appropriate Graduate Program Committee and the Dean of the Graduate School.

It should be further understood that:

1. The same courses cannot be applied toward two different degrees.
2. Credit applied to a previous degree at another institution which duplicates a portion of the program required under the second degree being sought at UTSA does not reduce the number of semester credit hours required for that second degree. (The only exception is the M.F.A. degree. See Courses Counted for Another Degree under Course Types and Acceptability in the Transfer of Credit section of this chapter.) Courses already taken would not be required. Rather, additional coursework would be substituted for previously completed courses.

TRANSFER OF CREDIT

Limitations

Quantity

Ordinarily, all work for the master's degree must be completed at UTSA. Transfer credit of usually not more than 6 semester credit hours may be allowed for graduate coursework completed at another accredited institution upon the approval of the appropriate Graduate Program Committee in which the major area is located. Upon petition by the student, recommendation of the appropriate Graduate Program Committee, and approval by the Dean of the Graduate School, a maximum of one-third of the semester credit hours of coursework (exclusive of thesis) required for a degree at UTSA may be accepted as transfer credit for the degree.

Time Limitation

All requirements for a master's degree must be completed within one six-year period. Work over six years old may be reinstated only with the permission of the Dean of the Graduate School, upon recommendation of the Graduate Program Committee.

Evaluation of Courses

Graduation Coordination in the Office of the Registrar evaluates transcripts and designates which graduate courses are acceptable under the above provisions for transfer toward a master's degree at UTSA. Whether or not a course is transferable as graduate coursework is determined by the course number assigned by the institution awarding the credit. To be transferable to UTSA, courses must be defined as graduate courses at the institution where credit was earned. Courses that are defined as undergraduate upper-division by their course numbers, but that can be applied to a graduate degree at the institution awarding the credit, are not accepted for transfer toward a master's degree at UTSA. All work submitted for transfer credit must have been completed with grades of "A" or "B" and must have been completed no more than six years before the degree was awarded.

Transfers within The University of Texas System

It is the policy of The University of Texas System that all academic institutions within the System may accept graduate credit from each other, and the regular requirements for residency are adjusted accordingly. The applicability of specific courses from other University of Texas institutions to a student's graduate degree program at UTSA, however, must be approved by the appropriate Graduate Program Committee.

Course Types and Acceptability

Accepted on a Limited Basis

UTSA Undergraduate Courses. With the approval of the appropriate Graduate Program Committee, the Department Chair, and the Dean of the college in which the student expects to earn their degree, a candidate for the master's degree may apply a maximum of 6 semester credit hours of unduplicated credit for undergraduate upper-division (junior- or senior-level) courses completed at UTSA with the grades of "A" or "B" to a master's degree; no course below the upper-division level or with other grades may be applied to the degree.

Not Accepted

Correspondence and Extension Courses. Courses completed by correspondence or extension may not be applied to a graduate degree program.

Courses Counted for Another Degree. No courses counted toward another degree may be applied to a graduate degree, either directly or by substitution. The only exception is that candidates holding a Master of Arts degree in Art from another institution seeking admission to the Master of Fine Arts degree program may have up to 24 semester credit hours applied toward the M.F.A. degree exclusive of the thesis and/or degree project, upon recommendation of the department Graduate Program Committee and approval of the Dean of the Graduate School. Work completed for the master's degree may be included in the work for the doctoral degree, when it is offered, provided it is acceptable to the candidate's supervising committee, the appropriate Graduate Program Committee, and the Dean of the Graduate School.

Credit by Examination. Credit by examination at UTSA is intended to enable undergraduate students to receive credit for courses leading to a bachelor's degree in which they may already have achieved the objectives. Credit cannot be earned by CEEB examination or by UT Challenge Examination for any courses used to meet minimum requirements for a graduate degree or graduate teacher certification program. Graduate degree-seeking students in the College of Business may challenge by examination any UTSA graduate-level "professional" or "background" course that is required in addition to minimum degree requirements. (See the UTSA Credit by Examination brochure.)

CHAPTER 6

DOCTORAL DEGREE

REGULATIONS

DOCTORAL DEGREE REGULATIONS

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DEGREE REQUIREMENTS

Residence Requirement

A student must spend at least two consecutive semesters (Fall and Spring, Summer Terms I and II and Fall, or Spring and Summer Terms I and II) in residence as a full-time student taking a minimum of 9 semester credit hours each residence semester.

Grade Point Average

A grade point average of “B” (3.0 on a 4.0 scale) must be maintained in each of the following:

1. all coursework completed at UTSA
2. graduate courses in the student’s major
3. graduate courses in the student’s support field.

In computing grade point averages, grades from other institutions are not used.

Course Requirements

No specific number of semester credit hours of coursework has been established for doctoral programs at UTSA, although advanced coursework is an essential part of a doctoral candidate’s preparation. Individual doctoral programs may set minimum semester-credit-hour requirements for the attainment of the degree.

Support Work

In addition to courses and research in a field of specialization within the major, supporting coursework will be taken to broaden or supplement the student’s preparation.

Support work may consist of coursework in one area or several; it may be in conference, laboratory, or problems courses; it may be a supervised activity off campus relevant to the major interest. Some portion, not necessarily all, of the support work is normally outside the major area unless that area is of a multidisciplinary nature. At least three courses, or their equivalents, from outside the area of specialization are generally required.

Language Proficiency

Students are required to possess a competent command of English. Proficiency in a foreign language is a matter of degree option. Students should refer to individual degree descriptions for English and foreign language proficiency requirements.

Time Limitation

All completed work that is included in a doctoral student’s degree program at the time of admission to candidacy must have been taken within the previous six years. The Graduate Program Committee will review the degree program of students who have not completed the degree at the end of two years from admission to candidacy; the committee will review the status of the student’s program yearly thereafter. At those times, the committee may recommend additional coursework, further examinations, or termination of candidacy. In addition, the program of study is subject to review by the Dean of the Graduate School.

TRANSFER OF CREDIT

Students are expected to complete all coursework at UTSA. Exceptions require approval of the appropriate Graduate Program Committee, the Graduate School, and the administrative office responsible for graduate education.

Limited Acceptability

UTSA Undergraduate Courses

Credit earned in undergraduate-level courses may not normally be applied to a doctoral degree program. Such courses may be taken to meet background or support requirements, if necessary.

Not Accepted

Correspondence and Extension Courses

Courses completed by correspondence or extension may not be applied to a doctoral degree program.

GRADUATE PROGRAM COMMITTEE REQUIREMENTS

The Graduate Program Committee specifies the coursework the student must complete, the qualifying examinations (written, oral, or both) the student must pass, the conditions under which the student may retake all or part of a qualifying examination, and the procedures the student must follow in developing a dissertation proposal.

In consultation with the graduate advisor, the student proposes a Dissertation Committee to advise or direct the student on the research and writing of the dissertation. The student selects the chair of the Dissertation Committee, with the consent of that person and permission of the Dean of the Graduate School.

ADMISSION TO CANDIDACY

Students seeking a doctoral degree at UTSA must be admitted to candidacy. In order to be admitted to candidacy, the student must comply with the following requirements:

1. Fulfill the requirements for unconditional admission as a graduate degree-seeking student, which entails the removal of any conditions assigned at the time of admission.
2. Satisfy any special admission requirements established for the degree program.
3. Be in good standing.
4. Have passed a qualifying examination (written, oral, or both) prepared by the Graduate Program Committee and have met any other requirements specified by the Graduate Program Committee for the specific degree program.
5. Submit a proposed program of study.
6. Having satisfied the above requirements, be recommended for admission to candidacy by the appropriate Graduate Program Committee, which in the case of interdisciplinary programs is a committee appointed by the Graduate School, consisting of no fewer than five members of the Graduate Faculty, with at least one representative from each of the disciplines included in the program.
7. Having satisfied the above requirements, be approved for admission to candidacy by the Dean of the Graduate School.

COMPLETING THE DEGREE

Program of Study

Before admission to candidacy, the student's proposed program of study is under the direction of the Graduate Program Committee in the major program area through an appropriate program advisor, if designated, and the Graduate Advisor of Record. Upon admission to candidacy and the formation of the student's dissertation committee, the program of study comes

under the purview of the Dissertation Committee, which reviews the proposed program of study and recommends to the Graduate Program Committee any additional course requirements. The final program of study, as approved by the Graduate Program Committee, is then recommended to the Graduate School for approval. Approval of the final program of study by the Graduate School is a degree requirement. All completed coursework included in the final program of study must have been taken within the preceding eight years. No course for which a grade of less than “C” was earned can be applied to the doctoral degree.

Students who are admitted to a doctoral program directly from the bachelor’s-level degree and who complete all requirements for the master’s degree and who pass their doctoral qualifying exam may apply to receive their master’s degree. Courses counted toward the master’s degree may also be included in the overall requirements of the doctorate.

Qualifying Examination

All students seeking a doctoral degree must pass a qualifying examination. This examination consists of questions to test the candidate’s knowledge and command of the major field. An examination covering support work is not a University-wide requirement, but it may be required at the discretion of the Graduate Program Committee or the Dissertation Committee.

Registration during Examination Semester(s)

Students must be registered during any semester or term in which they are taking required examinations.

Dissertation Committee

Upon admission to candidacy and in consultation with the Graduate Advisor of Record, the student selects their supervising professor with that professor’s consent. Upon recommendation of the Graduate Program Committee, the Graduate School appoints the Dissertation Committee. The committee must consist of at least four members, including the supervising professor who consults with other members of the committee as work proceeds.

The Dissertation Committee advises the student on the research and writing of the dissertation, conducts the final oral examination, and approves the dissertation. The chair of the Dissertation Committee ordinarily serves as the supervisor of research. Other members of the committee should be consulted as appropriate. Occasionally, a research professor or researcher who is not a member of the Graduate Faculty may be recommended by the Graduate Program Committee to serve as the supervisor for a specific dissertation because his or her expertise would be valuable to the student. When the research supervisor is not a member of the Graduate Faculty in the student’s area of study, a member of the Graduate Program Committee will be appointed as co-chair of the Dissertation Committee.

In addition to recommending the student’s final program of study to the Graduate Program Committee and supervising the research and writing of the dissertation, the Dissertation Committee certifies to the Graduate School that all degree requirements have been fulfilled.

Time Limit for Completing Doctoral Degree

All completed work that is included in a doctoral student’s degree program at the time of admission to candidacy must have been taken within the previous six years (exclusive of a maximum of three years of military service). The Graduate Program Committee will review the programs of students who have not completed the degree at the end of two years from admission to candidacy; the committee will review the status of the student’s program yearly thereafter. At those times, the committee may recommend additional coursework, further examinations, or termination of candidacy. In addition, the program is subject to review by the Dean of the Graduate School.

Doctoral Dissertation

A dissertation is required of every candidate and must be an original contribution to scholarship, based on independent investigation in the major area. It must be approved by the Dissertation Committee. Registration for the dissertation must be

for a period of more than one semester. During each semester or term that a student receives advice and/or assistance from a faculty member or supervision by the Dissertation Committee or uses University resources, they are required to enroll in the appropriate dissertation course.

Final Oral Examination (Defense of Dissertation)

A satisfactory final oral examination is required for the approval of a dissertation. After the Dissertation Committee makes a decision, which must be unanimous, to accept a dissertation for examination, the supervising professor notifies the Graduate School at least two weeks in advance of the date of the final oral examination.

The examination covers the dissertation and the general field of the dissertation, and other parts of the student's program as determined by the committee. All members of the Dissertation Committee must be satisfied that the student has

1. completed the work assigned by the committee;
2. passed all examinations required by the program's Graduate Program Committee, including the final oral examination;
3. completed a dissertation that is an independent investigation in the major field, and that itself constitutes a contribution to knowledge; and
4. submitted an abstract for publication in Dissertation Abstracts International that meets with the approval of the committee.

Once this is complete, the Dissertation Committee members sign the approval sheets for the doctoral dissertation and make an official recommendation to the Graduate School that the doctoral degree be awarded. Approval must be unanimous.

Submission and Publication of Dissertation

When the student has successfully defended the dissertation, he or she must arrange for its publication, usually by microfilm reproduction of the complete dissertation. Three unbound copies, including the original of the dissertation, must be forwarded to the Graduate School. The copies are transmitted to the library and sent to UMI for reproduction and binding. The student is required to pay \$55 publishing and \$10 (per copy) binding fees. Other forms of publication of the dissertation may be accepted to fulfill the publication requirement. A proposal for an alternative to microfilm reproduction must be approved by the Graduate School.

Publication by microfilm does not preclude subsequent publication of the dissertation, in whole or in part, as a monograph or in a journal. Registration of copyright at the author's expense may be arranged, if desired and appropriate, by completing a form available from the Graduate School. In order to protect patent or other rights, the student or supervising professor may request that the Graduate School delay publication for one year. This request must be supported by a written recommendation by the student's supervising professor.

Approval of the Degree

Upon approval by the Dissertation Committee of the dissertation and its defense, the Graduate Program Committee certifies to the Dean of the Graduate School that the student has completed all degree requirements, has passed all required examinations, and is entitled to the award of the doctoral degree.

GRADUATION UNDER A PARTICULAR CATALOG

Degree requirements may be changed from one catalog to the next. The student is normally bound by the requirements of the catalog in force at the time of his or her first registration; the student may choose, however, to fulfill the requirements of a subsequent catalog.

CHAPTER 7

GRADUATE PROGRAM

REQUIREMENTS

AND COURSE

DESCRIPTIONS

GRADUATE PROGRAM REQUIREMENTS AND COURSE DESCRIPTIONS

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COLLEGE OF

ARCHITECTURE

COLLEGE OF ARCHITECTURE

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COLLEGE OF ARCHITECTURE

DEPARTMENT OF ARCHITECTURE

The College of Architecture offers two graduate degree programs: the professional degree program—Master of Architecture, and the research degree program—Master of Science in Architecture.

The Professional Program: Master of Architecture Degree

The College of Architecture offers the Master of Architecture as a first professional degree; the program is normally two years in length for students who hold a Bachelor of Science in Architecture or equivalent degree. For career change students who have earned a bachelor's degree in a field other than architecture, the program length is contingent upon the applicant's background.

The professional program takes advantage of its unique location within downtown San Antonio, as well as South Texas and the borderlands of the western United States and Mexico. The city of San Antonio, composed of several historical layers from the 17th century to the present, is a laboratory for the exploration of architecture, urbanism, and community planning and design.

The professional program is fully accredited by the National Architectural Accreditation Board (NAAB) and is requisite for those who intend to become licensed architects. According to the NAAB 1998 Conditions and Procedures manual:

“In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite of licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree.”

Building on a solid base of undergraduate studies in architecture, the degree program provides a challenging professional curriculum. The two-year program is seen as a capstone of professional studies.

Program Admission Requirements. In addition to University-wide admission requirements, applicants must have completed a preprofessional bachelor's degree in architecture with a minimum grade point average of no less than 3.0 in the applicant's last 60 semester credit hours of undergraduate studies and must submit:

- a portfolio of samples of past work in graphic communication and design
- two letters of recommendation
- a Statement of Purpose that must discuss the student's anticipated focus of studies and its impact on subsequent professional practice
- Graduate Record Examination (GRE) scores
- official transcripts
- a complete application form
- Test of English as a Foreign Language (TOEFL) scores for international applicants who's first language is not English.

An application fee must be sent directly to the Graduate School. All materials must be sent directly to the Graduate School before the College of Architecture's preferred application deadline of March 1st (for Summer and Fall). Contact the College of Architecture at (210) 458-3010 or visit the Graduate School's Web site at <http://www.utsa.edu/graduate/> for information regarding application materials, the admission process, and deadlines.

Degree Requirements. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 48. Credit toward the program is earned only for grades of “A,” “B,” and “C.” Students must also maintain an overall grade point average of 3.0, with a maximum of 6 semester credit hours with the grade of “C.”

Students admitted to the program should consult the Graduate Advisor of Record for specific program requirements for their individual study plans. The program does not require proficiency in a foreign language, although proficiency in Spanish will enhance the student’s ability to participate in international opportunities.

Degree candidates must complete 48 semester credit hours of coursework consisting of the following:

A. 30 semester credit hours of required courses:

ARC	5133	Advanced and International Professional Practice and Ethics
ARC	5173	Architectural Theory and Criticism
ARC	5613	American Architecture
ARC	6146	Advanced Design Studio (two semesters, 12 credit hours)
ARC	6933	Master’s Project Preparation
ARC	6996	Master’s Project Studio

B. 12 semester credit hours of architecture electives selected from the following:

ARC	5153	Environmental Architecture and Sustainability
ARC	5203	History and Theory of Preservation
ARC	5213	Theories and Philosophies of Regionalism
ARC	5233	Architectural Surveys and Measured Drawings
ARC	5303	International Practice Seminar
ARC	5313	International Housing Design and Planning
ARC	5333	Introduction to Urban Design and Regional Physical Planning
ARC	5343	History and Theories of Urban and Regional Planning
ARC	5403	Historic Preservation Seminar
ARC	5423	Legal and Economic Aspects of Preservation
ARC	5623	Regional and Vernacular Architecture
ARC	6003	Morphology of the Architecture and Landscape of South Texas and Borderlands
ARC	6233	International Community Planning and Design
ARC	6413	Preservation Technology
ARC	6423	Architectural Conservation Theory
ARC	6951-3	Independent Study
ARC	6973,6	Special Problems

C. 6 semester credit hours of electives selected in consultation with the Graduate Advisor of Record.

The Research Program: Master of Science in Architecture Degree

The Master of Science in Architecture (M.S. Arch.) program is a non-studio, post-professional research program that prepares students for careers in research, teaching, and consulting. The focus of the program is research in architecture; areas of research include historic preservation, architectural history, sustainability in architecture, and international community planning and design. The program stresses critical writing and research methods. The program takes advantage of its location in downtown San Antonio and a rich heritage of historic architecture and urbanism.

Program Admission Requirements. In addition to University-wide admission requirements, applicants must have completed a bachelor’s degree with a minimum grade point average of no less than 3.0 in the applicant’s last 60 semester credit hours of undergraduate studies; and submit samples of expository writing, Graduate Record Examination (GRE) scores, two letters of recommendation, a statement of intent, and Test of English as a Foreign Language (TOEFL) scores for those international

applicants whose first language is not English. The application form, transcripts, GRE scores, and application fee must be sent directly to the Graduate School. All materials must be sent directly to the Graduate School before the College of Architecture's preferred application deadline of March 1st (for Summer and Fall). Contact the College of Architecture at (210) 458-3010 or visit the Graduate School's Web site at <http://www.utsa.edu/graduate/> for information regarding application materials, the admission process, and deadlines.

Degree Requirements. The minimum number of semester credit hours requirements for the Master of Science in Architecture degree, exclusive of coursework or other study required to remove admission deficiencies, is 33. Credit toward the program is earned only for grades of "A," "B," and "C." Students must also maintain an overall grade point average of 3.0 with a maximum of 6 semester credit hours with the grade of "C". Students admitted to the program should consult the GAR for specific program requirements for their individual study plans.

Degree candidates must complete 33 credit hours of coursework consisting of the following:

A. 12 semester credit hours of required courses:

ARC	5173	Architectural Theory and Criticism
ARC	6433	Research Methods in Architecture
ARC	6981,3	Master's Thesis (repeated for a total of 6 credit hours)

B. 15 semester credit hours of electives to be chosen in consultation with committee chair. The following are recommended graduate-level electives in architecture:

ARC	5133	Advanced and International Professional Practice and Ethics
ARC	5153	Environmental Architecture and Sustainability
ARC	5203	History and Theory of Preservation
ARC	5213	Theories and Philosophies of Regionalism
ARC	5233	Architectural Surveys and Measured Drawings
ARC	5303	International Practice Seminar
ARC	5313	International Housing Design and Planning
ARC	5333	Introduction to Urban Design and Regional Physical Planning
ARC	5343	History and Theories of Urban and Regional Planning
ARC	5403	Historic Preservation Seminar
ARC	5423	Legal and Economic Aspects of Preservation
ARC	5613	American Architecture
ARC	5623	Regional and Vernacular Architecture
ARC	6003	Morphology of the Architecture and Landscape of South Texas and Borderlands
ARC	6233	International Community Planning and Design
ARC	6413	Preservation Technology
ARC	6423	Architectural Conservation Theory
ARC	6951-3	Independent Study
ARC	6973,6	Special Problems

C. 6 credit hours of graduate-level, non-architecture electives.

Comprehensive Examination. A candidate for the Master of Science in Architecture must, in addition to other requirements, pass a written comprehensive examination. Students must be registered for ARC 6961 Comprehensive Examination during the semester in which they intend to take the examination.

Comprehensive examinations are given only to students who:

- have satisfied all admission conditions
- are in good academic standing
- have an approved degree plan

- have selected a supervising professor and thesis committee with an approved thesis topic
- are enrolled in ARC 6961 Comprehensive Examination. Note: credit earned for the ARC 6961 will not count toward the 33 semester credit hours required for the degree.

The Comprehensive Examination tests the student's knowledge in architectural theory and in the student's specialization. It is normally taken after the completion of the required coursework.

COURSE DESCRIPTIONS ARCHITECTURE (ARC)

5133 Advanced and International Professional Practice and Ethics

(3-0) 3 hours credit.

A seminar dealing with national and international business and legal environments in the design and construction industry. Topics include agreement and delivery options, forms of construction, project procedures and administration, liability, contract documents, and ethics.

5153 Environmental Architecture and Sustainability

(3-0) 3 hours credit.

Review of the current discourse of sustainability as it occurs in the design professions with a focus on ethical and sustainable design practices. Addresses key issues of environmentally sustainable design within a social and cultural framework. Examination of the tools and techniques employed to produce sustainable architectural environments. May be repeated for credit once when topics vary. (Formerly ARC 5143.)

5173 Architectural Theory and Criticism

(3-0) 3 hours credit.

Seminar survey of historical basis and contemporary development of architectural theory and the criteria used in architectural criticism from both Western and non-Western perspectives.

5203 History and Theory of Preservation

(3-0) 3 hours credit.

A seminar on the history, philosophy, and methodology of historic preservation and restoration.

5213 Theories and Philosophies of Regionalism

(3-0) 3 hours credit.

Seminar focusing on issues of regionalism; appropriate interventions between the natural environment and the history and traditions of the built environment that together maintain and contribute to a sense of place in communities and regions.

5233 Architectural Surveys and Measured Drawings

(3-0) 3 hours credit. Prerequisite: ARC 5203.

Documentation and interpretation of sites and buildings and graphic recording techniques.

5303 International Practice Seminar

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A seminar focusing on the professional, legal, social, and cultural issues that affect international architecture, construction, and urban development. May be repeated for credit once when topics vary.

5313 International Housing Design and Planning

(3-0) 3 hours credit.

Evolution of international housing planning and design with emphasis on sustainable design methods, materials, techniques, and solutions.

- 5333 Introduction to Urban Design and Regional Physical Planning**
(3-0) 3 hours credit.
Planning for human needs as related to the physical layout and spatial design of communities and regions.
- 5343 History and Theories of Urban and Regional Planning**
(3-0) 3 hours credit.
A survey of the history and theories of urban and regional planning. Values and ethics of the planning profession; methods of participation.
- 5403 Historic Preservation Seminar**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Selected topics in architecture, design, preservation, and planning. May be repeated for credit when topics vary, but not more than 6 hours will apply to the Master of Architecture degree or the Master of Science degree.
- 5423 Legal and Economic Aspects of Preservation**
(3-0) 3 hours credit.
Laws and regulations that affect preservation of the built environment, nationally, regionally, and locally. Fundamentals of legal protection for and regulation of historic cultural resources in light of contemporary attitudes toward the historic environment. Economic bases of the use of historic buildings and sites examined in terms of contemporary social and cultural attitudes that determine effective strategies of preservation action.
- 5613 American Architecture**
(3-0) 3 hours credit.
Development of the architecture of North, Central, and South America from the earliest human settlements to the present.
- 5623 Regional and Vernacular Architecture**
(3-0) 3 hours credit.
History of the settlement patterns of immigrants to the North American continent and the response to climate, material availability, and economic constraints that required adaptation of housing, farm, and industrial structures. Consideration of the anonymous builders of the South Texas/North Mexico region and the special problems their structures pose as objects worthy of preservation.
- 5633 Construction Management**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Organization of construction resources and activities to include consideration of scheduling, methods of construction, project planning and management, cost accounting, and personnel utilization.
- 6003 Morphology of the Architecture and Landscape of South Texas and Borderlands**
(3-0) 3 hours credit.
An examination of environmental conditions, cultural traditions, social patterns, building conventions, and aesthetic intentions that have influenced the architecture and planning of communities of South Texas, the Southwest, and the North Mexican borderlands. (Formerly ARC 6123. Credit cannot be earned for both ARC 6003 and ARC 6123.)
- 6113 Special Topics**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Selected topics in architecture. May be repeated for credit when topics vary, but not more than 6 hours will apply to the Master of Architecture degree or the Master of Science degree.
- 6146 Advanced Design Studio**
(1-10) 6 hours credit.
Advanced problems in architectural design. May be repeated for credit, but not more than 18 hours will apply to the Master of Architecture degree.

6233 International Community Planning and Design

(3-0) 3 hours credit.

A study of sustainable design, planning, economic, financial, and environmental issues that shape multicultural communities, regions and borders.

6413 Preservation Technology

(1-4) 3 hours credit.

Techniques of preservation: methods of analysis, history of materials, and technology used in old buildings. Emphasis on buildings as integrated sets of subsystems and how these are affected by the processes of material deterioration, conservation, and techniques of intervention. May be repeated for credit once when topics vary.

6423 Architectural Conservation Theory

(3-0) 3 hours credit.

A study of the problems of older sites and buildings and the techniques employed in preserving and restoring them.

6433 Research Methods in Architecture

(3-0) 3 hours credit.

This course examines theories and methods in architectural research. Includes a critical review of theoretical perspectives and considers a range of research methods and techniques used in architectural research.

6933 Master's Project Preparation

(3-0) 3 hours credit.

The course involves the preparation of a proposal for an independent design project.

6943 Professional Internship

3 hours credit. Prerequisites: Graduate standing, 18 semester credit hours of graduate work, and consent of instructor.

Supervised professional practice experience with public agencies or private firms. Individual conferences and written reports required. May be repeated for credit, but not more than 6 hours will apply to the Master of Architecture degree or the Master of Science degree.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master of Architecture degree or the Master of Science degree.

6961 Comprehensive Examination

1 hour credit.

Independent study course for the purpose of taking the Comprehensive Examination. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Credit earned in ARC 6961 may not be counted toward the degree. May be repeated once.

6973,6 Special Problems

(3-0, 6-0) 3 or 6 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 semester credit hours for ARC 6973 or 12 hours for ARC 6976 will apply to the Master of Architecture degree or the Master of Science degree.

6981,3 Master's Thesis

1 or 3 hours credit. Prerequisites: Graduate standing and permission of the Architecture Graduate Advisor of Record. May be repeated for credit but not more than 6 hours will apply to a degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6996 Master's Project Studio

(0-12) 6 hours credit. Prerequisites: Graduate standing and permission of the Architecture Graduate Advisor of Record.

The focus of the studio is the completion of an independent design project.

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COLLEGE OF
BUSINESS

COLLEGE OF BUSINESS

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COLLEGE OF BUSINESS

Mission Statement

The College of Business is dedicated to creating and sharing knowledge that enhances the translation of theory to practice. The College combines rigor with relevance and provides innovative solutions to global business challenges.

Master of Business Administration Degree

The Master of Business Administration (M.B.A.) degree is accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conforms to its recommended guidelines.

The Master of Business Administration degree is designed to offer the opportunity for intensive education to qualified graduate students and is available to individuals with undergraduate degrees in the business administration areas, as well as to those with specializations outside the business field.

Students whose previous training has been in nonbusiness fields may be admitted to the M.B.A. program but are required, as a condition of admission, to complete (in total or in part, depending upon the background of each student) the M.B.A. core courses. Students whose background is in business, but who have completed the M.B.A. core courses seven or more years before entering the program, may be required by the Admissions Subcommittee of the Graduate Program Committee to successfully complete or test out of the M.B.A. core courses. These courses are open only to graduate students and are in addition to degree requirements of the M.B.A.

Students who enter the M.B.A. degree program must demonstrate proficiency with computer programs commonly used in business applications, including, but not limited to, spreadsheets, presentation, and word processing software. Special not for credit courses may be offered to address this need.

Program Admission Requirements. For admission to the M.B.A. program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in business administration as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional).

The M.B.A. Program Committee evaluates each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- transcripts from all universities attended
- official Graduate Management Admission Test (GMAT) scores
- a personal statement
- a current résumé with employment or other experience (optional)
- letters of reference (optional).

M.B.A. Core Courses. The following courses constitute the M.B.A. core and are required for students who do not have credit for equivalent undergraduate courses. However, no credit for these courses may count toward M.B.A. degree requirements.

ACC	5003	Financial Accounting Concepts
BLW	5003	Legal Environment of Business
ECO	5003	Economic Theory and Policy
FIN	5003	Business Finance
IS	5003	Introduction to Information Systems
MGT	5003	Conceptual Foundations of Management

MKT	5003	Introduction to Marketing
MS	5003	Quantitative Methods for Business Analysis

Degree Requirements. The M.B.A. program requires 33 semester credit hours of work beyond any hours acquired in the M.B.A. core courses.

Candidates for the M.B.A. degree are required to successfully complete the foundations of knowledge, which are included in the following 21 semester credit hours:

ACC	5023	Accounting Analysis for Decision Making
ECO	5023	Managerial Economics
FIN	5023	Financial Management
MGT	5043	Management and Behavior in Organizations
MGT	5903	Strategic Management and Policy (Students who earn a grade of “B” or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of “C” may still satisfy the requirement by successfully passing a comprehensive examination as set out in this catalog.)
MKT	5023	Marketing Management
MS	5023	Decision Analysis and Production Management

Flexible or Full-time Status. The general M.B.A. degree allows students to take the program at their own pace, whether on a full-time or a part-time (flexible) basis. In addition, students may switch this status from semester to semester without additional approvals or admissions processes. Samples of flexible and full-time degree plans can be found at the College of Business graduate Web site: <http://business.utsa.edu/graduate/>.

Degree Options: Students seeking the M.B.A. degree may elect one of three options to complete the required 33 semester credit hours.

Option 1: General M.B.A. Nonthesis Option. Under Option 1, students are required to complete the 21 semester credit hours listed above and 12 semester credit hours of electives. These electives may be taken either in the College of Business (Departments of Accounting, Economics, Finance, Information Systems and Technology Management, Management, Management Science and Statistics, or Marketing) and include courses listed in the M.B.A. concentrations, or in areas outside of the College as approved by the Graduate Program Committee.

Option 2: General M.B.A. Thesis Option. Under Option 2, students are required to complete the 21 semester credit hours listed above, 6 semester credit hours of electives as approved by the Graduate Program Committee, and 6 semester credit hours of Master’s Thesis. See the University’s requirements for a thesis in Options for Master’s Degrees in Chapter 5.

Option 3: Nonthesis M.B.A. Concentration Option. Under Option 3, students have an opportunity to concentrate in a particular area. Areas of concentration are Accounting, Business Economics, Finance, Health Care Management, Information Assurance, Information Systems, Management Science, Management of Technology, Marketing Management, Project Management, Real Estate Finance, and Tourism Destination Development.

Specific requirements for each concentration are discussed under the departments of the College of Business.

Executive Master of Business Administration

The Executive Master of Business Administration (E.M.B.A.) is a version of the Master of Business Administration (M.B.A.) degree program structured specifically for executives, professionals, and entrepreneurs who have significant managerial experience. This five-semester plan of study features cohort classes, lock-step weekend class scheduling, and an emphasis on strategic leadership. The E.M.B.A. is accredited by the AACSB International—The Association to Advance Collegiate Schools of Business—and conforms to its recommended guidelines.

E.M.B.A. Program Admission Requirements. Because of the special focus of the E.M.B.A. program, the application process is separate from and independent of the regular M.B.A. program. Admission decisions are not reciprocal, class size is limited, and admission decisions are made on a rolling basis until all available class positions are filled.

For admission to the E.M.B.A. program, applicants must meet University-wide graduate admissions requirements and the following College of Business requirements:

- In general, applicants are expected to meet M.B.A. program admission requirements with special additional consideration given to work experience, life accomplishments, and leadership potential.
- Applicants are expected to have approximately 10 years of work experience with increasing managerial responsibility. Less experienced applicants will be considered if they can demonstrate exceptional accomplishment.
- Applicants must submit three letters of professional reference attesting to leadership potential.
- Applicants are required to participate in a personal interview with the E.M.B.A. Admissions Subcommittee of the Graduate Program Committee.

Applicants who fail to meet these requirements can be admitted conditionally upon recommendation of the E.M.B.A. Admissions Subcommittee of the Executive Programs Committee and approval of the Dean of the Graduate School.

Students are expected to enter the E.M.B.A. program with basic computer skills, specifically in the use of Microsoft® Word, PowerPoint, and Excel. Special not-for-credit courses may be offered to address this need. Because of the lock-step nature of the E.M.B.A., students must complete all required courses without exception. There will be no course waivers. In addition, students who leave the program before completion for any reason are not eligible to rejoin the same class in a subsequent semester. Admission to future E.M.B.A. classes is dependent upon successful reapplication. Acceptance in a future program is not guaranteed.

Master of Business Administration Degree in International Business

In response to the geographical and commercial environments of UTSA, the College of Business offers the Master of Business Administration degree in International Business. This program is designed to offer students from the United States or foreign countries the opportunity to study business administration while developing special expertise in its international aspects. Specific international content courses have been developed in the disciplines of management, marketing, economics, business law, accounting, and finance. There may be opportunities to study outside the United States and to apply the credit earned to the degree program at UTSA.

Students pursuing this degree must either demonstrate proficiency in one of the modern languages or take 6 semester credit hours of culture courses approved by the graduate advisor. The proficiency in language may be demonstrated either by completion of 6 semester credit hours of courses in the same language or by an examination measuring proficiency at the 6-semester-credit-hour level.

Students who are not United States citizens and whose native language is not English will be assumed to have completed the language requirement.

Program Admission Requirements. Applicants for admission to the M.B.A. program in International Business are required to meet the same general program admission requirements set out for the M.B.A. degree.

Degree Requirements. The M.B.A. program in International Business requires 33 semester credit hours of work beyond any hours acquired in the M.B.A. core courses.

A. Candidates for the M.B.A. degree in International Business are required to successfully complete the following 18 semester credit hours:

ACC	5023	Accounting Analysis for Decision Making
ECO	5023	Managerial Economics
FIN	5023	Financial Management
MGT	5903	Strategic Management and Policy (Students who earn a grade of “B” or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of “C” may still satisfy the requirement by successfully passing a comprehensive examination as set out in this catalog.)
MKT	5023	Marketing Management
MS	5023	Decision Analysis and Production Management

B. In addition, students must complete the following 15 semester credit hours of courses:

Required courses (9 semester credit hours):

FIN	5833	International Financial Management
MGT	5183	Global and Comparative Management
MKT	5673	International Marketing

International content elective courses (6 semester credit hours from the following):

ACC	6203	Seminar in International Accounting
BLW	5173	Legal Environment of International Business
ECO	6323	International Trade and Finance
GBA	5193	Doing Business under NAFTA
MGT	5233	International Business Analysis
MGT	5243	International Business Strategy
MGT	6973	Special Problems (International Business topics only)
MKT	6973	Special Problems (International Business topics only)

C. Special permission is required for:

FIN	5963	International Business Internship
		or
MKT	5963	International Business Internship
FIN	5983	International Business Essay
		or
MKT	5983	International Business Essay

D. Foreign coursework: Students choose either a program of 15 semester credit hours in international content courses as listed above or a combination of elective international content courses and foreign study as approved by the Graduate Program Committee. Normally the foreign study is taken at a cooperating foreign institution. Foreign study is encouraged and efforts are made to assist interested students in completing a portion of their work outside the United States.

MBA Online

The MBA Online program is a Web-based, asynchronous degree program offered by a consortium of eight University of Texas universities through The University of Texas TeleCampus. Courses taken in this program do not count toward the traditional UTSA M.B.A. degree. Students who cannot commute regularly to the UTSA campus because of distance or time constraints are encouraged to consider the MBA Online program. While all UTSA students participating in the MBA Online program will follow UTSA admission procedures, registration procedures and tuition and fees may differ. Students should consult the UT TeleCampus Web site at <http://www.telecampus.utsystem.edu> for current information on the MBA Online program and its courses.

Doctor of Philosophy Degree in Business Administration

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Business Administration. The degree program offers four areas of emphasis: Accounting, Finance, Information Technology, and Organization and Management Studies. The Ph.D. in Business Administration is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. Applicants must have a bachelor's degree from an accredited university. The Doctoral Studies Committee in the major areas will evaluate applicants to the Ph.D. program on several factors, including academic achievement, standardized test scores, a personal statement, letters of recommendation, and possibly an interview. Normally, a student should hold a master's degree in business or a related discipline before being granted admission to the Doctor of Philosophy in Business Administration degree program. Applicants who do not possess a graduate degree in a business-related discipline will be required to satisfy foundations of knowledge requirements for the M.B.A. program.

All applicants must submit the following material for evaluation:

- official transcripts of all undergraduate and graduate coursework completed
- Graduate Management Admission Test (GMAT) scores or Graduate Record Examination (GRE) scores from a recent (no more than five years) administration of the examination
- three letters of recommendation from academic or professional sources familiar with the applicant's background
- a résumé or curriculum vitae and a statement of academic interests and goals
- international students must also submit a score of at least 550 on the Test of English as a Foreign Language (TOEFL). TOEFL scores may not be more than two years old.

Admission normally requires appointment to a teaching assistantship, research assistantship, or research fellowship. The Doctoral Studies Committee, comprised of members selected from the graduate faculty, is responsible for advising students.

Degree Requirements. The degree requires a minimum of 69 semester credit hours beyond the master's degree. If a student does not have a master's degree in a business-related discipline, a minimum of 15 semester credit hours of foundations of knowledge coursework may be required. All students will be required to take 18 semester credit hours of Statistics and Research Methodology courses. Students will be required to take 19 semester credit hours of Ph.D.-level courses in the student's major area of studies, as directed by the Doctoral Studies Committee. Students will take 9 semester credit hours of free electives. A minimum of 23 semester credit hours in doctoral research, including 1 hour for comprehensive examination and 12 hours for the Doctoral Dissertation, must be completed. No course for which a grade of less than "C" was earned can be applied to the Doctoral degree program and no more than two courses with a grade of "C" may be applied to the program.

Program of Study

A. Foundation Courses

This requirement may be met by a Master's degree in Business or business-related discipline. If a student does not have the appropriate graduate degree, a minimum of 15 semester credit hours must be taken from the following list:

ACC	5023	Accounting Analysis for Decision Making
ECO	5023	Managerial Economics
FIN	5023	Financial Management
MGT	5043	Management and Behavior in Organizations
MGT	5903	Strategic Management and Policy
MKT	5023	Marketing Management
MS	5023	Decision Analysis and Production Management

B. Statistics and Research Methodology (18 semester credit hours):

1. Courses required of all students:

STA	7013	Advanced Applied Business Statistical Methods
STA	7023	Applied Linear Statistical Models

2. 12 semester credit hours from the following as approved by the Doctoral Studies Committee:

ECO	7013	Seminar in Microeconomic Theory
ECO	7053	Quantitative Methods for Business and Economics

ECO	7063	Econometrics
GBA	7013	Research Methods I
GBA	7023	Research Methods II
MS	7033	Applications in Causal Structural Modeling
STA	7033	Multivariate Statistical Analysis
STA	7083	Time Series Analysis

C. Major Area Coursework:

1. Four Ph.D.-level courses in major area; colloquium (13 semester credit hours).
2. Two directed electives approved by the Doctoral Studies Committee from among graduate-level courses in major area (6 semester credit hours).

D. Free Electives (9 semester credit hours):

Three courses to be approved by the Doctoral Studies Committee. If courses are in the College of Business, two are expected to be at the Ph.D. level. Courses from outside the College of Business must be at the graduate level and approved by the Committee.

E. Doctoral Research and Comprehensive Examination (11 semester credit hours):

This requirement is met by doctoral research coursework and passing the comprehensive examination.

F. Dissertation Research (minimum 12 semester credit hours).

The initial Program of Study must be approved by the Doctoral Studies Committee and must be submitted to the Dean for final approval.

Advancement to Candidacy. Advancement to candidacy requires a student to complete University and program requirements and to pass a written qualifying examination following completion of course requirements in the candidate's major field of study. The examination is administered by the Doctoral Studies Committee. No more than two attempts to pass qualifying examinations are allowed. Results of the written and oral examinations must be reported to the Doctoral Studies Committee, the Dean of the College, and the Dean of the Graduate School. Admission into the doctoral program does not guarantee advancement to candidacy.

Dissertation. Candidates must demonstrate the ability to conduct independent research by completing and defending an original dissertation. The research topic is determined by the student in consultation with his or her supervising professor. A dissertation committee, selected by the student and supervising professor, guides and critiques the candidate's research. The completed dissertation must be formally presented to and approved by the Dissertation Committee.

Following an open presentation of the dissertation findings, the Dissertation Committee conducts a closed meeting to determine the adequacy of the research and any further requirements for completion of the dissertation. Results of the meeting must be reported to the Dean of the College and to the Dean of the Graduate School.

Awarding of the degree is based on the approval of the Dissertation Committee, approved by the Dean. The UTSA Dean of the Graduate School certifies the completion of all University-wide requirements.

COURSE DESCRIPTIONS
GENERAL BUSINESS ADMINISTRATION
(GBA)

5003 Ethical Leadership in a Global Environment

(3-0) 3 hours credit.

Students examine legal and corporate social responsibility challenges for leaders in a global information economy. The course will examine the ethical/legal issues facing modern organizations and provide a framework for understanding the global/information economy in which contemporary organizations exist. The course will also focus on professional leadership development necessary to assume general manager roles in modern organizations.

5193 Doing Business under NAFTA

(3-0) 3 hours credit. Prerequisite: Permission of International Coordinator required.

A study of business practices in the United States, Canada, and Mexico under NAFTA. This course may require travel and/or field study in the three countries.

6971-3 Special Topics in General Business Administration

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Topics courses may be repeated for credit when topics vary, but no more than 6 hours, regardless of discipline, will apply to the degree.

7013 Research Methods I

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An introduction to the research process. The course examines the scientific method, issues in the philosophy of science, ethical issues in research, and an introduction to basic experimental and quasi-experimental design principles and threats to validity. The course also examines the elements of scientific paper writing.

7023 Research Methods II

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An advanced study of contemporary research design and data collection techniques including interviewing, survey construction, use of archival data, and qualitative approaches to data collection.

7103 Doctoral Teaching Seminar

(3-0) 3 hours credit.

A critical examination of teaching philosophies and pedagogical styles. Topics include course construction, content selection, and student learning.

DEPARTMENT OF ACCOUNTING

Mission Statement

The mission of the accounting programs in the Department of Accounting is to offer graduate and undergraduate accounting programs of high quality, which meet the needs of students for professional careers in the field. This mission includes providing a broad-based education and education in general business and accounting. The department is responsive to the needs of employers and other constituents of its programs. The department is also alert to the current issues in the local, regional, and national environment and plans and implements changes in the educational process to respond to those issues when needed. The faculty of the accounting program assist in accomplishing this mission through a planned integration of their teaching, intellectual, and service contribution.

The Master of Accountancy program has been separately accredited by AACSB International—The Association to Advance Collegiate Schools of Business.

Five-Year (150-Hour) Professional Accounting Program

The Five-Year Professional Accounting Program is a 3/2 degree program. Undergraduate accounting majors should apply for admission to the program during the second semester of their junior year. Once admitted, these students are allowed to take graduate courses while, technically, undergraduate students. In this program, the degree plan for the Bachelor of Business Administration (B.B.A.) in Accounting is combined with that of the Master of Accountancy (MACY). The advantage of the program is that it allows accounting majors to spread the graduate courses required for the MACY degree over the fourth and fifth years of the 150-hour program. Upon successful completion of the 150-hour program, students will be simultaneously awarded the B.B.A. in Accounting and the Master of Accountancy degrees.

Admission Criteria: To be admitted to the Five-Year (150-Hour) Professional Accounting Program, students must meet the following criteria:

1. be a declared accounting major
2. have an overall grade point average of 3.0, a grade point average of 3.0 in accounting courses taken, and an acceptable score on the Graduate Management Admission Test (GMAT)
3. have completed a minimum of 6 semester credit hours of upper-level undergraduate accounting courses including ACC 3023 Intermediate Accounting I.

In addition, the student must have completed at least 12 semester credit hours of upper-level undergraduate accounting courses by the end of the first semester following admission into the program.

Master of Accountancy Degree

The Master of Accountancy (MACY) degree is designed to accommodate applicants with a degree in any field. Applicants must complete the equivalent of a B.B.A. degree in accounting from an accredited institution or must enroll in the MACY core courses plus certain accounting courses set out by the Coordinator of Graduate Programs in Accounting. Students whose background is in business but who have completed MACY core courses or their equivalents seven or more years before entering the program may be required by the MACY Admissions Committee to successfully complete or test out of the MACY core courses. MACY core courses may be taken simultaneously with the MACY requirements, subject to course prerequisites and approval of the Coordinator of Graduate Programs in Accounting.

Program Admission Requirements. In order to be unconditionally admitted to the MACY program, applicants must meet University-wide graduate admission requirements. In addition, applicants are considered on the basis of demonstrated potential for success in graduate study in accounting and/or taxation as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, a personal statement, and other relevant factors.

A completed set of application material will include the following:

- completed application form
- transcripts from all universities attended
- official Graduate Management Admission Test (GMAT) scores
- a personal statement
- a current résumé with data regarding employment and other relevant experience (optional)
- letters of reference (optional).

Applicants are evaluated by the MACY Admissions Committee based on the above set of application materials. Those who do not meet the requirements for unconditional admission may be considered for admission on a conditional basis. Admission deficiencies, which do not count toward degree requirements, must be removed before enrolling for the last semester before graduation.

The following MACY core courses or their equivalents are required for students with undergraduate curriculum deficiencies; however, no credit for these courses will count toward the MACY degree requirements:

ACC	3023	Intermediate Accounting I
ACC	3033	Intermediate Accounting II
ACC	3043	Federal Income Taxation I
ACC	3113	Accounting Information Systems I
ACC	4013	Principles of Auditing
ACC	5003	Financial Accounting Concepts
ACC	5023	Accounting Analysis for Decision Making
BLW	5003	Legal Environment of Business
ECO	5003	Economic Theory and Policy
FIN	5003	Business Finance
IS	5003	Introduction to Information Systems
MGT	5003	Conceptual Foundations of Management
MKT	5003	Introduction to Marketing
MS	5003	Quantitative Methods for Business Analysis

Degree Requirements. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 30 hours.

Master of Accountancy Degree – Accounting Track

All candidates must complete the following:

A. 9 semester credit hours of required graduate accounting courses:

ACC	5863	Advanced Financial Accounting
ACC	6003	Managerial Accounting Theory
ACC	6013	Financial Accounting Theory

B. 12 semester credit hours of graduate electives in accounting or taxation, approved by the Coordinator of Graduate Programs in Accounting.

C. 6 semester credit hours of required graduate nonaccounting courses:

ACC	5163	Ethics and Accountant's Professional Responsibility
ACC	5173	Corporate Law and Regulation in Accounting

- D. 3 semester credit hours of graduate nonaccounting electives outside the area of accounting and taxation, approved by the Coordinator of Graduate Programs in Accounting.

Master of Accountancy Degree – Taxation Track

All candidates must complete the following:

- A. 15 semester credit hours of required graduate tax courses:

ACC	6043	Tax Research
ACC	6053	Estate, Trust, and Gift Taxation
ACC	6073	Advanced Corporate Taxation
ACC	6103	International Taxation
ACC	6113	Flow Through Entities

- B. 6 semester credit hours of graduate taxation or accounting electives, approved by the Coordinator of Graduate Programs in Accounting.

- C. 6 semester credit hours of required graduate nonaccounting courses:

ACC	5163	Ethics and Accountant's Professional Responsibility
ACC	5173	Corporate Law and Regulation in Accounting

- D. 3 semester credit hours of graduate nonaccounting electives outside the area of accounting and taxation, approved by the Coordinator of Graduate Programs in Accounting.

Master of Business Administration Degree – Accounting Concentration

Students choosing to concentrate in accounting must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours of graduate accounting courses with a course number greater than 5023.

Doctor of Philosophy Degree in Business Administration with an Emphasis in Accounting

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Business Administration with an emphasis in Accounting. See page 88 of this catalog for a detailed description of the general requirements for the Ph.D. degree. The Doctoral Studies Committee of the Department of Accounting will advise students admitted to the program who pursue a Ph.D. in Business Administration with an emphasis in Accounting.

To satisfy the Major Area Coursework for the accounting emphasis, a student must complete:

1. ACC 7013 Seminar in Empirical Research in Accounting
ACC 7023 Seminar in Behavioral Research in Accounting
ACC 7113 Seminar in Financial Accounting Theory
ACC 7123 Seminar in Managerial Accounting Theory
ACC 7201-3 Accounting Research Colloquium
2. Two directed electives (6 semester credit hours) as approved by the Doctoral Studies Committee.

COURSE DESCRIPTIONS
ACCOUNTING
(ACC)

- 5003 Financial Accounting Concepts**
(3-0) 3 hours credit.
An intensive study of accounting as a tool to communicate financial information for planning, analyzing, and controlling business enterprises directed toward decision making.
- 5023 Accounting Analysis for Decision Making**
(3-0) 3 hours credit. Prerequisite: ACC 5003 or an equivalent.
The study of accounting and its uses by management in the decision-making process.
- 5153 Intermediate Accounting Topics**
(3-0) 3 hours credit. Prerequisite: ACC 3033 or an equivalent.
A study of specialized financial reporting topics, including the application of professional standards and case-study analyses. (Credit cannot be earned for both ACC 5153 and ACC 4073.)
- 5163 Ethics and Accountant's Professional Responsibility**
(3-0) 3 hours credit.
A study of the role of a professional accountant; codes of accountants; ethical decision making; and the legal, regulatory and social environment in which an accountant makes decisions. This is a nonaccounting graduate course.
- 5173 Corporate Law and Regulation in Accounting**
(3-0) 3 hours credit.
An advanced study of business law and regulations with special emphasis on how they relate to the accounting profession. This is a nonaccounting graduate course.
- 5803 Controllership**
(3-0) 3 hours credit. Prerequisite: ACC 5023 or an equivalent.
A study of the accounting executive's role in the management of a business enterprise; case studies of the use of accounting information to management. (Formerly ACC 5033. Credit cannot be earned for both ACC 5803 and ACC 5033.)
- 5813 Advanced Auditing**
(3-0) 3 hours credit. Prerequisite: ACC 4013 or an equivalent.
A study of specialized areas of auditing. Topics may vary depending upon current professional controversies. (Formerly ACC 5043. Credit cannot be earned for both ACC 5813 and ACC 5043.)
- 5823 Nonprofit and Governmental Accounting**
(3-0) 3 hours credit. Prerequisite: ACC 5023 or an equivalent.
A study of accounting principles and practices of not for profit organizations, including federal, state, and local governments. (Formerly ACC 5053. Credit cannot be earned for both ACC 5823 and ACC 5053 or ACC 4053.)
- 5833 Cost Management and Control**
(3-0) 3 hours credit. Prerequisite: ACC 5023 or an equivalent.
Study of contemporary issues, cost concepts, and procedures in managerial accounting, to include analysis and application of techniques in the generation of data for management information systems. (Formerly ACC 5073. Credit cannot be earned for both ACC 5833 and ACC 5073.)

5843 Seminar in Current Auditing Issues

(3-0) 3 hours credit. Prerequisite: ACC 4013 or an equivalent.

A study of the current and emerging issues of internal, operational, and financial auditing. (Formerly ACC 5083. Credit cannot be earned for both ACC 5843 and ACC 5083.)

5863 Advanced Financial Accounting

(3-0) 3 hours credit. Prerequisite: ACC 3033 or an equivalent.

A study of specialized areas of financial accounting. Topics may vary depending upon current professional controversies. (Formerly ACC 5133. Credit cannot be earned for both ACC 5863 and ACC 5133.)

5873 Budgeting and Forecasting

(3-0) 3 hours credit. Prerequisite: ACC 5023 or an equivalent.

Examines the accountant's role in budgeting and forecasting. Study of advanced forecasting techniques and applications of microcomputers and forecasting. (Formerly ACC 5143. Credit cannot be earned for both ACC 5873 and ACC 5143.)

5893 Consulting

(3-0) 3 hours credit. Prerequisite: 15 semester credit hours of graduate accounting courses above ACC 5023 or an equivalent.

A study of project management. An applied approach using teams with appropriate cumulative expertise will address the various issues encountered by consultants.

6003 Managerial Accounting Theory

(3-0) 3 hours credit. Prerequisite: ACC 5023 or an equivalent.

Advanced study of the applications of managerial accounting, including cost analysis, variance analysis, pricing decisions, transfer pricing, and budgeting. Research into accounting literature, with the objective of critically evaluating the present status and future course of accounting thought.

6013 Financial Accounting Theory

(3-0) 3 hours credit. Prerequisite: ACC 3033 or an equivalent.

A study of the nature of accounting and the nature of theory, and a critical analysis of the history of the development of Generally Accepted Accounting Principles. Research into accounting literature, with the objective of critically evaluating the present status and future course of accounting thought.

6043 Tax Research

(3-0) 3 hours credit. Prerequisite: ACC 3043 or an equivalent.

An in depth study of how to find answers to tax questions. Students will become acquainted with various tax materials in the library and their use, including tax services, case reports, and IRS publications.

6053 Estate, Trust, and Gift Taxation

(3-0) 3 hours credit. Prerequisite: ACC 4153 or an equivalent.

Emphasis on estate and gift planning and income taxation of trusts and estates. Taxation of gratuitous transfers under the Federal Estate and Gift Tax Codes including inter vivos gifts, marital deduction, powers of appointment, retained interest, the concept of distributable net income, fiduciary taxation, and the concept of an estate.

6073 Advanced Corporate Taxation

(3-0) 3 hours credit. Prerequisite: ACC 4153 or an equivalent.

A study of federal income taxation of corporations and shareholders, which includes formation, distributions, penalty taxes, reorganization, and consolidations.

6083 Special Topics in Tax Practice

(3-0) 3 hours credit. Prerequisite: ACC 4153 or an equivalent.

Advanced case studies of tax audits, administrative appeals, settlement technique, appellate jurisdiction, choosing forums, ruling and technical requests, civil litigation, collection process, offers in compromise, interest and civil penalties, indirect methods of proof, and criminal penalties.

- 6103 International Taxation**
(3-0) 3 hours credit. Prerequisite: ACC 4153 or an equivalent.
A study of the issues involved in the taxation of multinational corporations and international trade partners.
- 6113 Flow Through Entities**
(3-0) 3 hours credit. Prerequisite: ACC 4153 or an equivalent.
A study of the special tax attributes of partnerships, S-corporations, limited liability companies, and limited liability partnerships including formation, operation, distributions, and dissolution.
- 6203 Seminar in International Accounting**
(3-0) 3 hours credit. Prerequisite: 9 semester credit hours of accounting.
An analysis of the issues involved in accounting for multinational corporations, including environmental influences, foreign currency translation, management accounting, and international accounting standard setting. A brief study of accounting history is included in the course. (Formerly ACC 6133. Credit cannot be earned for both ACC 6203 and ACC 6133.)
- 6943 Accounting Internship**
3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of upper division accounting, or an equivalent.
Internship must be approved in advance by the Internship Coordinator and the Graduate Advisor of Record. Supervised full or part-time off campus training in public accounting, industry, or government. Individual conferences and written reports required. Cannot be repeated for credit.
- 6951-3 Independent Study**
1 to 3 hours credit. Prerequisites: Graduate standing and written permission of the instructor and the student's Graduate Advisor of Record (forms available from the department office).
Independent reading, research, discussion, and/or writing under the direction of a graduate faculty member. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Approval of the appropriate committee on graduate studies to take the Comprehensive Examination.
Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Committee on Graduate Studies. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).
- 6971-3 Special Problems**
(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.
An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.
- 6983 Master's Thesis**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director (form available).
Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.
- 7013 Seminar in Empirical Research in Accounting**
(3-0) 3 hours credit. Prerequisites: Consent of instructor and admission to the Ph.D. program.
An exploration of accounting research that employs observational, data-analytical methodology as means for theory development and validation, with emphasis on positive, empirical studies related to auditing, financial markets, and international accounting issues.

7023 Seminar in Behavioral Research in Accounting

(3-0) 3 hours credit. Prerequisites: Consent of instructor and admission to the Ph.D. program.

The behavioral research in accounting seminar is a dichotomous class aimed at providing students with a framework for understanding the behavioral implications of the development, dissemination, and use of accounting information through an understanding of behavioral theories and methodologies.

7113 Seminar in Financial Accounting Theory

(3-0) 3 hours credit. Prerequisites: Consent of instructor and admission to the Ph.D. program.

This course focuses on accounting information reported to user groups outside the firm and is designed to introduce students to a number of substantive topics in empirical accounting research. Emphasis is placed on familiarizing students with the theories underlying financial accounting research, the nature of the research questions commonly addressed in empirical research, and the methods used to address those research questions. Topics include the earnings-return relation, financial reporting standard setting, information content of accounting disclosures, use of accounting information in contracting, and the relation between accounting information and firm value.

7123 Seminar in Managerial Accounting Theory

(3-0) 3 hours credit. Prerequisites: Consent of instructor and admission to the Ph.D. program.

A study of the accumulation, analysis, and interpretation of accounting data relevant to purposes of managerial decision making, profit planning, and control. Emphasis is placed on familiarizing students with the theories underlying cost/managerial accounting research, the nature of the research questions commonly addressed in cost/managerial accounting research, and the methods used to address those questions. A number of paradigms employed by researchers to study the use of accounting data within organizations will be discussed, including the application of mathematics and statistics to accounting analysis.

7201-3 Accounting Research Colloquium

1 to 3 hours credit. Prerequisites: Consent of instructor and admission to the Ph.D. program.

Presentation and analysis of literature in a selected area of research. May be repeated.

7211-6 Doctoral Research

1 to 6 hours credit. Corequisite: Concurrent enrollment in ACC 6961.

May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

7311-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisite: Admission to candidacy for Doctoral degree in Business Administration.

May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

DEPARTMENT OF ECONOMICS

Master of Business Administration Degree – Business Economics Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study business administration at the graduate level with particular emphasis in business economics. It assists students in preparing for economics related careers in the business environment and government or for graduate study in economics at the doctoral level.

Students choosing to concentrate in business economics must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours as follows:

ECO	6033	Macroeconomic Issues
ECO	6103	Econometrics and Business Forecasting
6 semester credit hours of graduate economics elective courses		

Master of Arts Degree in Economics

The Master of Arts degree in Economics (M.A.E.) blends the traditional social sciences-oriented master's program in economics with modern applied and analytical tools. It is designed to prepare students for careers in a wide range of professional fields or further graduate study in economics. Students may choose a thesis or nonthesis option. The program and admissions are supervised by the Economics Graduate Program Committee, which includes the Economics Graduate Advisor. General requirements for completion of the program consist of required courses, electives, and a comprehensive examination.

Program Admission Requirements. For admission to the M.A.E. program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of potential for success in graduate study in economics as indicated by a combination of records in the applicant's application package, including:

- a completed application form
- transcripts from all universities attended
- official Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores
- letters of reference (optional)
- a statement of purpose (optional).

The Economics Graduate Admissions Committee evaluates each applicant individually based on the stated records. Accepted students are required to have completed an undergraduate degree before the start of the Master's program. Also, students with noneconomics undergraduate degrees may be required to take some undergraduate or graduate courses in addition to degree requirements.

Degree Requirements. Students must complete 33 semester credit hours and a comprehensive examination.

A. 12 semester credit hours of required economics graduate courses:

ECO	6013	Microeconomic Theory
ECO	6033	Macroeconomic Issues
ECO	6103	Econometrics and Business Forecasting
ECO	6113	Mathematical Economics

B. 21 semester credit hours of elective graduate work, 9 of which may be noneconomics courses, contingent upon approval by the Economics Graduate Advisor. With approval of the advisor, students with graduate credits in a noneconomics field may apply up to 9 hours of graduate work to fulfill the noneconomics elective requirements. In the case of students who have not had similar courses in their undergraduate program, College of Business 5003-numbered courses other than ECO 5003 Economic Theory and Policy may, upon the Graduate Advisor's approval, qualify as electives.

Such electives may be desirable for those with a prospect of entering the Ph.D. program in Business Administration at UTSA. Students pursuing the thesis option may fulfill up to 6 semester credit hours of the elective work with a thesis. Economics elective courses are economics graduate courses not in the student's required course sequence, including:

ECO	6203	Government and Business
ECO	6213	Public Sector Economics
ECO	6323	International Trade and Finance
ECO	6403	Financial Economics
ECO	6523	Labor Economics
ECO	6533	Economics of Education
ECO	6543	Health Care Economics and Policy
ECO	6553	Urban and Regional Economics
ECO	6971-3	Special Topics

- C. **Comprehensive Examination.** Students must pass a comprehensive examination administered by their graduate committee. This examination is normally taken in the semester before or during the semester in which degree requirements are completed. During the first month of the appropriate semester, the student informs the Economics Graduate Advisor of the intent to take the examination and requests the formation of the committee. The committee consists of the Economics Graduate Advisor and two other faculty members, who may be recommended by the student. One committee member may be a noneconomics faculty member. If the thesis option is adopted, the thesis supervisor is a member of the committee.

COURSE DESCRIPTIONS ECONOMICS (ECO)

5003 Economic Theory and Policy

(3-0) 3 hours credit.

The opportunity for intensive study of micro- and macroeconomic concepts; the price system as it functions under competition, monopoly, and partial monopoly; national income measurement and determination; business cycles; money and banking; monetary policy; and fiscal policy and economic stabilization.

5023 Managerial Economics

(3-0) 3 hours credit. Prerequisites: ECO 5003 and MS 5003, or their equivalents.

Application of price theory to economic decisions of the firm. A problem oriented approach emphasizing demand, production, and profit maximizing conditions, and their implications for output and pricing strategies under various market structures and types of organization.

6013 Microeconomic Theory

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Introduction to advanced microeconomic theory and policy. Topics include theory of demand and consumer behavior, theory of production and cost analysis, market structures and pricing, and social welfare implications.

6033 Macroeconomic Issues

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Introduction to advanced macroeconomic theory and policy. Topics include indicators of overall economic activity, various models of the economy and stabilization policies, economic growth, inflation and unemployment, models of consumption, investment, and trade and their impact on policy effectiveness. (Formerly ECO 5033. Credit cannot be earned for both ECO 6033 and ECO 5033.)

6103 Econometrics and Business Forecasting

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Classical and advanced regression and forecasting methodologies, including analysis of simple and multiple regression models, hypothesis testing, smoothing procedures, autoregressive integrated moving average models for time series, forecast evaluation and combination. Application of computer-assisted regression analysis and forecasting methods to business and economic problems.

6113 Mathematical Economics

(3-0) 3 hours credit. Prerequisites: ECO 2013, ECO 2023, and MAT 1033, or their equivalents.

An examination of mathematical methods used in economic analysis. Topics include linear algebra, calculus and optimization techniques, and their applications in economic theory and decision making.

6203 Government and Business

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Study of the role of government in the marketplace. Economic analysis of market structure and industry performance; motivations for and the effects of antitrust laws, economic regulations of private business, and public ownership of business.

6213 Public Sector Economics

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Theoretical rationale for collective action; incidence, equity, and efficiency of taxation methods; externalities and property rights; analysis of public goods, regulation, and public choice. (Formerly ECO 5603. Credit cannot be earned for both ECO 6213 and ECO 5603.)

6323 International Trade and Finance

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Classical and modern theories regarding trade patterns and commercial policies. Causes and consequences of international trade. International trade practices under varying commercial policy approaches. Balance of payments, foreign exchange markets, and exchange rate determination. International currency systems and policies. Regional monetary and economic integration. (Formerly ECO 5303. Credit cannot be earned for both ECO 6323 and ECO 5303.)

6403 Financial Economics

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Foundations in modern financial economics. Applies economic analysis to financial issues. Analytical methods to be discussed include inter-temporal utility models and general equilibrium theory. Financial topics include mean-variance frontier, capital asset pricing model, and arbitrage pricing theory.

6523 Labor Economics

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Survey of wage theory, wage determination and structure of labor markets, employment opportunities, economic security, leisure, and technological change, and labor organizations and collective bargaining. (Formerly ECO 6313. Credit cannot be earned for both ECO 6523 and ECO 6313.)

6533 Economics of Education

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

The course will cover economic aspects of education, including student diversity, connections to civil society, competitiveness, and the resulting national and international controversies over political vs. market accountability of school operators. Students will have the opportunity to develop model-building and model-interpretation skills.

6543 Health Care Economics and Policy

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

The application of economic principles and modeling to the health care marketplace. Students will be given the opportunity to apply theoretical and empirical economic analysis to business and public policy issues in the health care industry.

6553 Urban and Regional Economics

(3-0) 3 hours credit. Prerequisite: ECO 5003, an equivalent, or consent of instructor.

Economic aspects of regions and their cities, including growth and development processes; data sources and analytical methods; and analysis of urban issues such as transportation, education, land use, pollution, and public sector service delivery.

6943 Economics Internship

3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor.

Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record.

Cannot count as an economics elective toward an M.B.A. with a concentration in Business Economics.

Supervised full- or part-time off-campus work experience and training in economics. Individual conferences and written reports required.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Topics

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Topics courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 semester credit hours will apply to a Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7013 Seminar in Microeconomic Theory

(3-0) 3 hours credit. Prerequisite: ECO 3013 or ECO 3033, an equivalent, or consent of instructor.

Decision problems faced by the household and firm; theories of consumer choice; theory of production, cost, markets, and pricing decisions in deterministic and stochastic settings.

7023 Seminar in Macroeconomic Theory

(3-0) 3 hours credit. Prerequisite: ECO 3053, an equivalent, or consent of instructor.

Macroeconomic models and their implications for forecasting and policy; determination of the interest rate, price level, wage rate, employment, and output; dynamic models of consumption, investment, and expectations; introduction to monetary economics and growth models.

7041-3 Topics in Economic Research

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

Seminar on special topics in a particular area of research. These topics may include financial economics, econometrics, international economics, industrial organization, public economics, resources and energy, and government and business. May be repeated for credit when topics vary.

7053 Quantitative Methods for Business and Economics

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A review of mathematical tools and their application in modeling and solving business and economic problems. Topics include linear algebra, linear systems and solution methods, special and multivariate functions, differential and integral calculus, constrained optimization and Lagrange method, and optimal control and dynamic programming.

7063 Econometrics

(3-0) 3 hours credit. Prerequisites: MAT 1033, MS 1013, STA 7013, and STA 7023, or equivalents, or consent of instructor.

A study of fundamental econometric techniques and applications. Topics include single equation models, least squares, and maximum likelihood estimation, properties of estimators, generalized least squares, general linear hypothesis, model selection techniques, simultaneous equations identification and estimation methods, distributed lag models, forecasting and time-series models.

7083 Time Series Analysis

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Univariate and multivariate time series analysis of economics and financial data, autoregressive integrated moving average (ARIMA), vector autoregression, unit roots, cointegration, error correction, and ARCH models.

DEPARTMENT OF FINANCE

Master of Business Administration Degree – Finance Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study business administration at the graduate level with an emphasis in finance. It particularly assists students in preparing for finance related careers in the business environment or for graduate study in finance at the doctoral level.

Students choosing to concentrate in finance must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours as follows:

FIN 5633 Investment Theory and Problems
9 semester credit hours of graduate finance elective courses

Master of Business Administration Degree – Real Estate Finance Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study business administration at the graduate level with an emphasis in real estate finance. It assists students in preparing for real estate careers in the business environment or for graduate study in real estate at the doctoral level.

Students choosing to concentrate in real estate finance must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours as follows:

FIN 5413 Real Estate Finance
FIN 5433 Real Estate Investment
FIN 5453 Real Estate Development
MOT 5243 Essentials of Project and Program Management

Master of Science Degree in Finance

The Master of Science degree in Finance (M.S.F.) provides an intensive education in various aspects of finance, including markets and institutions, corporate finance, international finance, financial modeling, and investments including derivative securities. Emphasis is on theoretical aspects of finance, developments in financial instruments and markets, and practical application tools and techniques. The program is designed to train students to be financial managers and analysts in corporations, banks, and investment institutions. It also provides the opportunity for students to prepare to undertake specialized certification examinations and doctoral studies in finance. The program, including admission, is supervised by the Graduate Program Committee in Finance, which includes the Graduate Advisor in Finance. General requirements for completion of the program consist of nonfinance foundations of knowledge requirements, required finance courses, elective work, and a comprehensive examination.

Program Admission Requirements. For admission to the Master of Science degree in Finance program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in finance as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional).

The M.S.F. Graduate Program Committee evaluates each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- transcripts from all universities attended
- official Graduate Management Admission Test (GMAT) scores

- a personal statement
- a current résumé with employment or other experience (optional)
- letters of reference (optional).

Students with nonfinance undergraduate degrees may be required to take additional undergraduate and graduate courses for removal of deficiencies, as determined by the Graduate Program Committee in Finance. Such courses do not apply toward the degree.

Degree Requirements. Students must complete 33 semester credit hours and a comprehensive examination.

A. 9 semester credit hours of foundations of knowledge courses:

ACC	5023	Accounting Analysis for Decision Making
ECO	5023	Managerial Economics
MS	5023	Decision Analysis and Production Management

B. 9 semester credit hours of Finance courses:

FIN	5023	Financial Management
FIN	5633	Investment Theory and Problems
FIN	6313	Modeling of Financial Decision Making (must be taken at least one semester before graduation)

C. 15 semester credit hours of electives, at least 12 of which must be in finance. The Graduate Advisor in Finance must approve nonfinance electives. Finance electives include:

FIN	5033	Cases in Financial Management
FIN	5413	Real Estate Finance
FIN	5433	Real Estate Investment
FIN	5453	Real Estate Development
FIN	5713	Financial Markets
FIN	5733	Banking and the Financial Services Industry
FIN	5813	Corporate Valuation
FIN	5833	International Financial Management
FIN	5853	Entrepreneurial Business Finance
FIN	5913	Portfolio Theory and Efficient Capital Markets
FIN	5943	Financial Statement Analysis
FIN	6213	Speculative Markets and Securities
FIN	6223	Corporate Risk Management
FIN	6943	Finance Internship
FIN	6951-3	Independent Study
FIN	6973	Special Problems

D. Comprehensive Examination. All candidates must pass a comprehensive examination administered by the Graduate Program Committee in Finance.

Degree Options: Students seeking the M.S.F. degree may elect one of two options to complete the required 33 semester credit hours.

Option 1: General M.S.F. Option. Under Option 1, students are required to complete the 9 hours of foundations of knowledge courses, the 9 hours of finance courses and the 15 hours of elective courses as outlined above.

Option 2: Concentration in Real Estate Finance. Under Option 2, students have an opportunity to concentrate in the area of real estate finance.

Master of Science Degree in Finance – Real Estate Finance Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study finance at the graduate level with an emphasis in real estate finance. It assists students in preparing for real estate careers in the field of finance or for graduate study in real estate at the doctoral level.

Students choosing to concentrate in real estate finance must complete the 9 semester credit hours containing the foundations of knowledge, the 9 semester credit hours of finance courses and 15 semester credit hours of electives, including the following courses:

FIN	5413	Real Estate Finance
FIN	5433	Real Estate Investment
FIN	5453	Real Estate Development
MOT	5243	Essentials of Project and Program Management

Doctor of Philosophy Degree in Business Administration with an Emphasis in Finance

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Business Administration with an emphasis in Finance. See page 88 of this catalog for a detailed description of the general requirements for the Doctoral degree. The Doctoral Studies Committee of the Department of Finance will advise students admitted to the program who pursue a Ph.D. in Business Administration with an emphasis in Finance.

To satisfy the Major Area Coursework for the finance emphasis, a student must complete 15 semester credit hours from the following courses:

- | | | |
|-----|--------|---------------------------------|
| FIN | 7013 | Financial Theory |
| FIN | 7023 | Corporate Finance |
| FIN | 7033 | Valuation |
| FIN | 7043 | Empirical Finance |
| FIN | 7113 | International Financial Markets |
| FIN | 7201-3 | Finance Research Colloquium |

- Two directed electives:

FIN	7053	Topics in Financial Research
FIN	elective	

COURSE DESCRIPTIONS

FINANCE

(FIN)

5003 Business Finance

(3-0) 3 hours credit. Prerequisite: ACC 5003 or an equivalent.

The framework, tools, and basic concepts of financial management. Areas of inquiry include taxation, forecasting, working capital management, external financing, capital budgeting, and dividend policy.

5023 Financial Management

(3-0) 3 hours credit. Prerequisites: ACC 5003, ECO 5003, and FIN 5003, or their equivalents. Completion of or concurrent enrollment in ACC 5023 is recommended.

The study of concepts related to the financial management of the firm. Topics include asset and liability management, capital investment analysis and valuation, risk and uncertainty, sources and costs of financial alternatives, and corporate financial policy. (Formerly FIN 5043. Credit cannot be earned for both FIN 5023 and FIN 5043.)

5033 Cases in Financial Management

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

A case approach will be used to illustrate the applications of financial management to business situations and to integrate topical areas. Primary areas of focus include planning, current asset management, capital budgeting, mergers and acquisitions, and financing alternatives.

5413 Real Estate Finance

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

A study of finance concepts applied to real estate lending and development. Topics may include the primary and secondary mortgage markets, construction and development financing, lender loan analysis, an introduction to the legal aspects of real property lending, and an overview of real estate investment trusts.

5433 Real Estate Investment

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

This course focuses primarily on the fundamentals and valuation of real property as an investment class. The course examines the major concepts and analytical methods useful for making real estate investment and finance decisions relating to individual properties. It builds upon the modern corporate finance perspective and treats property as one particular class of capital assets. This course may cover other topics that relate to investment property analysis such as securitized equity real estate investment where the emphasis is on multiple property valuation and decision making and such as commercial appraisal methods as they relate to property valuation.

5453 Real Estate Development

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

This course studies the real estate development process. Topics may include evaluation of real estate trends to project development needs, zoning and other legal considerations, site selection and evaluation, ownership and financing consideration, project scheduling, and evaluation of completed projects. Real estate professionals may be invited to present proposed or recently developed projects in San Antonio or other locations that may be used as case studies.

5633 Investment Theory and Problems

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

A study of investment analysis and decision making with regard to financial instruments traded in organized markets. Topics include descriptions and functions of markets; impact of market structure on market efficiency and security pricing; valuation of stocks, bonds, and options; analysis of risk and return characteristics of investment alternatives; and selection and management of bond and stock portfolios.

5713 Financial Markets

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

An examination of major financial markets with emphasis on current trends and developments. Topics include markets used for risk management, such as financial futures, listed options, and SWAPS.

5733 Banking and the Financial Services Industry

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

The study of management practices applicable to banks and other firms operating in the financial services industry. Bank management practices using an asset/liability management approach are emphasized. Topics include major trends and developments having an impact on the financial services industry.

5813 Corporate Valuation

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

The techniques and issues involved in making long term investment decisions and valuing the financial claims on a company. Topics include the concepts of the cost of capital and financial structure, dividend policy, risk assessment and management, forecasting, and cash flow analysis.

5833 International Financial Management

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

The theory of business finance as applied to the operations of multinational firms. The determinants of exchange rates and the management of exchange rate risk are analyzed in terms of their impact on how a multinational corporation functions in the international setting. Topics include the financial analysis and control of foreign investment decisions, management of working capital, participation in the international capital markets, financing of international trade, and management of corporate risk.

5853 Entrepreneurial Business Finance

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

The course focuses on the financial needs and conditions unique to the small firm that arise as it progresses from the development stage through the start-up, expansion, and harvesting stages. Topics include comparison of operating and managerial characteristics, valuation issues, and financial alternatives.

5913 Portfolio Theory and Efficient Capital Markets

(3-0) 3 hours credit. Prerequisite: FIN 5633 or an equivalent.

A comprehensive survey of the classical and contemporary theories of optimum portfolio construction; a study of the determinants of risk return trade-offs in the selection of securities; and emphasis on the theory and evidence of efficient markets and its implications on the analysis of securities and portfolio management.

5943 Financial Statement Analysis

(3-0) 3 hours credit. Prerequisite: FIN 5633 or an equivalent.

The processes by which the economic information contained within financial statements is interpreted and used to evaluate historical performance and project future performance of the firm. Topics include hidden assets and liabilities, earnings quality, liquidity and cash flows.

5963 International Business Internship

3 hours credit. Prerequisites: Consent of instructor and the Graduate Advisor of Record.

Opportunity for work experience in international business or a public agency.

5983 International Business Essay

3 hours credit. Prerequisites: Consent of instructor and the Graduate Advisor of Record.

Original research report on an international management topic.

6213 Speculative Markets and Securities

(3-0) 3 hours credit. Prerequisite: FIN 5633 or an equivalent.

An examination of derivative financial instruments such as options and futures and their potential role in controlling portfolio risk. Valuation and the risk and return characteristics of these instruments, as well as trading and portfolio strategies, will be developed.

6223 Corporate Risk Management

(3-0) 3 hours credit. Prerequisite: FIN 5633 or an equivalent.

An understanding of derivative instruments and their application in corporate risk management is developed. The topics covered reflect the fact that management of risk in the corporate context is a source of competitive advantage and growth. Derivative instruments such as options, futures, and swaps are analyzed. The choice of different instruments and their properties in managing corporate risk is examined.

6313 Modeling of Financial Decision Making

(3-0) 3 hours credit. Prerequisite: FIN 5023 or an equivalent.

Computer models of financial problems commonly used in industry are developed. Topics include financial statement analysis, financial planning and forecasting, capital investment analysis, and financing decisions. Applications to investment analysis include security and options valuations, performance analysis, and portfolio management. Decision making under uncertainty is examined through various techniques, including simulation.

6943 Finance Internship

3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Cannot count as a finance elective toward the M.B.A. with a concentration in Finance. Supervised full- or part-time off-campus work experience and training in finance. Individual conferences and written reports required.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to a Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7013 Financial Theory

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

The course covers financial theory, including considerations of financial decision making in an uncertain environment, introduction to utility theory; state-preference theory; and mean-variance choice theories. Considerations of market equilibrium, introduction to financial derivatives, and international finance will be covered, as well as empirical findings in finance.

7023 Corporate Finance

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

The theory of financial management of the firm, including Miller and Modigliani propositions and their extensions; imperfect information and agency problems; and asymmetric information and signaling, will be considered. Corporate finance issues such as capital structure, dividend policy, corporate governance, and bankruptcy topics will be covered. Empirical research in corporate financial decisions will also be covered.

7033 Valuation

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

The concepts of valuation are developed through such topics as asset pricing models and arbitrage methods. Development of concepts of value additivity, stochastic dominance, and state preference will be undertaken. Stochastic processes and stochastic calculus are developed for the pricing of options in continuous time. Other discrete time processes and valuation methods will also be covered.

7043 Empirical Finance

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Methodologies and techniques for testing hypotheses regarding asset pricing models, option pricing models, volatility, and market efficiency will be developed. Market structure issues using event studies and time series applications are explored and developed.

7053 Topics in Financial Research

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

This is a research seminar course where the topics may vary. Topics envisaged include the following: advanced international financial management topics, the theory and management practices in financial intermediaries, and advanced topics in real estate finance. The course may be repeated for credit when topics vary.

7113 International Financial Markets

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Techniques are demonstrated in how to conduct empirical research in international financial markets (Forex, stocks, bonds, commodities, and derivatives) with sophisticated econometrics and extensive data analysis. Topics include trading mechanisms, market efficiency, price discovery, arbitrage, transaction costs, portfolio management, and exchange policies.

7201-3 Finance Research Colloquium

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

Presentation and analysis of literature in a selected area of research. May be repeated.

7211-6 Doctoral Research

1 to 6 hours credit.

May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

7311-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisite: Admission to Candidacy for the Doctoral degree in Business Administration.

May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

DEPARTMENT OF INFORMATION SYSTEMS AND TECHNOLOGY MANAGEMENT

Master of Business Administration Degree – Information Assurance Concentration

This concentration is designed to offer the opportunity for qualified students to study business administration while developing special expertise in information assurance. To achieve this end, students can focus their elective courses on information assurance subjects such as voice and data security, risk assessment, computer forensics, and incident response. These course offerings require previous academic credit or professional experience in information security, information systems or computer science.

Students choosing to concentrate in information assurance must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours of graduate information assurance courses.

Master of Business Administration Degree – Information Systems Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study business administration while developing special expertise in information systems. To achieve this end, students can focus their elective courses on developing general managerial knowledge in the design and implementation of information systems, management of communications technologies, and principles of database management systems. Some of the course offerings require previous academic credit or professional experience in information systems.

Students choosing to concentrate in information systems must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours of graduate information systems courses other than IS 5003 Introduction to Information Systems.

Master of Business Administration Degree – Management of Technology Concentration

This concentration is designed to offer the opportunity for qualified graduate students, primarily with a nontechnical background, to study business administration while developing special expertise in the management of technology. To achieve this end, students can focus their elective courses on developing general managerial skills applicable to technology-based organizations, leading professional and technical employees, and integrating the various functions of an organization in today's rapidly changing technological environment.

Students choosing to concentrate in management of technology must complete the 21 semester credit hours of courses that constitute the foundations of knowledge and 12 semester credit hours as follows:

A. Required courses (6 semester credit hours):

MOT	5163	Management of Technology
MOT	5223	Management of Professional Personnel

B. Elective courses (6 semester credit hours):

Students must complete an additional 6 semester credit hours of graduate courses from Management of Technology (other than MOT 5013 Global Foundations of Management of Technology and MOT 5023 Technological Foundations of Management of Technology), Information Systems (other than IS 5003, Introduction to Information Systems), Management Science (other than MS 5003, Quantitative Methods for Business Analysis), and/or Statistics.

Master of Business Administration Degree – Project Management Concentration

This concentration is designed to offer qualified graduate students the opportunity to study business administration while developing special expertise in project management. To achieve this end, students will complete courses that will enable them to manage projects successfully. Additionally, students will focus their elective choices to improve their understanding of the business environment in which contemporary projects are managed. Students choosing to concentrate in project management must complete the 21 semester credit hours of the courses that constitute the foundations of knowledge and 12 semester credit hours as follows:

A. Required Courses (6 semester credit hours):

MOT	5233	Advanced Topics in Project Management
MOT	5243	Essentials of Project and Program Management

B. Elective courses (6 semester credit hours):

Students are required to take 6 semester credit hours of graduate elective courses. Students are encouraged to select courses which will develop their knowledge of a specific project management domain such as e-commerce, health care management, information systems, or technology management. The Management of Technology (MOT) Graduate Programs Committee must approve the 6 elective hours.

Master of Science Degree in Information Technology

The Master of Science degree in Information Technology (M.S.I.T.) provides information systems and computer science professionals with the opportunity to acquire technical knowledge in a variety of specialized information technology fields and the management skills to create, plan, organize, lead, and control the information technology in their organizations. The program is designed for students with a technical background and preferably an undergraduate or graduate degree in information systems or computer science.

Program Admission Requirements. For admission to the M.S.I.T. program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in information technology as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional).

The M.S.I.T. Program Committee evaluates each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- transcripts from all universities attended
- official Graduate Management Admission Test (GMAT) scores
- a personal statement
- a current résumé with employment or other experience (optional)
- letters of reference (optional).

Degree Requirements. Candidates for the degree of Master of Science in Information Technology (M.S.I.T.) must complete the following:

A. 12 semester credit hours of required courses:

IS	5143	Information Technology
IS	5203	Telecommunication Systems
MGT	5043	Management and Behavior in Organizations

MOT	5203	Strategic Management of Technology
		or
IS	6813	Strategic Management of Information Technology

B. All candidates for the degree must complete an additional 21 semester credit hours of elective courses:

1. 15 semester credit hours selected from the following:

CS	5103	Software Engineering
CS	5443	Database Management Systems
CS	6543	Networks
CS	6553	Performance Evaluation
IS	5193	Software Engineering Management
IS	5563	International Telecommunications Policy
IS	6103	Information Systems Design and Implementation
IS	6303	Introduction to Voice and Data Security
IS	6323	Security Risk Analysis
IS	6343	Secure Network Designs
IS	6353	Security Incident Response
IS	6363	Computer Forensics
IS	6373	Cyber Law
IS	6383	Policy Assurance for Infrastructure Assurance
IS	6423	Secure Software Design
IS	6433	Supervisory Control and Data Acquisition
IS	6503	Principles of Database Management
IS	6703	Advanced Business Information Systems
IS	6953	Independent Study

2. 6 semester credit hours selected from the following:

MGT	5093	Leadership
MGT	5133	Organizational Decision Making

Any of the graduate courses from Management of Technology (MOT) other than MOT 5013 Global Foundations of Management of Technology and MOT 5203 Strategic Management of Technology.

Master of Science Degree in Information Technology – Infrastructure Assurance Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study information technology while developing the special expertise in infrastructure assurance. To achieve this end, students can focus their elective courses on developing the specialized knowledge requirements for the computer and information security area while at the same time completing the requirements for the Master of Science (M.S.) degree.

Program Admission Requirements. For admission to the M.S.I.T. program, applicants must meet University-wide graduate admission requirements. Applicants are further considered on the basis of demonstrated potential for success in graduate study in information technology as indicated by a combination of prior academic achievement, Graduate Management Admission Test (GMAT) scores, personal statement, résumé (optional), and references (optional).

The M.S.I.T. Program Committee evaluates each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- transcripts from all universities attended

- official Graduate Management Admission Test (GMAT) scores
- a personal statement
- a current résumé with employment or other experience (optional)
- letters of reference (optional).

Degree Requirements. Candidates for the degree of Master of Science in Information Technology (M.S.I.T.) must complete the following:

A. 12 semester credit hours of required courses:

IS	5143	Information Technology
IS	5203	Telecommunication Systems
MGT	5043	Management and Behavior in Organizations
MOT	5203	Strategic Management of Technology
		or
IS	6813	Strategic Management of Information Technology

B. All candidates for the degree must complete an additional 21 semester credit hours of elective courses:

1. 15 semester credit hours:

IS	6303	Introduction to Voice and Data Security
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12 semester credit hours selected from the following:

IS	6323	Security Risk Analysis
IS	6343	Secure Network Designs
IS	6353	Security Incident Response
IS	6363	Computer Forensics
IS	6373	Cyber Law
IS	6383	Policy Assurance for Infrastructure Assurance
IS	6423	Secure Software Design
IS	6433	Supervisory Control and Data Acquisition
IS	6953	Independent Study

2. 6 semester credit hours selected from the following:

MGT	5093	Leadership
MGT	5133	Organizational Decision Making

Any of the graduate courses from Management of Technology (MOT) other than MOT 5013, Global Foundations of Management of Technology and MOT 5203, Strategic Management of Technology.

Master of Science Degree in Management of Technology

The Master of Science in Management of Technology (M.S. MOT) differs significantly from both the M.B.A. and the M.B.A. with a concentration in Management of Technology. The M.S. MOT has a different set of required foundations of knowledge courses and focuses on management issues and skills required to stimulate and manage technological innovation and creativity, and help bring value creating ideas, goods, and services to the marketplace. Courses may be available through distance learning.

Program Admission Requirements. For admission to the M.S. MOT program, the ideal applicant should have an undergraduate or graduate degree in a scientific, engineering, mathematical, or other technology-based discipline from an accredited university or college and meet University-wide graduate admission requirements. In addition, the MOT Graduate Programs Committee evaluates each applicant individually, based on a combination of:

- prior academic achievement
- Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE)
- at least two letters of recommendation
- a current résumé with employment or other experience
- a personal statement.

Degree Requirements. Students must successfully complete 33 semester credit hours and a comprehensive examination.

A. Candidates are required to successfully complete the following 15 semester credit hours:

MOT	5053	Building Enterprise Equity
MOT	5163	Management of Technology
MOT	5223	Management of Professional Personnel
MOT	5243	Essentials of Project and Program Management
MOT	5313	Emerging Technologies

B. Candidates must complete an additional 12 semester credit hours of electives as approved by the MOT Programs of Study Committee.

C. Candidates are required to complete the following 6 semester credit hours leading to a capstone experience in the management of technology. The capstone experience, under the guidance of a graduate faculty advisor, is a synthesizing effort that may be a project, a thesis, or a paper prepared either for publication or for presentation at an appropriate conference.

MOT	6923	Directed Research in Management of Technology
MOT	6933	Management of Technology Capstone

D. Candidates must pass a comprehensive examination administered by the MOT Programs of Study Committee.

Doctor of Philosophy Degree in Business Administration with an Emphasis in Information Technology

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Business Administration with an emphasis in Information Technology. See page 88 of this catalog for a detailed description of the general requirements for the Doctoral degree. The Doctoral Studies Committee of the Department of Information Systems and Technology Management will advise students admitted to the program who pursue a Ph.D. in Business Administration with an emphasis in Information Technology.

To satisfy the Major Area Coursework for the information technology emphasis, a student must complete:

1. IS 7013 Foundations of Information Systems Research
 IS 7023 Behavioral and Organizational Information Systems Research
 IS 7033 Topics in Information Systems Technology Research
 IS 7043 Seminar in Software Development
 IS 7201-3 Information Technology Research Colloquium
2. Two directed electives (6 semester credit hours) as approved by the Doctoral Studies Committee.

COURSE DESCRIPTIONS INFORMATION SYSTEMS (IS)

5003 Introduction to Information Systems

(3-0) 3 hours credit.

A conceptual study of information systems in organizations. A survey of information systems concepts will be presented, including a historical perspective of information systems, the structure of the information systems function, an introduction to information systems technologies (hardware and software), application planning, system development, end user computing, decision support systems, and the management of information systems resources. Small cases and application problems which illustrate the concepts studied will be assigned. (Credit for this course cannot be counted toward the M.B.A. concentration in Information Systems.)

5013 Database Management for Business

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

The use of databases in a contemporary business environment will be discussed. The course includes an in-depth analysis of topics associated with the definition, creation, and use of databases for business-oriented applications. Topics include current applications in the field of database management systems with hands-on experience with a database or data-warehousing software package.

5023 Software Development

(3-0) 3 hours credit. Prerequisite: IS 5003 or an equivalent.

Modern approaches to program design. Emphasis in this course is on programming logic, object-oriented programming and program design. JAVA will be used to illustrate the concepts of the class. Class projects using JAVA will give the students some experience in developing software.

5043 Analysis and Design of Information Systems

(3-0) 3 hours credit. Prerequisite: IS 5003 or an equivalent.

This course concentrates on the procedures for conducting the analysis and design of an information system. The techniques necessary to determine the requirements of a large-scale information system will be the focal point of the course. Translating the user requirements to system specifications will also be one of the main objectives of the course.

5103 Computer Support of Groups

(3-0) 3 hours credit. Prerequisite: IS 5003 or an equivalent.

A study of the ways computers can be used to support the communication, coordination, and decision-making needs of groups. Problems encountered by face-to-face and distributed groups will be examined. Technology for addressing the problems will be studied.

5113 Electronic Commerce

(3-0) 3 hours credit. Prerequisite: IS 5003 or an equivalent.

Addresses the technological aspects of doing business on the Internet, including the technology underlying the Internet, common services required for all electronic commerce such as authentication and electronic payment systems, and the problems associated with some electronic commerce applications.

5143 Information Technology

(3-0) 3 hours credit. Prerequisite: Undergraduate degree in information systems or computer science, or consent of instructor.

Broad coverage of technology concepts underlying modern computing and information management. Topics include computer architecture and operating systems, information retrieval techniques, graphical user interfaces, networks, groupware, computer performance evaluation, efficiency of algorithms, and cryptography. Hands-on exposure to Internet services, SQL database language, PowerBuilder graphical interface language, and Lotus Notes.

5193 Software Engineering Management

(3-0) 3 hours credit. Prerequisite: Undergraduate degree in information systems or computer science, or consent of instructor.

Focuses on managing and improving the delivery of software in organizations, especially projects that include the development of large, multidisciplinary systems. Students are exposed to the tools and techniques used on commercial systems, and will present research on how best to manage information technology projects. Emphasis on measurement tools for effective managerial planning and control.

5203 Telecommunication Systems

(3-0) 3 hours credit. Prerequisite: Undergraduate degree in information systems or computer science, or consent of instructor.

Examines current, future, and basic technical concepts and related telecommunications operations; explores critical issues of communications and connectivity among information systems from strategic, organizational, and technical perspectives. An in-depth examination of basic telecommunication terminology and concepts. Topics include signaling, modulation, multiplexing, frequency bands and propagation characteristics, spectral analysis of signals, digital coding, switching systems, OSI models, and traffic analysis.

5313 Web Site Design and Development

(3-0) 3 hours credit. Prerequisite: IS 5113 or consent of instructor.

This course examines the principles of designing Web sites to meet business requirements. The course includes a technical look at Web site architecture and database integration in support of e-commerce utilizing popular commercial software. Hands-on team projects involving actual development utilizing principles from the course will be a major element of the course.

5403 Database Design and Management

(3-0) 3 hours credit. Prerequisite: IS 2043 or knowledge of programming.

A study of database management systems and languages. The class will include database design, normalization, data models, and database administration. Object-oriented databases will also be discussed. A popular DBMS will be used to illustrate the concepts discussed in class. (This course can be used only for a leveling course in the M.S.I.T. program.)

5413 Introduction to Telecommunications

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Includes an in-depth study of the basic telecommunications concepts and terminology. The course includes an introduction to voice and data networks, signaling, multiplexing and security. Network topologies and protocol fundamentals and architectures are presented and compared. (This course can be used only for a leveling course in the M.S.I.T. program.)

5423 Analysis and Design of Information Systems

(3-0) 3 hours credit. Prerequisite: IS 5403.

An introduction to systems theory. An in-depth discussion of how to design and build an information system. Topics include requirements determination, system models, object-oriented design, system design and implementation, and cost benefit analysis. Projects will be used to demonstrate the theory presented in class. (This course can be used only for a leveling course in the M.S.I.T. program.)

5563 International Telecommunications Policy

(3-0) 3 hours credit. Prerequisite: IS 5203 or consent of instructor.

The ultimate use of technology depends on a number of variables. Political factors as well as technical ones must be considered. All levels of government regulate telecommunications, from the city that controls the placement of telephone wires to the nation and/or state that issues licenses to broadcast. Because of the nature of telecommunications and the importance of the information it carries, international policies are also involved. This seminar investigates the institutions that affect the use of telecommunications, including the Department of State, the Department of Commerce, and the Federal Communications Commission.

6103 Information Systems Design and Implementation

(3-0) 3 hours credit. Prerequisite: IS 4053 or consent of instructor.

Integrates the areas of computer technology, systems analysis, and systems design in designing large-scale application or decision support systems. A strong introduction to the formalization of the information systems design process is provided. The course explores state of the art systems design and specification techniques and stresses the frontiers of knowledge in the specification, design, implementation, and testing of information systems.

6203 Data Communication and Network Management

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Emphasis is on the impact of communications technology on information systems and the firm. Major topics include communication concepts, network architectures, data communications software and hardware, distributed information systems, and communication services. Network management and managing the new technologies are also emphasized.

6303 Introduction to Voice and Data Security

(3-0) 3 hours credit. Prerequisite: IS 5203 or consent of instructor.

A study of security in both the voice and data networks and an examination of the security issues associated with the movement toward a convergence of the two infrastructures. Topics to be covered include voice and data network connectivity, modem security, VOIP security, wireless security, cryptography, intrusion detection systems, voice and data firewalls, malicious software, information operations and warfare, and denial of service attacks.

6323 Security Risk Analysis

(3-0) 3 hours credit. Prerequisites: IS 5203 and IS 6303, or consent of instructor.

Addresses the tools, techniques, and methodologies in performing computer system and network security risk analyses. Computer system and network vulnerabilities will be examined as well as tools designed to discover or exploit them. Security Best Practices and audit requirements for specific environments will be studied. Topics to be covered include internal and external penetration tests, wardialing, wireless security technology, risk analysis methodology, and security audits.

6343 Secure Network Designs

(3-0) 3 hours credit. Prerequisites: IS 5203 and IS 6303, or consent of instructor.

The course is intended to provide the background on issues related to secure network design and management. Subjects included in the class are network design, firewalls, security, fault management, and performance management. Current network management software, network security evaluation, and the role of the network architecture and protocols will also be discussed.

6353 Security Incident Response

(3-0) 3 hours credit. Prerequisite: IS 6303.

Addresses the detection and response portion of the security operational model. Takes an in-depth look at intrusion detection methodologies and tools and the approaches to handling intrusions when they occur. Examines the laws that address cybercrime and intellectual property issues. Includes a study of proper computer and network forensics procedures to aid in the identification and tracking of intruders and in the potential prosecution of criminal activity.

6363 Computer Forensics

(3-0) 3 hours credit. Prerequisite: IS 6303 or consent of instructor.

This class will examine the role of computer forensics in the security process. Technical issues concerning how to conduct a forensics examination as well as the legal issues associated with the process will be studied. Current forensics software will be used to illustrate the process.

6373 Cyber Law

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Legal issues associated with cybercrimes will be studied. Laws associated with cybercrime, and rules of evidence will be the main issues discussed in this class. Intellectual property and privacy will also be included.

- 6383 Policy Assurance for Infrastructure Assurance**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
This course will examine the policies associated with infrastructure assurance. This will include the laws and regulations from a governmental body as well as policies generated by a business organization. The main thrust will be to examine the affect that policies and policy decisions have on the security function. Current case studies will be included.
- 6393 Risk Assessment**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
This course addresses the development and implementation of Information Assurance (IA) Risk Assessment (RA). The course presents an in-depth analysis of the range of knowledge required for performing RA functions. This course addresses the core performance requirements for an RA, and also provides a set of performance measures that can be incorporated into the RA functions.
- 6403 Information Resource Management**
(3-0) 3 hours credit. Prerequisite: MGT 5043 or consent of instructor.
Study of the problems and techniques associated with managing information resources. Topics include information systems project planning and control, staffing, and costing alternatives. The role of the information systems function in relation to the business firm is also studied.
- 6423 Secure Software Design**
(3-0) 3 hours credit. Prerequisites: IS 5143 and IS 6303, or consent of instructor.
This class will present ways of designing and implementing secure software. Techniques for developing interconnected software that is secure from outside attack will be explored. Modifying legacy code will also be discussed. Case studies and class projects will be used to illustrate the design principles discussed in class.
- 6433 Supervisory Control and Data Acquisition**
(3-0) 3 hours credit. Prerequisite: IS 6303 or consent of instructor.
Supervisory control and data acquisition systems are used to control many utility networks, chemical plants, pipelines and many other types of industries. This course will examine the vulnerabilities associated with these systems and discuss how they can be made secure from outside attack. Fundamentals of software-controlled processes will also be discussed.
- 6503 Principles of Database Management**
(3-0) 3 hours credit. Prerequisite: IS 3063 or consent of instructor.
Discussion and in depth analysis of topics associated with the definition, creation, and management of databases for business-oriented applications. Topics include current developments in the field of database management systems. Design and implementation of a database system will be done as a major project in the course.
- 6603 Seminar in Computer Security and Internal Control**
(3-0) 3 hours credit. Prerequisite: IS 5003 or consent of instructor.
In depth analysis of topics related to control and security during system development and operation of information systems. Emphasis is on techniques associated with control and security requirements in information systems.
- 6703 Advanced Business Information Systems**
(3-0) 3 hours credit. Prerequisite: IS 3073 or consent of instructor.
Study of computer based technologies for facilitating the analysis and evaluation of complex problems. A review of decision analysis and a discussion of representations and the modeling process. General concepts of artificial intelligence are examined as the foundation for designing computer based information systems that support strategic planning and managerial control. Methods and principles of knowledge engineering are explored.
- 6813 Strategic Management of Information Technology**
(3-0) 3 hours credit. Prerequisite: Semester of graduation or consent of Graduate Advisor of Record.
This course develops a conceptual framework for strategy, its definition, elements, and relationships to the basic business functions of management of information technology. Considers the impact of technology and environmental

forces on strategic management of organizations. Examines the role of information technology in business process re-engineering, product life cycles, and new business models. (Credit cannot be earned for both IS 6813 and MOT 5203.)

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate committee on graduate studies to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Committee on Graduate Studies. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director (form available).

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7013 Foundations of Information Systems Research

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A survey of the foundations of information systems (IS) research. Students gain an understanding of both the foundations and the current research directions in a variety of IS topic areas. The course addresses frameworks, research concepts, and exemplary Management Information Systems (MIS) research. Students develop the ability to critically evaluate MIS journal articles and are exposed to a diversity of topics, research methodologies, and journals.

7023 Behavioral and Organizational Information Systems Research

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

This course focuses on one or more areas of emerging IS behavioral research. Topics may include individual, group, or organizational decision making, issues for e-commerce, knowledge management, management of information, and human factors. May be repeated once for credit when topics vary.

7033 Topics in Information Systems Technology Research

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

This research seminar focuses on issues and methods in one or more areas having to do with the technology of information systems. Topics may include communication systems, infrastructure assurance, and data management. May be repeated once for credit when topics vary.

7043 Seminar in Software Development

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

In this course, theories and models applicable to the analysis of systems structure and the processes of systems analysis and design are studied in relation to software engineering concepts. Emerging or advanced topics in the development of information system applications, such as socio-technical or soft-system methods, methodology engineering, or workflow system design, are included

7201-3 Information Technology Research Colloquium

1 to 3 hours credit. Prerequisite: Consent of instructor.

This course will primarily be a presentation and analysis of research in information technology with particular emphasis on the students' areas of specialization.

7211-6 Doctoral Research

1 to 6 hours credit.

May be repeated for credit, but not more than 24 hours may be applied to the Doctoral degree.

7311-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisite: Admission to Candidacy for the Doctoral degree in Business Administration.

May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

**COURSE DESCRIPTIONS
MANAGEMENT OF TECHNOLOGY
(MOT)**

5013 Global Foundations of Management of Technology

(3-0) 3 hours credit. Prerequisites: Consent of instructor.

This course includes an overview of the contemporary business context: leadership of change, legal issues, science and technology policy, and global economic transformation. Elements of decision support systems are introduced, including accounting, finance, and information systems. Strategic paradigms of management of technology are used to integrate the content and give voice to emerging perspectives.

5023 Technological Foundations of Management of Technology

(3-0) 3 hours credit. Prerequisites: Consent of instructor.

This course examines the activities used to transform viable products and processes. Consideration is given to "green design" within a system's context. Design is used as the rubric to integrate the activities. (Same as EGR 5633. Credit cannot be earned for both MOT 5023 and EGR 5633.)

5053 Building Enterprise Equity

(3-0) 3 hours credit. Prerequisite: MKT 5023 or consent of instructor.

An analysis of the role of technology and innovation in modern business practice. Emphasis is on managing technological change to develop business opportunities and competitive advantage. The concepts and tools covered aim to make the task of innovation and product portfolio management more understandable and controllable.

5163 Management of Technology

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Examines a broad range of topics and issues involved in the management of technology, including the international research and development environment and infrastructure; government, industry, and university roles in technology development; managing the research and development function; technology forecasting and assessment; and new product development.

5173 Technology Transfer: The Theory and Practice of Knowledge Utilization

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Technology transfer or diffusion may be defined as the utilization or application of knowledge. The course examines the organizational, behavioral, and communication challenges involved in transferring technology from the research laboratory to the marketplace.

5183 Design of Experiments for Technology Managers

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An applied approach to design of experiments in engineering and scientific settings. Randomized block designs, factorials, two- and three-level factorial and fractional factorial designs, nested and split-plot designs, response surface methods, and robust design methods are studied. Computer statistical packages, including JMP, are used. A project and presentation based on designing an industrial experiment is required.

5203 Strategic Management of Technology

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Development of a conceptual framework for strategy, its definition, elements, and relationships to the basic functions of management of technology. Considers the impact of technology and environmental forces on strategic management of the organization. (Credit cannot be earned for both MOT 5203 and IS 6813.)

5213 Organizational Systems for Management of Technology

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Focuses on organizational systems commonly found in modern organizations dealing with technology, innovation, and creativity. Considers alternative organizing concepts, interfacing and integrating considerations, and decision-making and control systems.

5223 Management of Professional Personnel

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

The study of behavior in professional and technical organizations. Focuses on the characteristics of professional and technical personnel, status and role systems within the professional organization, and communication and conflict within and among professional groups.

5233 Advanced Topics in Project Management

(3-0) 3 hours credit. Prerequisite: MOT 5243 or consent of instructor.

An advanced course that examines contemporary issues in project management. Includes topics such as, the value of project management, organizational project management maturity, project selection models, enterprise project management, and project office implementation. Synthesis and evaluation are emphasized. A basic understanding of project management is required.

5243 Essentials of Project and Program Management

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

This course addresses concepts and techniques for the management of business and technology projects. Includes topics such as, the project life cycle, project planning, project scheduling, project cost estimating, project risk analysis, project control techniques, earned value management, project organizations and functions, project manager responsibilities, and team building.

5253 Starting the High-Tech Firm

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A review of the steps and processes involved in starting a technology-based economic endeavor. The focus is built around the steps of identifying a problem area, identifying potential technological solutions to the identified need, and developing a proposed business entity to commercialize the technology solution.

5313 Emerging Technologies

(3-0) 3 hours credit. Prerequisite: Permission of the Graduate Advisor or consent of instructor.

Examines science-based innovations with the potential to either create or transform a constellation: emerging technologies may involve either a single discovery or a bundle of innovations that converge to create a new technological

system. This course focuses not only on the emergence of technology from basic research to implementation, but also on the commercialization of technology. Seminar format, case-study preparation, presentation, and cooperative learning are defining characteristics of this course.

5323 Biotechnology Industry

(3-0) 3 hours credit. Prerequisite: Permission of the Graduate Advisor or consent of instructor.

An overview of the biotechnology industry, this course includes discussions covering biologics, pharmaceuticals and medical devices from discovery and design through commercialization and marketing. Focus is on strategic issues confronting management of an early stage biotech company from start-up through the venture capital phase. Seminar format, presentation, and cooperative learning are defining characteristics of this course.

6923 Directed Research in Management of Technology

(3-0) 3 hours credit. Prerequisite: Permission of the Graduate Advisor of Record or consent of instructor.

A directed research course to prepare students for MOT 6933, Management of Technology Capstone. The course emphasizes the understanding of scientific research problem solving, including research problems in management of technology, the design and methodology of research solutions to those problems, and the relations between problem and design.

6933 Management of Technology Capstone

3 hours credit. Prerequisite: Permission of the Graduate Advisor of Record or consent of instructor.

Research and preparation of an in-depth study of a complex problem in management of technology. Credit is awarded upon completion of the project, thesis, conference paper, or publishable article. The grade report for this class is either "CR" (satisfactory participation) or "NC" (unsatisfactory participation).

6943 Management of Technology Internship

3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in management of technology. Individual conferences and written reports are required.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the MOT Graduate Programs Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to a Master's degree.

DEPARTMENT OF MANAGEMENT

Master of Business Administration Degree – Health Care Management Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study business administration at the graduate level with particular emphasis in health care management. It will assist students who enter with differing work experience in their quest for managerial roles within a variety of types of health care organizations.

Students choosing to concentrate in health care management must complete the 21 semester credit hours of courses containing the foundations of knowledge.

In addition, students choosing this concentration must complete 12 semester credit hours as follows:

BLW	6553	Legal, Ethical, and Social Issues of Health Care Management
MGT	6123	Health Care Management
MGT	6133	Organizational and Managerial Issues in Health Care Delivery
MGT	6923	Health Care Management Internship*

*Internship to be completed in a health care field. This will allow students to experience the “real” world of American health care management and write a capstone paper.

Doctor of Philosophy Degree in Business Administration with an Emphasis in Organization and Management Studies

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Business Administration with an emphasis in Organization and Management Studies. See page 88 of this catalog for a detailed description of the general requirements for the Doctoral degree. The Doctoral Studies Committee of the Department of Management will advise students admitted to the program who pursue a Ph.D. in Business Administration with an emphasis in Organization and Management Studies.

To satisfy the Major Area Coursework for the Organization and Management Studies emphasis, a student must complete:

1. MGT 7013 Seminar in Organizational Behavior
MGT 7023 Seminar in Organization Theory
MGT 7033 Seminar in Strategic Human Resources
MGT 7043 Foundations of Strategy
MGT 7201-3 Organization and Management Studies Research Colloquium

2. Two directed electives:

MGT	7053	Empirical Approaches to Strategy
MGT	7073	Seminar in Organization and Management Studies

COURSE DESCRIPTIONS MANAGEMENT (MGT)

5003 Conceptual Foundations of Management

(3-0) 3 hours credit.

This course examines the evolution and development of conceptual frameworks for understanding managerial work and organizational processes within the context of changing environments. An integrated strategic management perspective is emphasized.

- 5043 Management and Behavior in Organizations**
 (3-0) 3 hours credit. Prerequisite: MGT 5003 or an equivalent.
 This course examines the processes and techniques used to get work done through others in an organization. These processes include a study of individual differences, motivation, leadership, group behavior, interpersonal communication, decision making, and change. Cross-cultural applications are considered.
- 5053 Organizational Communication**
 (3-0) 3 hours credit. Prerequisite: MGT 5043.
 A survey of theoretical and functional aspects of organizational communication, stressing interpersonal, intra- and interorganizational, and intercultural communication.
- 5093 Leadership**
 (3-0) 3 hours credit. Prerequisite: MGT 5043 or consent of instructor.
 An advanced course in organizational behavior that examines traditional and contemporary perspectives on leadership and the group process toward which leadership is directed. The course includes applications of leadership theory to contemporary organizational problems.
- 5133 Organizational Decision Making**
 (3-0) 3 hours credit. Prerequisite: MGT 5043 or consent of instructor.
 An advanced course in organizational behavior focusing on the behavioral elements of the decision-making process. Drawing on theory and research in several disciplines, the course examines individual, group, and organizational decision-making models. Emphasis on prescriptive models for effective decision making.
- 5153 Social Issues in Business**
 (3-0) 3 hours credit. Prerequisite: MGT 5043.
 Focuses on the forces surrounding the secularly oriented, technologically energized, and scientifically administered business sector of Western society. Develops an understanding of the underlying and basic forces that have fostered and shaped business. Emergence of the social responsibility ethic is examined.
- 5183 Global and Comparative Management**
 (3-0) 3 hours credit. Prerequisite: MGT 5003 or consent of instructor.
 Examination of management challenges facing multinational and international business. Includes the study of organization options, political risk and strategy, staffing, communication, multicultural negotiations, and cross-cultural behavior and management. Emphasis on different countries' approaches to competing, notably East Asia, Mexico, and Europe.
- 5233 International Business Analysis**
 (3-0) 3 hours credit. Prerequisite: MGT 5003, an equivalent, or consent of instructor.
 The opportunity to develop strategic opportunities in international business through the analysis of international trade and other international statistics. Extensive use of the Internet and international databases to find, evaluate, analyze, and develop international business opportunities. Emphasis is on developing export and import trade and transportation opportunities.
- 5243 International Business Strategy**
 (3-0) 3 hours credit. Prerequisite: MGT 5003, an equivalent, or consent of instructor.
 Emphasis on how firms create global bases of sustainable competitive advantage. Examines strategic problems unique to global business competition, including dimensions of perceived environment uncertainty, international entry-mode choices, global sourcing, and creating entry barriers to defendable product markets.
- 5623 Employee Relations/Negotiations**
 (3-0) 3 hours credit. Prerequisite: MGT 5003 or consent of instructor.
 An analysis of various employee relations systems in organizations. Emphasis on various formal and informal discipline, grievance, and appeal systems in private and public organizations, as well as group and individual negotiation and dispute resolution processes.

5633 Effective Negotiating

(3-0) 3 hours credit. Prerequisite: MGT 5003, an equivalent, or consent of instructor.

An advanced course on the theory and processes of negotiation as it is practiced in a variety of settings. The course is designed to be relevant to the broad spectrum of negotiation problems that are faced by the manager and professional.

5643 Management of Personnel and Human Resources

(3-0) 3 hours credit. Prerequisite: MGT 5043 or consent of instructor.

Management's approach to and the techniques for handling the human resources in an organization. An examination of the primary management activities involved in the procurement, development, utilization, and maintenance of its human resources. Course focuses on behavioral and social science findings as they relate to the policy and practice of managing the employment relationship.

5723 Labor Relations in the Public Sector

(3-0) 3 hours credit. Prerequisite: MGT 5043 or consent of instructor.

An analysis of the unique role of labor relations at the federal, state, and local levels. Consideration is given to relevant legislation and how and why public employees organize for collective bargaining. Emphasis is on the practical aspects of bargaining and contract administration and how they relate to the public in general.

5733 Employment Law and Legislation

(3-0) 3 hours credit. Prerequisite: MGT 5043 or consent of instructor.

An analysis of the various laws and administrative rulings having an impact on the employment process of organizations. Focus is on the law as it affects various administrative decisions in recruiting, selection, training, promoting, and other employment areas, including benefits and labor relations.

5813 Strategic Human Resources Management

(3-0) 3 hours credit. Prerequisite: MGT 5643 or consent of instructor.

An examination of the overall role and functions of human resource management in relation to an organization's strategic planning process. Emphasis is on human resource issues of strategic importance to an organization's top management. Course focuses on the broader issues of human resource management policy, practice, and trends.

5903 Strategic Management and Policy

(3-0) 3 hours credit. Prerequisite: Completion of the foundations of knowledge courses or consent of instructor.

A course intended to integrate material taken in the M.B.A. program, as well as to broaden the horizons of the student beyond the focus on the firm. The macroeconomic aspects of the economy and contemporary problems and trends of business are covered. Students who earn a grade of "B" or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of "C" may still satisfy this requirement by successfully passing a comprehensive examination as set out in this catalog.

6123 Health Care Management

(3-0) 3 hours credit. Prerequisite: MGT 5003 or an equivalent.

Introduction to the health care industry, health care management and policy issues, managing in a regulated industry, and health care research issues. Students will have the opportunity to analyze several aspects of the health care industry using organizational and managerial frameworks.

6133 Organizational and Managerial Issues in Health Care Delivery

(3-0) 3 hours credit. Prerequisite: MGT 5003 or an equivalent.

An analysis of the organizational and managerial implications of clinical issues in the delivery of health care. Students have the opportunity to examine quality of care issues and concerns related to patient care that affect how health care organizations are managed.

- 6923 Health Care Management Internship**
3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in health care management. Individual conferences and written reports required.
- 6943 Management Internship**
3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in management. Individual conferences and written reports required.
- 6951-3 Independent Study**
1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the degree.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.
Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the appropriate Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).
- 6971-3 Special Problems**
(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.
An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.
- 6983 Master's Thesis**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.
Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.
- 7013 Seminar in Organizational Behavior**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Critical examination of the theory and research pertaining to individual and group behavior within the context of a larger work organization system.
- 7023 Seminar in Organization Theory**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Critical examination of the theory and research pertaining to the relationships of organization structure and processes to complex environmental conditions. Multiple theoretical paradigms will be examined.

7033 Seminar in Strategic Human Resources

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A critical examination of research linking the management of human resource policies, practices, and deployments in the context of internal and external environments with the performance of the organization.

7043 Foundations of Strategy

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A critical examination of the theoretical foundations of corporate strategy, especially the relationship between strategy and organizational performance.

7053 Empirical Approaches to Strategy

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A critical examination of the empirical foundations of corporate strategy. Emphasis will be placed on the design of empirical studies of strategy.

7073 Seminar in Organization and Management Studies

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Organized course offering the opportunity for specialized study not normally available as part of the regular course offerings. This seminar may be repeated for credit when topics vary, but not more than 6 hours will apply to the Doctoral degree. Topics can include: The Learning Organization, Complex Adaptive Systems, and Special Issues in the Management of Technology.

7201-3 Organization and Management Studies Research Colloquium

1 to 3 hours credit. Prerequisite: Consent of instructor.

Presentation and analysis of research in selected areas of organization and management studies.

7211-6 Doctoral Research

1 to 6 hours credit.

May be repeated for credit upon approval of the Doctoral Studies Committee, but not more than 24 hours may be applied to the Doctoral degree.

7311-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisite: Admission to Candidacy for the Doctoral degree in business.

May be repeated for credit upon approval of the Doctoral Studies Committee, but not more than 12 hours may be applied to the Doctoral degree.

**COURSE DESCRIPTIONS
BUSINESS LAW
(BLW)**

5003 Legal Environment of Business

(3-0) 3 hours credit.

A legal analysis of the ethical and legal environment of business. Includes topics such as the common law, court systems, business torts and crimes, contracts and related areas of the Uniform Commercial Code, agency formation, forms of business organizations, administrative law, employment law, and real and personal property law.

5033 Commercial Law

(3-0) 3 hours credit.

Thorough study of the Uniform Commercial Code and related business transactions, including Bankruptcy and Federal Securities Regulations.

5173 Legal Environment of International Business

(3-0) 3 hours credit. Prerequisite: BLW 5003 or consent of instructor.

Survey of the legal environment of international business and the laws of international commerce. Includes comparative law, treaties and international agreements and contracts, international organizations, the Foreign Corrupt Practice Act, international letters of credit, exports and imports, tariffs, antidumping, the GATT, NAFTA, European Union, foreign investments, international patent laws, and related international legal topics.

6553 Legal, Ethical, and Social Issues of Health Care Management

(3-0) 3 hours credit. Prerequisite: BLW 5003, an equivalent, or consent of instructor.

Introduction to problems, issues, and trends in organized health care delivery with a particular focus on related legal and ethical issues.

6943 Business Law Internship

3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in business law. Individual conferences and written reports required.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

DEPARTMENT OF MANAGEMENT SCIENCE AND STATISTICS

Mission Statement

The mission of the Department of Management Science and Statistics is to offer both undergraduate and graduate educational programs that are of high quality and meet the changing needs of the global community; to provide a supportive learning environment for students; to foster the success of our students in their professional careers; and to create an academic environment that stresses excellence in teaching, intellectual contributions, and service. The Department contributes to the field of knowledge through research and education in the quantitative sciences. Theory and analysis are applied to a variety of interdisciplinary problems to discover new approaches for meeting the challenges of decision making in a global arena of expanding technology and information.

Master of Business Administration Degree – Management Science Concentration

This concentration is designed to offer the opportunity for qualified graduate students to develop expertise in the field of management science while studying business administration. Students are provided the opportunity to learn quantitative methods and to apply these methods to organizational processes to improve the quality of managerial decision making, to improve operational efficiencies, to increase productivity, and to facilitate the timely flow of goods, services, and information. To achieve this end, students can focus their elective courses on the use of modern methodologies and techniques in the analysis and support of managerial decision-making activities, including the application of computer hardware and software.

Students choosing to concentrate in management science must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours of electives from the following:

MS	5303	Decision Support Systems
MS	5323	Statistical Methods for Business Analysis
MS	5343	Logistics Systems Management
MS	5373	Simulation Analysis of Business Systems
MS	5393	Production Operations Management
MS	5423	Service Management and Operations
MS	5453	Management and Control of Quality
MS	5463	Lean Operations and Six Sigma
MS	5473	Logistics System Analysis
MS	5483	Operations Research Methods in Statistics
MS	6943	Management Science Internship
MS	6953	Independent Study
MS	6973	Special Problems

Additionally, a student may request the management science coordinator or chair to substitute other appropriate College of Business graduate electives for one or two of the above courses.

Master of Science Degree in Statistics

The Master of Science (M.S.) degree in Statistics includes instruction in a broad range of statistical methods and computational tools to equip students to pursue careers as government, industrial, or academic statisticians, or to continue to doctoral study in statistics.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, a B.A. or B.S. in mathematics, statistics, or a closely related field is highly recommended as preparation. In particular, the completion of STA 3523 Mathematical Statistics or its equivalent is required for unconditional admission. Those students who do not qualify for unconditional admission should anticipate that additional undergraduate and/or graduate coursework may be required to complete the degree. All applicants are required to submit scores from the Graduate Record Examination (GRE) aptitude test.

Degree Requirements. Candidates for this degree are required to successfully complete 36 semester credit hours as specified below:

A. All candidates for the Master of Science in Statistics must complete the following 21 semester credit hours of coursework:

MAT	5203	Theory of Functions of a Real Variable I (or its equivalent)
MAT	5283	Linear Algebra and Matrix Theory (or its equivalent)
STA	5103	Applied Statistics
STA	5133	Data Analysis with Statistical Software
STA	5503	Mathematical Statistics I
STA	5513	Mathematical Statistics II
STA	5713	Linear Models

B. A candidate for the Master of Science degree in Statistics must complete 6 semester credit hours of coursework chosen from eligible graduate courses in Statistics (STA) within the Department of Management Science and Statistics.

C. A candidate for the Master of Science degree in Statistics must complete 3 semester credit hours of approved coursework chosen from eligible graduate courses in either Mathematics or Statistics.

D. Each student in the Master's program is required either to write a Master's thesis or complete 6 semester credit hours of graduate-level courses in Mathematics, Statistics, or other disciplines as approved by the Graduate Advisor of Record.

E. Each candidate for the degree is required to pass an advanced comprehensive examination in Statistics or successfully defend his or her thesis research results.

Doctor of Philosophy Degree in Applied Statistics with an Emphasis in Biostatistics

In this age of advanced technology, there is an increasing demand for individuals with the expertise in designing experiments and analyzing large complex data sets via the latest advances in computing. In particular, there is a real need for professionals with a Ph.D. in Applied Statistics. Statisticians are in very high demand in the growing biomedical field to develop methods for evaluating the efficacy and safety of new medications/drugs, surgeries, and other treatments and in the cutting edge research of Bioinformatics to assess such topics or protocols as gene therapy, genomics research, aging and many other newly developed issues. The Ph.D. in Applied Statistics combines theory with applications to prepare students to pursue careers in academia, research organizations, government, and private industry.

Program Admissions Requirement. In addition to satisfying the University-wide graduate admission requirements, an M.S. or M.A. in mathematics, statistics, or a closely related field is required. Students who have not earned a qualifying master's degree may be required to complete the equivalent courses in the appropriate background areas before taking doctoral coursework. The admissions requirements consist of:

- A minimum 3.5 grade point average in graduate courses in Statistics and Mathematics.
- A complete core of graduate classes or their equivalents including: MAT 5203 Theory of Functions of a Real Variable I or equivalent, MAT 5283 Linear Algebra and Matrix Theory, STA 5133 Data Analysis with Statistical Software, STA 5503 Mathematical Statistics I, STA 5513 Mathematical Statistics II, and STA 5713 Linear Models. Applications that do not meet these standards will be reviewed on an individual basis.
- A Graduate Record Examination (GRE) score from a recent (no more than five years prior to the application date) administration of the exam.
- Official transcripts of all undergraduate and graduate coursework completed.
- Three letters of recommendation from academic or professional sources familiar with the applicant's background.
- A curriculum vitae and a statement of academic work experiences, interests, and goals.
- International students from non-English speaking countries must also submit a score of at least 550 on the Test of English as a Foreign Language (TOEFL). TOEFL scores may not be more than two years old.
- Applicants may be asked to appear before the admissions committee for a personal interview.

Degree Requirements. Candidates for this degree are required to successfully complete a minimum of 60 semester credit hours beyond the master's degree as specified below:

A. All candidates for the Ph.D. in Applied Statistics must complete the following 15 semester credit hours of coursework:

STA	6133	Simulation and Statistical Computing
STA	6991	Statistical Consulting (to be taken three semesters)
STA	7503	Advanced Inference I
STA	7513	Advance Inference II
STA	7723	Advanced Linear Models

B. All candidates for the Ph.D. in Applied Statistics must complete 15 semester credit hours of approved graduate courses at the 6000 level or higher within the Department of Management Science and Statistics.

C. All candidates for the Ph.D. in Applied Statistics must complete at least 6 semester credit hours of approved elective courses offered by the University of Texas Health Science Center at San Antonio or UTSA.

D. All candidates for the Ph.D. in Applied Statistics must complete 12 semester credit hours of Doctoral Research.

E. All candidates for the Ph.D. in Applied Statistics must complete 12 semester credit hours of Dissertation.

All students in the program will be required to complete a degree plan specifying the courses they will complete within the specialty or track areas selected by the student. This degree plan must be approved by the Doctoral Studies Committee before the end of the second semester of enrollment.

Advancement to Candidacy. Advancement to candidacy requires a student to complete University and Applied Statistics program requirements. After completing the required coursework, students seeking candidacy must also pass written and oral qualifying examinations before being admitted to candidacy for the degree. The written examination is administered by the graduate faculty in the specialization area. Written examinations are scheduled once a year, whereas the oral examination is administered at the discretion of the student's dissertation committee. The oral examination is for the purpose of eliminating any questions of competency related to substantive written exams and serves as a hearing for the student's dissertation proposal. Students will be provided no more than two attempts to pass written qualifying examinations and two attempts to pass the oral qualifying examination. Majority approval of the dissertation examination committee is required to pass the oral examination. The oral examination must be completed within one year of completion of the written examination. Results of the written and oral qualifying examinations must be reported to the Dean of the Graduate School.

Dissertation. Candidates must demonstrate the ability to conduct independent research by completing and defending an original dissertation. The research topic is determined by the student in consultation with his or her supervising professor. A dissertation committee, selected by the student and supervising professor, guides and critiques the candidate's research. The completed dissertation must be formally presented to and approved by the Dissertation Committee.

Following an open presentation of the dissertation findings, the Dissertation Committee conducts a closed meeting to determine the adequacy of the research and any further requirements for completion of the dissertation. Results of the meeting must be reported to the Dean of the College and to the Dean of the Graduate School.

Awarding of the degree is based on the approval of the Dissertation Committee, approved by the Dean of the College. The UTSA Dean of the Graduate School certifies the completion of all University-wide requirements.

COURSE DESCRIPTIONS
MANAGEMENT SCIENCE
(MS)

5003 Quantitative Methods for Business Analysis

(3-0) 3 hours credit. Prerequisites: MAT 1033 and MS 1013, their equivalents, or consent of instructor.

Introduction to managerial decision analysis using quantitative and statistical tools. Course includes a general framework for structuring and analyzing decision problems. Some of the topics include decision theory, statistical techniques (such as analysis of variance, regression, non-parametric tests), introduction to linear programming, and introduction to time series. Uses applicable decision support software.

5023 Decision Analysis and Production Management

(3-0) 3 hours credit. Prerequisite: MS 5003 or an equivalent.

Study of applications of quantitative approaches (such as mathematical programming, networks, stochastic processes, multicriteria analysis, and simulation) to business decision analysis. Emphasis is given to production management applications (such as resource allocation, scheduling, inventory control, capital budgeting) and the use of computerized decision support systems.

5303 Decision Support Systems

(3-0) 3 hours credit. Prerequisite: MS 5023.

Study of systems for supporting managerial and personal/professional decision processes. Topics include review of sample decision support systems, methodologies for identifying decision needs, exploration of analysis tools and related computer technologies and software, survey of expert systems and artificial intelligence applications, and hands-on building of systems.

5323 Statistical Methods for Business Analysis

(3-0) 3 hours of credit. Prerequisite: MS 5003 or an equivalent.

Introduction to multivariate statistical analysis. Typical topics include multiple regression, multiple analysis of variance, logistic regression, discriminant analysis, conjoint analysis, cluster analysis, and factor analysis. Emphasizes the use of computer statistical packages.

5343 Logistics Systems Management

(3-0) 3 hours credit.

Study of business logistics: the process of planning, implementing, and controlling the flow and storage of goods or services and related information from point of origin to point of consumption to achieve customer satisfaction. Focuses on the cost and value added to products or services by making them available in the desired condition when and where they are needed.

5373 Simulation Analysis of Business Systems

(3-0) 3 hours credit. Prerequisite: MS 5023.

Study of computer simulation techniques in the analysis of business decision situations. Currently available tools, including general purpose simulation languages, spreadsheets, and graphics programs, are explored. Applications from a wide spectrum of areas are discussed.

5393 Production Operations Management

(3-0) 3 hours credit. Prerequisite: MS 5023.

Survey of the body of knowledge concerning the management of operations. Considers manufacturing and service principles. The course reviews a variety of topics necessary in the field of production and inventory management, including logistics and distribution processes. The unique nature of service operations is stressed.

5423 Service Management and Operations

(3-0) 3 hours credit.

Focuses on understanding the variety of service industries (both profit and nonprofit) and the growing importance of the service industry to the economy. In addition to the traditional topics of quality, customer satisfaction and value creation, additional topics include service encounters, service design and development, service productivity, and globalization of services. Tools and techniques for management service operations are also emphasized.

5453 Management and Control of Quality

(3-0) 3 hours credit. Prerequisite: MS 5023.

An examination of the fundamental nature of quality assurance, its strategic importance in business and industry, and the economic impact of quality. Theoretical and management issues relating to quality problem solving are emphasized. The contribution of the leaders in modern quality management are discussed.

5463 Lean Operations and Six Sigma

(3-0) 3 hours credit.

Course provides an introduction to Six Sigma methodologies and is designed to present the fundamentals of Six Sigma and instill an understanding of what is required to build a sustainable Six Sigma structure. Lean tools, such as physical maps, time value, and Kanban are included as well as advanced Six Sigma statistical tools.

5473 Logistics System Analysis

(3-0) 3 hours credit.

The design and management of logistics systems for firms of varying size and differing supply and market conditions. This course relies upon heavy use of computer-assisted cases and problems to illustrate and integrate issues found in materials management and distribution organizations.

5483 Operations Research Methods in Statistics

(3-0) 3 hours credit. Prerequisite: Consent of Instructor.

Theory and applications of mathematical programming techniques applied to statistical analysis. Mathematical topics such as linear, integer and quadratic program theory and algorithms will be covered. Support vector machines as an application of quadratic programming will be introduced. Mathematical programming techniques for regression and classification analysis will be discussed. Simulation methods for jackknife and bootstrap estimation and or stochastic analysis will also be covered.

6943 Management Science Internship

3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in management science. Individual conferences and written reports required.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

- 6983 Master's Thesis**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.
Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.
- 7033 Applications in Causal Structural Modeling**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
An advanced treatment of causal modeling, including reviews of path analysis, covariance algebra, creating path diagrams, and structural equations, LISREL notation and syntax, confirmatory factor analysis and its extensions.

COURSE DESCRIPTIONS STATISTICS (STA)

- 5073 Methods of Statistics I**
(3-0) 3 hours credit. Prerequisite: STA 1053.
Emphasis on methods and applications of statistics. Measure of location, variability, and association. Interpretation of categorical data, hypothesis testing, and use of SAS programs and applications. Cannot be applied to a Master of Science degree in Statistics.
- 5083 Methods of Statistics II**
(3-0) 3 hours credit. Prerequisite: STA 5073.
A continuation of STA 5073, with emphasis on linear statistical models. Use of SAS programs and applications. Topics in applied statistics may include maximum likelihood estimation and its properties, and likelihood ratio tests. Procedures in regression and model fitting, transformations of data, analysis of variance, and others. Cannot be applied to a Master of Science degree in Statistics.
- 5103 Applied Statistics**
(3-0) 3 hours credit. Prerequisite: STA 3523 or consent of instructor.
Simple linear model, noncentral distributions, other graphical displays, correlation, multiple regression, nonlinear regression, one-way analysis of variance, fixed effects model, random effects model, higher-order classifications, mixed model, model selection, analysis of covariance, and regression formulation of classification models.
- 5133 Data Analysis with Statistical Software**
(3-0) 3 hours credit. Prerequisites: CS 1713 and STA 3523, or their equivalents.
Statistical analysis of data sets using SAS, S-Plus, and other popular statistical software. Manipulation of data sets and production of reports and graphs. Emphasis is on linear models and basic multivariate procedures.
- 5213 Advanced Statistical Quality Control**
(3-0) 3 hours credit. Prerequisite: EGR 5093 or consent of instructor.
Methods and techniques for process control, process and gage capability analyses, inspection plans, American National Standards, and recent advanced techniques. Use of statistical software including JMP. Tour of manufacturing industry. Case studies in process control outgoing quality and costs. A required project, assigned by a manufacturing company, must be presented. This course is designed for technology managers and engineers and cannot be applied to a Master of Science degree in Statistics.

5233 Product and Manufacturing Reliability

(3-0) 3 hours credit. Prerequisite: EGR 5093 or consent of instructor.

Topics include product and manufacturing reliability from managerial, engineering, and statistical perspectives. Emphasis on component and system reliability estimation, testing, and demonstration. Advanced topics such as accelerated life tests, Bayesian procedures, system availability, system maintainability, and compliance with international standards are addressed. Methods and theory are supported through data analytic packages such as JMP, SAS, and S-Plus. This course is designed for technology managers and engineers and cannot be applied to a Master of Science degree in Statistics.

5253 Applied Time Series Analysis

(3-0) 3 hours credit. Prerequisite: STA 3523 or consent of instructor.

Modern techniques for time series analysis and their applications. Principles of model building. Regression methods, moving averages, and autoregressive integrated moving average models. Practical examples drawn from various application environments. Use of software such as MINITAB, SAS, and S-Plus in time series analysis.

5313 Theory of Sample Surveys with Applications

(3-0) 3 hours credit. Prerequisite: STA 3523.

Basic sampling techniques and their comparisons for finite populations. Topics include simple random sampling, stratified sampling, ratio and regression estimates, systematic sampling, cluster sampling, multistage and double sampling, and bootstrap and other sampling plans.

5413 Nonparametric Statistics

(3-0) 3 hours credit. Prerequisite: STA 3523 or consent of instructor.

Order statistics, test of goodness of fit, rank-order statistics, linear rank statistics for problems involving location and scale, association in multiple classifications, and asymptotic relative efficiency.

5503 Mathematical Statistics I

(3-0) 3 hours credit. Prerequisites: STA 3513 and STA 3523.

Axioms of probability, random variables and probability distributions, sampling distributions, and stochastic convergence.

5513 Mathematical Statistics II

(3-0) 3 hours credit. Prerequisite: STA 5503.

Sufficient statistics, unbiased estimation, likelihood ratio test, sequential probability ratio test, and decision theory.

5713 Linear Models

(3-0) 3 hours credit. Prerequisites: MAT 2233 and either STA 5103 or consent of instructor.

Introduction to matrices and their applications in statistics, distribution of quadratic forms, multivariate normal and theory for the full rank and less than full rank models, including multiple regression and analysis of variance models.

5803 Process Control and Acceptance Sampling

(3-0) 3 hours credit. Prerequisite: STA 3523 or consent of instructor.

Introduction to statistical process control and product inspection plans. Topics include control charts by attributes and variables, special control charts, specification limits, process capability, and acceptance sampling plans by attributes and variables. Use of statistical software.

5813 Applied Multivariate Statistics

(3-0) 3 hours credit. Prerequisites: MAT 2233 and either STA 3523 or consent of instructor.

Principal components, factor analysis, cluster analysis, multidimensional scaling, discriminant analysis, multivariate normal distribution, estimation of mean vector and covariance matrix, Hotelling's T^2 , and tests concerning covariance matrices.

- 5853 Analysis of Categorical Data**
(3-0) 3 hours credit. Prerequisite: STA 3523 or consent of instructor.
Types of categorical data, cross-classification of tables, tests for independence, measures of association, loglinear models for multi-dimensional tables. Logit models and analogies with regression. Specialized methods for ordinal data.
- 5903 Survival Analysis**
(3-0) 3 hours credit. Prerequisite: STA 5513 or consent of instructor.
This course introduces both parametric and nonparametric methods for analyzing censored survival data. Topics include Kaplan-Meier estimator, inference based on standard lifetime distributions, regression approach to survival analysis including the proportional hazards model. Emphasis on application and data analysis using SAS and S-Plus.
- 5973 Directed Research**
3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.
- 6113 Applied Bayesian Statistics**
(3-0) 3 hours credit. Prerequisite: STA 5503 or consent of instructor.
Probability and uncertainty, conditional probability and Bayes' Rule, posterior analysis for commonly used distributions, prior distribution elicitation, Bayesian methods in linear models, Bayesian computation using software, and applications.
- 6133 Simulation and Statistical Computing**
(3-0) 3 hours credit. Prerequisite: STA 5103 or consent of instructor.
Random variable generation, Monte Carlo integration, Markov chain Monte Carlo simulation, Monte Carlo optimization, Gibbs sampling and Metropolis-Hastings algorithm.
- 6833 Design and Analysis of Experiments**
(3-0) 3 hours credit. Prerequisite: STA 3523, STA 5513, or consent of instructor.
Introduction to experimental design and data analysis in scientific and engineering settings. Topics include one-factor experiments, randomized block designs, factorials, two- and three-level factorial and fractional factorial designs, nested and split-plot designs, response surface methods, and Taguchi methods. Use of statistical software. (Formerly STA 5833. Credit cannot be earned for both STA 6833 and STA 5833.)
- 6913 Bioinformatics and Data Mining I: Microarray Data Analysis**
(3-0) 3 hours credit. Prerequisite: STA 3523, STA 4713, or consent of instructor.
This course provides a detailed overview of statistical methods used in microarray and proteomics data analysis and exploits the design of such experiments. The topics include introduction to genome biology and microarray technology, R programming and Bioconductor, pre-processing, normalization, microarray experimental design and analysis, multiple testing, LIMMA, dimension reduction in microarray, cluster analysis, and classification in microarray experiments. (Formerly STA 5913. Credit cannot be earned for both STA 6913 and STA 5913.)
- 6953 Independent Study**
3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either “CR” (satisfactory performance on the Comprehensive Examination) or “NC” (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

6983 Master’s Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master’s degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6991 Statistical Consulting

(1-0) 1 hour credit. Prerequisite: Background in regression analysis and experimental design.

The principles dealing with the basic art and concepts of consulting in statistics. This course discusses the role and responsibilities of applied statisticians, relationship between clients and consultants, and effective report writing, etc. Each student is assigned at least one consulting problem and is required to submit a comprehensive final report. May be repeated for credit, but not more than 3 hours can be applied to the Doctoral degree.

7013 Advanced Applied Business Statistical Methods

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Methods and applications of statistics. Topics include basic probability theory, probability distributions of both discrete and continuous random variables, expectations, moments, distributions of functions of random variables, sampling distributions, estimations of population parameters, and hypothesis testing. Nonparametric statistical techniques and their applications to business research will also be covered in the course. Statistical computer software such as SAS or SPSS will be used in the course for data analysis. This course is designed for doctoral students in Business and cannot be applied to a Master of Science degree in Statistics without consent of the instructor and prior approval from the Graduate Advisor of Record.

7023 Applied Linear Statistical Models

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An in-depth study of regression and analysis of variance models. Topics include multiple regression and model building, multiple and partial correlation, analysis of residuals, analysis of variance, multivariate analysis of variance, analysis of variance as regression analysis, generalized linear model, and applications of statistical models to problems in business. Computer software packages such as SAS or SPSS will be used for data analysis. This course is designed for doctoral students in Business and cannot be applied to a Master of Science degree in Statistics without consent of the instructor and prior approval from the Graduate Advisor of Record.

7033 Multivariate Statistical Analysis

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An advanced treatment of multivariate statistical techniques. Topics include multivariate normal distribution, multivariate tests of hypotheses, confidence regions, principal component analysis, factor analysis, discrimination and classification analysis, and clustering. Computer software packages such as SAS or SPSS will be used for data analysis. This course is designed for doctoral students in Business and cannot be applied to a Master of Science degree in Statistics without consent of the instructor and prior approval from the Graduate Advisor of Record.

- 7083 Time Series Analysis**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Univariate and multivariate time series analysis of economic and financial data, autoregressive integrated moving average (ARIMA) models and vector autoregression, out-of-sample forecasting using computer software. Unit roots, cointegration and error correction, and ARCH models. This course is designed for doctoral students in Business and cannot be applied to a Master of Science degree in Statistics without consent of the instructor and prior approval from the Graduate Advisor of Record.
- 7113 Bayesian Statistics**
(3-0) 3 hours credit. Prerequisite: STA 5513 or consent of instructor.
Topics include single parameter Bayesian analysis, prior distribution: informative and noninformative priors, multiple parameter Bayesian analysis, Bayesian computation, Bayesian hierarchical models and empirical models, Bayesian model checking, Bayesian applications to generalized linear models, and Bayesian decision theory.
- 7211-6 Doctoral Research**
1 to 6 hours credit.
May be repeated for credit, but not more than 12 hours may be applied toward the Doctoral degree.
- 7311-6 Doctoral Dissertation**
1 to 6 hours credit. Prerequisite: Admission to candidacy for Doctoral degree in Applied Statistics.
May be repeated for credit, but not more than 12 hours may be applied toward the Doctoral degree.
- 7503 Advanced Inference I**
(3-0) 3 hours credit. Prerequisite: Doctoral standing.
Limit theorems and asymptotic methods for density estimation, the convergence of computational methods, such as the EM algorithm, and others. Development of expansion methods needed in advanced inferences such as Taylor series expansions, Edgeworth expansions, and saddle point methods for approximating likelihood solutions, asymptotics via derivatives of functionals, and resampling methods, such as the bootstrap and jackknife, robustness, and estimation for dependent data.
- 7513 Advanced Inference II**
(3-0) 3 hours credit. Prerequisite: STA 7503.
The advanced theory of statistical inference, including the general decision problem; Neyman-Pearson theory of testing hypotheses; the monotone likelihood ratio property; unbiasedness, efficiency, and other small sample properties of estimators; asymptotic properties of estimators, such as second order efficiency, likelihood ratio tests (LRT), other likelihood procedures using computational methods, general sequential procedures such as the sequential probability ratio test (SPRT), and conditional inference.
- 7723 Advanced Linear Models**
(3-0) 3 hours credit. Prerequisite: STA 5713 or consent of instructor.
Topics include generalized linear models, analysis of repeated measures, random and mixed effects models, topics in longitudinal data analysis. Topics may be deleted or added at the discretion of the instructor.
- 7813 Advanced Multivariate Analysis**
(3-0) 3 hours credit. Prerequisite: STA 5813 or consent of instructor.
Multivariate analysis of variance, discriminant functions for group separation, classification of observations into groups, multivariate regression, canonical correlation, principal component analysis, factor analysis, path analysis and structural equation modeling.
- 7853 Advanced Categorical Data Analysis**
(3-0) 3 hours credit. Prerequisite: STA 5503, STA 5853, or consent of instructor.
Models for multinomial responses, models for matched pairs and more complex repeated categorical response data, generalized linear mixed models for categorical responses. Asymptotic theory for parametric models, alternative estimation theory for parametric models.

7903 Advanced Survival Analysis: Counting Process Approach

(3-0) 3 hours credit. Prerequisite: STA 5903 or consent of instructor.

This course extends the Cox model to multiple event data using a counting process approach. The topics include counting processes, estimation of the survival and hazard functions, Cox model, residual and influence analysis, testing proportional hazard, multiple events model, frailty models, and S-Plus and SAS programming.

7923 Bioinformatics and Data Mining II: Data Mining

(3-0) 3 hours credit. Prerequisite: STA 3523, STA 4713, or consent of instructor.

This course provides an overview of machine learning (data mining) tools in analyzing the vast amounts of data found in biology, business, and other high-tech industries. The topics include introduction to Machine Learning and Data Mining, R Programming, data gathering and cleansing, Linear Methods, Additive Models, Model Assessment, Classification and Regression Trees (CART), Boosting and Random Forest, Neural Networks, Support Vector Machines, Nearest-Neighbor Classification, Cluster Analysis, Association Rules, visualization, and Applications to Microarray data analysis. (Formerly STA 5923. Credit cannot be earned for both STA 7923 and STA 5923.)

DEPARTMENT OF MARKETING

Master of Business Administration Degree – Marketing Management Concentration

This concentration is designed to offer qualified graduate students the opportunity to study business administration while developing special expertise in marketing management. To achieve these ends, students focus their elective courses in the area of marketing.

Students choosing to concentrate in marketing management must complete the 21 semester credit hours of courses containing the foundations of knowledge and 12 semester credit hours of graduate marketing courses as follows:

MKT 5063 Marketing Research Design and Application
9 semester credit hours of graduate marketing elective courses beyond MKT 5023 Marketing Management

Master of Business Administration Degree – Tourism Destination Development Concentration

This concentration is designed to offer qualified graduate students the opportunity to study business administration while developing special expertise in the development of a destination marketing organization, country, state, region or city. To achieve these ends, students will focus their elective courses in the area of tourism.

Students choosing to concentrate in tourism destination development must complete the 21 semester credit hours of M.B.A. courses containing the foundations of knowledge and an additional 12 semester credit hours of graduate tourism elective courses from the following:

MKT 5303 Destination Strategic Planning
MKT 5313 Marketing and Selling a Destination
MKT 5323 Managing Public Policy Issues
MKT 6933 Internship in a Destination Marketing Organization
MKT 6963 Independent Study in Tourism
MKT 6973 Special Problems

COURSE DESCRIPTIONS MARKETING (MKT)

5003 Introduction to Marketing

(3-0) 3 hours credit.

Examination of marketing in society and the firm. Functions, institutions, processes, methods, and issues will be examined. Emphasis is on marketing decision making.

5023 Marketing Management

(3-0) 3 hours credit. Prerequisites: ACC 5003, ECO 5003, FIN 5003, and MKT 5003, or their equivalents. Completion of or concurrent enrollment in ACC 5023 is recommended.

An analysis of marketing management processes within organizations. Focus is on the use of strategic planning and market analysis to design marketing programs in competitive environments.

5043 Consumer Behavior in Marketing Strategy

(3-0) 3 hours credit. Prerequisite: MKT 5023 or an equivalent.

The study of consumer behavior as the basis for marketing opportunities. Analyzes and evaluates contemporary models of consumer behavior as a guide to organizational decision making.

5063 Marketing Research Design and Application

(3-0) 3 hours credit. Prerequisite: MKT 5023 or an equivalent.

Reviews the methodology essential to marketing's role of guiding the firm's production, distribution, pricing, and communication efforts through marketing research, including designing and conducting customer research, and analyzing and communicating research results.

5083 Advertising and Promotion Management

(3-0) 3 hours credit. Prerequisite: MKT 5023 or an equivalent.

The use of communication processes and programs to attain promotional goals; examination of mass and interpersonal forms of communication, and the uses of sales promotion tools.

5303 Destination Strategic Planning

(3-0) 3 hours credit.

A thorough analysis of the strategic planning and implementation process within destination marketing organizations including managing stakeholders groups, destination audits, visitor research, the role of marketing and branding of the destination, managing human resources and various organizational structures.

5313 Marketing and Selling a Destination

(3-0) 3 hours credit.

Examination of marketing planning and implementation with specific focus on developing a marketing plan, advertising agency selection, market research, selling to marketing intermediaries and meeting planners, convention facility marketing and sales, the role of the website, visitor guides, public relations and film commissions.

5323 Managing Public Policy Issues

(3-0) 3 hours credit.

Examination of the current and relevant issues regarding public policy issues impacting destination marketing organizations. This includes such topics as collection and disbursement of hotel occupancy taxes, contractual relations with and accountability to governing authorities, selection of advertising agencies, determining advisory board structures, managing relationships with industry organizations, economic impact studies, managing capacity and demand within destinations, and education of public as to the value of tourism.

5673 International Marketing

(3-0) 3 hours credit. Prerequisite: MKT 5023 or an equivalent.

Analysis of global marketing strategies, including an examination of the cultural, economic, and political dimensions. Focus is on developing alternative market entry strategies and managing longer-term competitive marketing adjustments.

5963 International Business Internship

3 hours credit. Prerequisites: Consent of instructor and the student's Graduate Advisor of Record.

Work experience in international business or a public agency.

5983 International Business Essay

3 hours credit. Prerequisites: Consent of instructor and the student's Graduate Advisor of Record.

Original research report on an international management topic.

6933 Internship in a Destination Marketing Organization

3 hours credit. Prerequisites: Graduate standing and completion of all 21 foundations of knowledge courses and 9 hours of elective courses in the concentration. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record.

All candidates for a Master of Business Administration degree with a Concentration in Tourism Destination Development will complete a "capping" experience to their academic studies. The supervised full- or part-time internship will be in either a domestic or international destination marketing organization subject to approval of the faculty internship coordinator and the Graduate Advisor of Record. Participants may or may not receive compensation from the sponsoring destination marketing organization.

6943 Marketing Internship

3 hours credit. Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time off-campus work experience and training in marketing. Individual conferences and written reports required.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6963 Independent Study in Tourism

3 hours credit. Prerequisites: Graduate standing and permission, in writing (form available) by the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member regarding the management of a destination marketing organization. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings; examples include Brand Management, Services Marketing, Sales Management, Multicultural Marketing, and topics in Tourism Management. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

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COLLEGE OF
EDUCATION
AND HUMAN
DEVELOPMENT

COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

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COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

The College of Education and Human Development offers the following degrees: Master of Arts Degree in Bicultural-Bilingual Studies, Master of Arts Degree in Counseling, Master of Arts Degree in Education, Master of Education Degree in Educational Leadership and Policy Studies, Doctor of Education Degree in Educational Leadership, Doctor of Philosophy Degree in Counselor Education and Supervision, and Doctor of Philosophy Degree in Culture, Literacy, and Language.

Master of Arts Degree in Education

The Master of Arts (M.A.) degree in Education offers the opportunity for advanced study and professional development programs in six fields of concentration in the following departments:

Department of Health and Kinesiology

Kinesiology and Health Promotion Concentration

Department of Interdisciplinary Learning and Teaching

Curriculum and Instruction Concentration

Early Childhood and Elementary Education Concentration

Instructional Technology Concentration

Literacy Education Concentration

Special Education Concentration

Education concentrations provide specialized degree plans in one or more areas of program emphasis so that students may choose a plan suitable to their needs and objectives. Degree plans are designed to offer the opportunity to gain advanced levels of knowledge and professional competency for students engaged in or concerned about educational activity in schools, colleges, and other public or private institutions and agencies. Credit toward graduate-level certificates and certificate endorsements may be earned in conjunction with work toward the Master's degree in most programs. Programs with a thesis option emphasize the development of research competencies critical to continued graduate-level study.

Program Admission Requirements. Applicants without adequate preparation in education may be required to complete preparatory courses as a condition of admission. Individuals who do not meet the University-wide graduate admission grade point average standard may be required to submit Graduate Record Examination (GRE) scores for consideration in admission decisions. Some concentrations may also require GRE scores because of licensing regulations. Contact the Graduate Advisor of Record for the M.A. in Education for more information.

Degree Requirements. Education degrees have four required components: a core of common courses, a program emphasis, support work, and a comprehensive examination.

A. Core courses common to all concentrations:

C&I	5003	Theory and Dynamics of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Contemporary Educational Philosophy

B. Program emphasis. The program emphasis must consist of at least 12 semester credit hours in one of the fields of concentration. Some concentrations offer more than one program emphasis. A program emphasis may require up to 24 semester credit hours. Courses outside the specific concentration may be used to meet this requirement with advance approval of the student's program advisor and the Graduate Advisor of Record. See individual concentration listings or contact the Graduate Advisor of Record for the M.A. in Education for more information.

- C. Support work. Each student is required to select additional courses, with the approval of the program advisor and the Graduate Advisor of Record, to complete the degree requirements of 33 semester credit hours (with thesis) or 36 hours (without thesis). Nine semester credit hours must support the concentration. Three additional hours must be taken with the approval of the Graduate Advisor of Record. In some degree programs, support work may consist of additional courses in the area of concentration.

Students in some programs may take support courses in their teaching fields. Students in teacher certification programs may take their support work courses in areas that meet certification requirements. It is recommended that thesis students take an appropriate statistics course or an additional research course as part of the support work.

- D. Comprehensive examination. The comprehensive examination committee for each concentration is responsible for preparing and administering the examination. The examination may be repeated, but a student who has failed the examination two times must have the permission of the Graduate Program Committee in order to take the examination additional times. Normally, failure to pass the examination should be followed by additional coursework or other work to remedy deficiencies or areas of weakness before the examination is retaken.

Summary of Degree Options

Option I. Thesis option (33 semester credit hours):

- A. Core. 12 semester credit hours required:

C&I	5003	Theory and Dynamics of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Contemporary Educational Philosophy

- B. Concentration. 12 semester credit hours of coursework to form a program emphasis in a single concentration.

- C. Support work. 3 semester credit hours in an approved statistics course or an additional research course.

- D. Thesis. 6 semester credit hours:

EDU	6983	Master's Thesis (taken twice for a total of 6 hours)
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Option II. Nonthesis option (36 semester credit hours):

- A. Core. 12 semester credit hours required:

C&I	5003	Theory and Dynamics of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Contemporary Educational Philosophy

- B. Concentration. At least 12 semester credit hours of coursework to form a program emphasis in a single concentration.

- C. Support work. No more than 12 semester credit hours as follows:

9 hours of support courses
3 hours of approved electives

DIVISION OF BICULTURAL-BILINGUAL STUDIES

Master of Arts Degree in Bicultural-Bilingual Studies

The Master of Arts degree in Bicultural-Bilingual Studies is designed to respond to a variety of societal needs through advanced multidisciplinary study in language, culture, and related disciplines. It has concentrations in Bicultural-Bilingual Education, Bicultural Studies, and English as a Second Language.

Program Admission Requirements. The Division of Bicultural-Bilingual Studies offers an interdisciplinary program that encourages applicants from a wide range of disciplines. Applicants who do not meet University-wide requirements for unconditional admission may be admitted conditionally if scores from the Graduate Record Examination (GRE), letters of recommendation, and/or previous work in the field provide evidence of academic potential. Information on the GRE and applications for the test may be obtained from the UTSA Testing Center or from the Educational Testing Service, Princeton, New Jersey 08540. The institution code for The University of Texas at San Antonio is 6919 for the GRE.

Degree Requirements. Degree candidates are required to complete successfully a 36-semester-credit-hour program. Upon completion of at least 30 semester credit hours of coursework, the candidate is required to pass a written and oral comprehensive examination.

Candidates for the concentration in Bicultural-Bilingual Education must demonstrate proficiency in a second language.

Candidates for the concentrations in Bicultural Studies and English as a Second Language are required to give evidence of second language learning experiences acceptable to the division's Graduate Program Committee.

Bicultural-Bilingual Education Concentration

This concentration is offered for students interested in advanced study in the design and implementation of bicultural-bilingual education programs. This interdisciplinary course of study presents systematic instruction in bilingualism, cultural dynamics, and applied linguistics. It also includes an examination of theory and research related to effective bilingual education. The Master's degree is offered under two options: thesis and nonthesis.

Degree Requirements. Degree candidates must complete the following:

Option 1. Nonthesis Option

A. Required coursework. 30 semester credit hours of coursework from six major areas as follows:

Sociocultural Studies (6 hours from the following):

BBL	5003	Foundations for Bicultural Studies
BBL	5013	Multicultural Groups in the United States
BBL	5023	Cultural Adaptation in Bilingual Societies
BBL	5073	Psychosocial Processes in Bicultural-Bilingual Environments
BBL	5123	Sociolinguistics and Education
BBL	5133	Latino Biculturalism in the United States
BBL	6223	Anthropology and Education in Multicultural Contexts

Bilingual Education Theory (3 hours):

BBL	5113	Theoretical Foundations of Bicultural-Bilingual Education
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Linguistics and Second Language Studies (3 hours from the following):

ESL	5003	Linguistics for Second Language and Bilingual Specialists
ESL	5013	Foundations of Second Language Acquisition

Bilingual Teaching Methodology (6 hours from the following):

BBL	5033	Bilingual Content Instruction
BBL	5063	Biliteracy in Bilingual Classrooms
BBL	5143	Communication in Bilingual Classrooms
BBL	5193	Multicultural Literature for Children

Research and Assessment (6 hours):

BBL	5053	Assessment in Bilingual and Second Language Studies
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and 3 hours from the following:

BBL	6043	Bilingual Education Research
BBL	6063	Research Methods in Bilingual and Second Language Studies

English as a Second Language (6 hours from the following):

ESL	5033	Second Language Reading and Writing
ESL	5053	Approaches to Second Language Instruction
ESL	5063	Language and Content-Area Instruction

B. Electives (6 hours):

6 semester credit hours of graduate elective coursework in Bicultural-Bilingual Studies, English as a Second Language, or in approved related areas.

Option II. Thesis Option

A. Required coursework. 30 semester credit hours of coursework from six major areas as follows:

Sociocultural Studies (6 hours from the following):

3 hours from:

BBL	5003	Foundations for Bicultural Studies
BBL	5013	Multicultural Groups in the United States
BBL	5023	Cultural Adaptation in Bilingual Societies
BBL	5073	Psychosocial Processes in Bicultural-Bilingual Environments

3 hours from:

BBL	5123	Sociolinguistics and Education
BBL	5133	Latino Biculturalism in the United States
BBL	6223	Anthropology and Education in Multicultural Contexts

Bilingual Education Theory (3 hours):

BBL	5113	Theoretical Foundations of Bicultural-Bilingual Education
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Linguistics and Second Language Studies (6 hours from the following):

ESL	5003	Linguistics for Second Language and Bilingual Specialists
ESL	5013	Foundations of Second Language Acquisition
ESL	5083	Pedagogical Grammar

Bilingual Teaching Methodology (6 hours from the following):

BBL	5033	Bilingual Content Instruction
BBL	5063	Biliteracy in Bilingual Classrooms
BBL	5143	Communication in Bilingual Classrooms
BBL	5173	Sociocultural Issues and the Teaching of Reading
BBL	5193	Multicultural Literature for Children

Research and Assessment (9 hours):

BBL	5053	Assessment in Bilingual and Second Language Studies
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and 6 hours from the following:

BBL	6003	Research Design and Inquiry in Bicultural-Bilingual Studies
BBL	6043	Bilingual Education Research
BBL	6063	Research Methods in Bilingual and Second Language Studies
BBL	6073	Ethnographic Research Methods in Bicultural-Bilingual Settings
BBL	6093	Chicana/Latina Feminist Methodologies
ESL	6013	Second Language Acquisition Research

B. Master's Thesis (6 semester credit hours of Master's Thesis).

Bicultural Studies Concentration

This program concentration offers students the opportunity to pursue interdisciplinary study of cultural diversity and sociocultural dynamics in multicultural societies. Emphasis is on the study of biculturalism in the United States. Courses are designed for students with professional, policy, and research interests in intercultural relations within the various institutional settings of society, including business, education, government, health, social services, and cultural organizations. The curriculum complements a wide range of academic backgrounds including the humanities, social sciences, public policy, and business. At least 21 semester credit hours must be courses with a BBL designation. The Master's degree is offered under two options: thesis and nonthesis.

Degree Requirements. Degree candidates must complete the following 36 semester credit hours of coursework:

A. Required coursework. 30 semester credit hours of coursework from four major areas as follows:

Sociocultural Foundations (12 hours):

BBL	5003	Foundations for Bicultural Studies
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9 additional semester credit hours, selected from the following:

BBL	5013	Multicultural Groups in the United States
BBL	5023	Cultural Adaptation in Bilingual Societies
BBL	5073	Psychosocial Processes in Bicultural-Bilingual Environments

BBL	5133	Latino Biculturalism in the United States
BBL	6033	Topics in Bicultural Studies (Consult the program advisor)
BBL	6223	Anthropology and Education in Multicultural Contexts

Historical Foundations (3 hours from the following):

HIS	5263	History of The Spanish Borderlands
HIS	5303	Twentieth-Century Texas
HIS	5313	South Texas: Rural and Urban
HIS	5423	Colonial Mexico
HIS	5433	Modern Mexico
HIS	6173	Latina/os in the United States

Expressive Culture and Language Diversity (9 hours from the following):

AHC	5823	Topics in Mesoamerican Pre-Columbian Art
AHC	5843	Topics in Latin American Colonial Art
AHC	5853	Topics in Contemporary Latin American Art
BBL	5043	Ethnography of Communication
BBL	5093	Multicultural Art and Folklore in the United States
BBL	5123	Sociolinguistics and Education
BBL	5193	Multicultural Literature for Children
ESL	5003	Linguistics for Second Language and Bilingual Specialists
SPN	5473	Latin American Civilization
SPN	5483	Studies in Hispanic Culture
SPN	5803	Mexican American Literature
SPN	5853	Spanish of the Southwest

Research Foundations (6 hours from the following):

BBL	6003	Research Design and Inquiry in Bicultural-Bilingual Studies
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and one of the following:

BBL	6053	Assessment in Bicultural-Bilingual Communities
BBL	6073	Ethnographic Research Methods in Bicultural-Bilingual Settings
BBL	6093	Chicana/Latina Feminist Methodologies

B. *Option I.* 6 semester credit hours of Master's Thesis

OR

Option II. 6 semester credit hours of graduate elective coursework in Bicultural-Bilingual Studies, English as a Second Language, or approved related areas.

English as a Second Language Concentration

This program of study is designed for students interested in teaching English as a Second Language (ESL) to children or adults in schools and programs in the United States or in international settings. It is an interdisciplinary program that presents systematic instruction in applied linguistics, second language acquisition theory, and ESL program implementation. Students must take at least 21 semester credit hours of English as a Second Language courses and 9 hours of Bicultural-Bilingual Studies courses. The Master's degree is offered under two options: thesis and nonthesis.

Degree Requirements. Degree candidates must complete the following 36 semester credit hours of coursework:

A. Required coursework. 30 semester credit hours of coursework from four major areas as follows:

Language Theory and Language Use (9 hours):

ESL	5003	Linguistics for Second Language and Bilingual Specialists
ESL	5013	Foundations of Second Language Acquisition
ESL	5083	Pedagogical Grammar
		or
BBL	5123	Sociolinguistics and Education

Classroom Practice and Program Designs (12 hours from the following):

BBL	5053	Assessment in Bilingual and Second Language Studies
ESL	5053	Approaches to Second Language Instruction

and 3 hours from the following:

ESL	5033	Second Language Reading and Writing
ESL	6043	Family and Adult Literacy in Language Minority Communities
ESL	6063	Advanced Second Language Literacy

and 3 hours from the following:

ESL	5043	Listening and Speaking in Second Language Programs
ESL	5063	Language and Content-Area Instruction
ESL	5073	Computer Assisted Language Learning
ESL	6053	Program and Syllabus Design
ESL	6941-3	Internship in English as a Second Language

Research (6 hours from the following):

ESL	6013	Second Language Acquisition Research
BBL	6063	Research Methods in Bilingual and Second Language Studies
		or
BBL	6073	Ethnographic Research Methods in Bicultural-Bilingual Settings

Sociocultural Studies (3 hours from the following):

BBL	5003	Foundations for Bicultural Studies
BBL	5013	Multicultural Groups in the United States
BBL	5023	Cultural Adaptation in Bilingual Societies
BBL	5043	Ethnography of Communication
BBL	6223	Anthropology and Education in Multicultural Contexts

B. *Option I.* 6 semester credit hours of Master's Thesis

OR

Option II. 6 semester credit hours of graduate elective coursework in Bicultural-Bilingual Studies, English as a Second Language, or approved related areas, 3 hours of which must carry an ESL prefix.

Doctor of Philosophy Degree in Culture, Literacy and Language

The Division of Bicultural-Bilingual Studies offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Culture, Literacy and Language. The program focuses on the consequences of cultural and linguistic diversity for literacy and language acquisition. Successful Ph.D. candidates must demonstrate in-depth interdisciplinary knowledge in culture, literacy, and language, and must deliver an original contribution to the field.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Program Admission Requirements. In addition to the University-wide admission requirements, the minimum requirements for admission to the Doctoral degree program in Culture, Literacy and Language are as follows:

1. A master's degree in an area such as the following: anthropology, applied linguistics, bicultural-bilingual studies, foreign language education, history, international business, linguistics, psychology, sociology, and teaching English as a Second Language. Masters' degrees in other fields may be accepted, subject to the approval of the Doctoral Program Committee.
2. A portfolio consisting of the following items will be evaluated by the Doctoral Program Committee, comprised of members selected from the graduate faculty of the Division of Bicultural-Bilingual Studies:
 - A master's degree transcript documenting a grade point average of 3.5 or better in an approved master's degree program.
 - Graduate Record Examination (GRE) scores.
 - Advanced proficiency in a language other than English to be demonstrated by examination or approved coursework.
 - For students whose master's degree is from a non-English speaking university, submission of Test of English as a Foreign Language (TOEFL) scores of no less than 550 (paper version).
 - Three letters of recommendation attesting to the student's academic and personal attributes for success in the program and potential for contributing substantially to a field of study related to the degree.
 - A sample of academic writing in the form of an essay describing research interests and purpose for pursuing the Ph.D. in Culture, Literacy and Language.

Applicants are evaluated based on the above criteria.

Degree Requirements. The Doctoral degree requires a minimum of 60 semester credit hours beyond the Master's degree. The core curriculum consists of 24 semester credit hours of required courses. A minimum of 12 semester credit hours in research methods and 15 semester credit hours in doctoral research must be completed.

Program of Study

A. Foundation Course (3 semester credit hours required):

BBL 7003 Proseminar in Culture, Literacy and Language

B. Research Methods Courses (12 semester credit hours required):

BBL 7013 Research Design and Statistics for Culture, Literacy and Language

BBL 7023 Qualitative Research Methods for Culture, Literacy and Language

BBL 7033 Research in the Speech Community

or

BBL 7043 Research Design and Qualitative Analysis for Culture, Literacy and Language

EDU 7043 Educational Research Statistics: Descriptive and Comparative

(Or other approved statistical methods course.)

C. Core Courses (9 semester credit hours required):

BBL	7123	Sociocultural Contexts of Literacy
BBL	7133	Bilingualism and Second Language Acquisition
BBL	7213	Seminar in Ethnological Theory

D. Designated Electives (12 semester credit hours required). Students, in consultation with their academic advisor and the Graduate Advisor of Record, will select 12 semester credit hours for an emphasis in a coherent interdisciplinary area. As part of these 12 hours, students will be required to take a minimum of 6 semester credit hours of advanced Doctoral seminars.

Advanced Doctoral Seminars

BBL	7113	Cultural Studies Research
BBL	7203	Seminar in Latino Biculturalism
BBL	7223	Seminar in Biliteracy and Second Language Literacy
BBL	7233	Seminar in Second Language Acquisition and Bilingualism
BBL	7243	Seminar in Language and Language Use
BBL	7253	Seminar in Latino Issues in Education

Other Designated Electives

BBL	5043	Ethnography of Communication
BBL	5123	Sociolinguistics and Education
BBL	6053	Assessment in Bicultural-Bilingual Communities
BBL	6073	Ethnographic Research Methods in Bicultural-Bilingual Settings
BBL	6223	Anthropology and Education in Multicultural Contexts
BBL	6233	Advanced Topics in Language Policy
BBL	6243	Evaluation Research for Bilingual and Second Language Programs
ESL	6013	Second Language Acquisition Research

E. Free Electives (9 semester credit hours required). Students, in consultation with their academic advisor and the Doctoral Program Coordinator (Graduate Advisor of Record), will select additional graduate level courses within the University in order to complete a coherent emphasis area. Selection of this coursework will be driven by two primary factors: the discipline in which a student has completed the Master's degree and the research goals for that student.

F. Doctoral Research (15 semester credit hours minimum):

BBL	7303	Directed Doctoral Research (3 hours minimum)
BBL	7313	Doctoral Dissertation (12 hours minimum)

The entire program of study must be approved by the student's dissertation advisor, dissertation committee, and the Doctoral Program Committee and must be submitted to the Dean of the Graduate School through the Dean of the College for final approval.

Qualifying Examination. A faculty committee nominated by the Doctoral Program Committee conducts the construction, administration, and evaluation of both parts of the examination. The written portion of the examination covers the areas completed in all core and emphasis courses and cannot be taken until after the completion of 42 semester credit hours. In order to pass this examination, the student must demonstrate a broad knowledge of culture, literacy, and language. The oral portion of the examination takes place within two weeks of the written portion and focuses on clarifying the student's ideas from the written portion. Both parts of the examination are given to a doctoral student before admission to candidacy. The purpose of the examination is to ensure that the student has a sufficient grasp of the theoretical and methodological fundamentals to conduct independent research in the chosen dissertation area. No more than two attempts to pass qualifying examinations are allowed.

Advancement to Candidacy. Advancement to candidacy will require a student to complete all University and program requirements. In addition, the student must pass written and oral qualifying examinations, select an original and acceptable research topic, select a supervising professor and dissertation committee, submit appropriate human subject research forms, complete a dissertation proposal to be approved by the dissertation committee, and pass written and oral qualifying examinations. The written examination will be constructed, administered, and evaluated by the Doctoral Studies Committee.

Dissertation and Final Oral Examination. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation. The dissertation may employ quantitative or qualitative research methods as applicable to the selected emphasis for the degree. The Doctoral dissertation must make a substantial contribution to a field within culture, literacy and language. The research topic will be determined by the student in consultation with his or her supervising professor. A dissertation committee selected by the student and supervising professor and approved by the Graduate School will guide and critique the candidate's research. The Dissertation Committee must unanimously approve the completed dissertation. The dissertation shall then be defended publicly before the student's committee and interested members of the University community. Following an open presentation of the dissertation findings, a final oral examination covering the dissertation and the general field of the dissertation will be administered and evaluated by the student's dissertation committee.

COURSE DESCRIPTIONS BICULTURAL-BILINGUAL STUDIES (BBL)

5003 Foundations for Bicultural Studies

(3-0) 3 hours credit.

The study of concepts, theories, and approaches used in the examination of culture and society, with emphasis on the analysis of bicultural and transcultural praxis.

5013 Multicultural Groups in the United States

(3-0) 3 hours credit.

A study of sociocultural diversity, culture maintenance and change, culture revitalization, and other aspects of ethnicity, race, class and gender in the United States.

5023 Cultural Adaptation in Bilingual Societies

(3-0) 3 hours credit.

The study of the dynamic relations between culture, language, and the social environment. Explanations for the range of cultural, historical, psychological, and political-economic adaptations in diverse systems.

5033 Bilingual Content Instruction

(3-0) 3 hours credit.

Examines curriculum development, materials, and pedagogy applicable to the integrated teaching of mathematics and the social and natural sciences in bilingual classrooms. Emphasizes research-based methods that use the learner's first language as a vehicle for content instruction. Offered in Spanish.

5043 Ethnography of Communication

(3-0) 3 hours credit.

Examines the theoretical perspectives for the study of communication in varying cultural contexts. Topics may include intercultural and intracultural communication patterns, the effect of cultural differences on interactions, culture concepts, nonverbal behavior, and increasing intercultural effectiveness.

5053 Assessment in Bilingual and Second Language Studies

(3-0) 3 hours credit.

Study and evaluation of means of assessing language proficiency in bilingual and English as a Second Language programs. Critical review of standardized tests of language proficiency, as well as alternative and informal language assessment techniques, consideration of relationships between second language proficiency and academic achievement, and sociocultural dimensions of testing and assessment.

- 5063 Biliteracy in Bilingual Classrooms**
(3-0) 3 hours credit.
Examines research and instructional practices supporting the acquisition of biliteracy through reading, writing, speaking, and listening. Preparation and adaptation of holistic, thematically based materials and activities. Critical evaluation of existing materials in Spanish. Offered in Spanish.
- 5073 Psychosocial Processes in Bicultural-Bilingual Environments**
(3-0) 3 hours credit.
The study of the social and cognitive psychological factors facing populations in bicultural-bilingual environments.
- 5083 Curricular and Instructional Considerations for Linguistically and Culturally Diverse Classrooms**
(3-0) 3 hours credit.
A critical analysis of the rationale for the preparation of teachers who are culturally and linguistically proficient/responsive to address the needs of diverse student populations. The study of various conceptual frameworks for curricular, instructional, and parental involvement for effective educational practices with diverse learners of different ages, levels, or backgrounds will be conducted. In addition, course analyzes the influences on learning of sociocultural, sociopsychological, and sociopolitical variables and their relevance for the identity and education of diverse learners focusing particularly on the pedagogical and assessment implications.
- 5093 Multicultural Art and Folklore in the United States**
(3-0) 3 hours credit.
A study of the visual arts and the folklore of representative culture groups creating a significant contribution to contemporary society. The course emphasizes Latino/a contributions to mural and street art, regional and religious art, as well as folk, popular, and other arts.
- 5113 Theoretical Foundations of Bicultural-Bilingual Education**
(3-0) 3 hours credit.
A critical analysis of the rationale for bicultural-bilingual education focusing on history, philosophy, and theory. The study and analysis of bicultural-bilingual program designs, research perspectives on effective implementation, and adaptation to community needs.
- 5123 Sociolinguistics and Education**
(3-0) 3 hours credit.
Study of sociolinguistic theory and methodology, with special emphasis on their applicability to linguistically diverse educational contexts and communities. Topics include sociolinguistic approaches to bilingualism and second language learning, dialect diversity, and minority language maintenance and shift.
- 5133 Latino Biculturalism in the United States**
(3-0) 3 hours credit.
A study of Mexican American, Puerto Rican, Cuban, and other Latino communities in the United States. Topics may include economic labor force participation, the dynamics of globalization and transnationalism, cultural revitalization and self-determination patterns, school achievement and performance, political participation, and integration.
- 5143 Communication in Bilingual Classrooms**
(3-0) 3 hours credit.
Emphasis on oral and written communicative strategies for achieving full interaction among students in bilingual classrooms. Review of specialized teaching-related vocabularies needed to conduct instruction in two languages. Offered in Spanish.
- 5173 Sociocultural Issues and the Teaching of Reading**
(3-0) 3 hours credit.
Study of how social, cultural, and linguistic factors affect the reading and writing practices of students and how school reading curriculum, instruction, and assessment can be designed to support students from differing sociocultural backgrounds. Special attention is given to the role that social class, dialect, gender, second language learning, and ethnicity play in literacy learning and teaching.

5193 Multicultural Literature for Children

(3-0) 3 hours credit.

A study of representative children's literature for, and about, the many culture groups in the Americas, with emphasis on Latinos and Latinas.

6003 Research Design and Inquiry in Bicultural-Bilingual Studies

(3-0) 3 hours credit. Prerequisite: Completion of 15 semester hours of degree program.

Familiarizes students with various research approaches and methodologies used in bicultural-bilingual studies including the conceptualization, structure and types of research design, and pragmatic deliberation of data acquisition and analysis. Topics include information retrieval and library research, literature review, research criticism, and proposal writing.

6033 Topics in Bicultural Studies

(3-0) 3 hours credit.

Examines topics of interest in bicultural studies and bilingual education. Possible topics include, but are not limited to, contemporary Chicano arts, Chicanas, Mexican American folklore, cultural factors in human resources development, and bilingual-multicultural school communities. May be repeated for credit when topics vary.

6043 Bilingual Education Research

(3-0) 3 hours credit.

Examines qualitative and quantitative methods and models applied to the field of bilingual education. Evaluation of community and school-based research that influences instructional policies and practices in bilingual programs.

6053 Assessment in Bicultural-Bilingual Communities

(3-0) 3 hours credit.

Critical review of research in the areas of testing of ethnic minority populations, sociocultural dimensions of testing and assessment, standardized testing, academic achievement, and cognitive assessment issues. Research projects in appropriate assessment of language and cognitive abilities for minority group members.

6063 Research Methods in Bilingual and Second Language Studies

(3-0) 3 hours credit.

Research design for the study of linguistic, social, and psychological variables in bilingual, second language, and dialectally diverse populations. Emphasis is on designing and carrying out a research project.

6073 Ethnographic Research Methods in Bicultural-Bilingual Settings

(3-0) 3 hours credit. Prerequisites: BBL 6003 and completion of 15 semester credit hours of degree program.

Explores ethnographic approaches and their translation into bicultural-bilingual studies from a multidisciplinary perspective. Emphasis is on learning and practicing participant observation, interviewing, journal writing, document searching, strategies for qualitative analysis and interpretation, and writing styles of research reports.

6093 Chicana/Latina Feminist Methodologies

(3-0) 3 hours credit.

This course will examine the different frameworks for theory building by Chicana/Latina feminists. Challenging assumptions within social sciences, Chicana/Latina intellectuals have developed a critical theory that interrogates knowledge production. The course emphasizes methodology and how we produce knowledge, the means by which we examine communities, and how we conduct research as insiders/outsideers.

6223 Anthropology and Education in Multicultural Contexts

(3-0) 3 hours credit. Prerequisite: BBL 5003.

The application of anthropological theory and methods to the study of education with emphasis on bicultural-bilingual school and community contexts. Topics include theories of culture, cultural transmission and acquisition, and cultural reproduction and production for understanding informal and formal education and its outcomes.

- 6233 Advanced Topics in Language Policy**
(3-0) 3 hours credit. Prerequisite: ESL 5003 or an equivalent.
Study of language policies, discourses, and practices. Topics may include theory and implementation of bilingual policies in the United States, cases of official language decisions, instructional medium choices, literacy initiatives, gender-neutral language reforms, or other language-related decisions and policies.
- 6243 Evaluation Research for Bilingual and Second Language Programs**
(3-0) 3 hours credit.
The study of evaluation theory and practice for bilingual programs. Topics include design, pilot testing, implementation, coordination, and assessment of effectiveness of evaluation processes.
- 6941-3 Internship in Bicultural/Multicultural Settings**
1 to 3 hours credit.
A supervised experience, relevant to the student's program of study, within selected community organizations. Must be taken on a credit/no-credit basis, and no more than 3 hours will apply to a Master's degree.
- 6951-3 Independent Study**
1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor, the student's program advisor and Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or no often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee to take the Comprehensive Examination.
Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).
- 6973 Special Problems**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.
- 6983 Master's Thesis**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.
Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.
- 7003 Proseminar in Culture, Literacy and Language**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
This course is intended to provide first-year doctoral students with an opportunity to explore the main theories and areas of research in culture, literacy, and language, with emphasis on language minority communities. Readings include foundational and recent work in interdisciplinary study of culture, literacy, and language, with emphasis on implications for human development, social organization, and education. Students will also become familiar with areas of research of doctoral program faculty.

7013 Research Design and Statistics for Culture, Literacy and Language

(3-0) 3 hours credit. Prerequisite: An introductory course in statistics.

Research design for quantitative studies in culture, literacy, and language. Topics include formulating testable hypotheses, collecting data on linguistic and cultural variables, selecting appropriate statistical models, and interpreting results. Special attention to the procedures commonly used in studies of language development and language variation, including parametric and nonparametric models, to specialized computer programs and databases used in the study of language development and bilingualism, e.g., the CHAT and CLAN programs developed by the Child Language Data Exchange System (CHILDES) at Carnegie Mellon University.

7023 Qualitative Research Methods for Culture, Literacy and Language

(3-0) 3 hours credit.

Multimethod research involving an interpretive, naturalistic approach to its subject matter. Examines the use and collection of case studies, personal experience, introspective/retrospective accounts, life story, interview, observational, historical, interactional, and visual texts as data sources. Special attention to software packages commonly used in the study of qualitative data on culture, language, and literacy, e.g., Ethnography, QSR Non-numerical Unstructured Data Indexing, Searching, and Theorizing.

7033 Research in the Speech Community

(3-0) 3 hours credit. Prerequisites: BBL 5123 or an equivalent, and BBL 7023, or approval of instructor.

Sociolinguistic field research methods in linguistically diverse communities, with attention to both quantitative and qualitative approaches. Emphasis on collection, reduction, and analysis of language data. Special attention to procedures and analytic techniques commonly used to examine language data from minority speech communities. Consideration of ethical issues in research in minority communities.

7043 Research Design and Qualitative Analysis for Culture, Literacy and Language

(3-0) 3 hours credit. Prerequisite: BBL 7023.

Enhances doctoral research proposals from formulation of the research questions, appropriate methods for collection, construction of a conceptual literature review, analysis of data, and determining findings. Provides theory and techniques for analyzing qualitative data sets. Diverse theoretical frameworks will be used to analyze the data sets required from students. May include use of qualitative computer software.

7113 Cultural Studies Research

(3-0) 3 hours credit. Prerequisite: BBL 7213 or consent of instructor.

Interdisciplinary study of anthropological and humanistic conceptions of all forms of cultural production in relation to social and historical structures. Examines a range of society's arts, beliefs, institutions, and communicative practices in relation to social and historical structures.

7123 Sociocultural Contexts of Literacy

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Theories and research in language and literacy that examine the complex interactions among social, cultural, psychological, and political factors in literacy learning in multicultural and multilingual contexts.

7133 Bilingualism and Second Language Acquisition

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Theories and research in bilingualism, multilingualism, and second language acquisition. Emphasis on the linguistic, cognitive, and motivational factors in the study of language acquisition.

- 7203 Seminar in Latino Biculturalism**
(3-0) 3 hours credit. Prerequisite: BBL 7113 or consent of instructor.
Study of Mexican American, Central American, Cuban, and Puerto Rican ethnic self-determination patterns in the context of mainstream cultural diversity in the United States. Suggested topics include: Latino cultural expression, Latino labor market participation, Latino political participation, Latino educational participation and achievement. May be repeated for credit when topics vary.
- 7213 Seminar in Ethnological Theory**
(3-0) 3 hours credit.
Study of the relations of theory and ethnography in sociocultural anthropology. Suggested topics include culture, ethnography, comparison, history, and the current controversies that illustrate various theoretical perspectives.
- 7223 Seminar in Biliteracy and Second Language Literacy**
(3-0) 3 hours credit. Prerequisite: BBL 7123 or consent of instructor.
Exploration of literacy development from social and cognitive perspectives. Topics may include simultaneous acquisition of first and second language literacy; emerging literacy in second language; adult literacy; reading and writing in a second language; the relationship of biliteracy and second language literacy to language maintenance and shift. May be repeated for credit when topics vary.
- 7233 Seminar in Second Language Acquisition and Bilingualism**
(3-0) 3 hours credit. Prerequisite: BBL 7133 or consent of instructor.
Study of the research in second language acquisition and bilingualism. Topics may include age and second language acquisition; identity and second language acquisition; sociocultural theories of second language acquisition, universal grammar and second language acquisition, interlanguage variation, bilingual groups in the Americas, Asia, and Europe, cultural and linguistic interaction norms, and cognitive development in the bilingual child. May be repeated for credit when topics vary.
- 7243 Seminar in Language and Language Use**
(3-0) 3 hours credit. Prerequisite: BBL 7133 or consent of instructor.
Topics in linguistic theory and their relationships to language behavior in multilingual contexts. Topics may include phonological theory, syntactic models, discourse analysis, pragmatics, language socialization, language contact, language maintenance and shift, sociolinguistics and literacy, and language variation. May be repeated for credit when topics vary.
- 7253 Seminar in Latino Issues in Education**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Critical analysis of the social, political, economic, and cultural factors that have historically impacted the K-16 education of Latinos in the United States. Examination of theoretical frames used to interpret their schooling experiences. Topics may include legal and policy issues, historical perspectives, bilingual/multicultural education, and teacher preparation for a linguistically diverse society. May be repeated for credit when topics vary.
- 7303 Directed Doctoral Research**
3 hours credit. Prerequisite: Consent of instructor.
Supervised research on a topic in culture, literacy, and language. May be repeated for credit, but no more than 6 hours may be applied to the Doctoral degree.
- 7311-3 Doctoral Dissertation**
1 to 3 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.
May be repeated for credit, but no more than 12 hours may be applied to the Doctoral degree. Credit will be awarded upon completion of the dissertation.

**COURSE DESCRIPTIONS
ENGLISH AS A SECOND LANGUAGE
(ESL)**

- 5003 Linguistics for Second Language and Bilingual Specialists**
(3-0) 3 hours credit.
Concepts in linguistics directed toward a broad understanding of human language, with particular attention to second-language and bilingual contexts.
- 5013 Foundations of Second Language Acquisition**
(3-0) 3 hours credit.
Study of principles, theories, and issues in second language acquisition and bilingualism, with implications for language teaching.
- 5033 Second Language Reading and Writing**
(3-0) 3 hours credit.
Current approaches to the teaching and learning of reading and writing in English as a Second Language. The relationship of second language reading and writing to language learning including oral development. A critical evaluation of existing literacy materials available for second language learners.
- 5043 Listening and Speaking in Second Language Programs**
(3-0) 3 hours credit.
Development, presentation, and evaluation of materials and strategies for teaching listening, speaking, and pronunciation to second language learners. Emphasizes current theories and development of oral proficiency.
- 5053 Approaches to Second Language Instruction**
(3-0) 3 hours credit.
Study of instructional strategies and materials, including available community resources for teaching linguistically diverse students. Attention will range from early stages of second language acquisition through more advanced stages of language development.
- 5063 Language and Content-Area Instruction**
(3-0) 3 hours credit.
Theoretical and practical approaches to integration of language teaching with subject matter areas. Emphasis on oral language and literacy for academic purposes. Emphasis on school settings.
- 5073 Computer Assisted Language Learning**
(3-0) 3 hours credit.
Overview of the rationale, value, and management of technology in the second language classroom; the creation of technology-enhanced lessons, effective use of internet-based resources, and critical evaluation of language learning software applications.
- 5083 Pedagogical Grammar**
(3-0) 3 hours credit.
Study of English grammar from descriptive and discourse perspectives, with consideration of cross-linguistic contrasts and of applications for teaching English as a Second Language.
- 6013 Second Language Acquisition Research**
(3-0) 3 hours credit. Prerequisite: 15 semester credit hours completed in degree program or consent of instructor.
Investigation of second language acquisition from multiple perspectives through data-based studies.

6033 Topics in Second Language Acquisition and Teaching

(3-0) 3 hours credit.

Suggested topics include, but are not limited to, discourse analysis and second language acquisition, technology and second language learning and instruction, and Universal Grammar and second language acquisition. May be repeated for credit when topics vary.

6043 Family and Adult Literacy in Language Minority Communities

(3-0) 3 hours credit.

Theoretical and practical aspects of family and adult literacy development in language minority communities. Topics may include relationships between oral and written language; second language literacy, and relationships between literacy and social, economic, and political factors. Implications for program development and implementation.

6053 Program and Syllabus Design

(3-0) 3 hours credit.

Theoretical and practical concerns in developing instructional programs to meet the objectives of second language learners, including English for Specific Purposes.

6063 Advanced Second Language Literacy

(3-0) 3 hours credit.

Current approaches and theories of second language literacy, with a focus on the integration of reading and writing. Review of research on second language reading and second language writing. Theory-based practice in literacy development in a second language.

6941-3 Internship in English as a Second Language

1 to 3 hours credit. Prerequisites: 15 semester credit hours of coursework in ESL and consent of instructor.

Supervised experience in teaching English as a Second Language. Highly recommended for students with limited teaching experience in ESL. Must be taken on a credit/no-credit basis, and no more than 3 hours will apply to a Master's degree.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the division's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

DEPARTMENT OF COUNSELING, EDUCATIONAL PSYCHOLOGY, AND ADULT AND HIGHER EDUCATION

Master of Arts Degree in Counseling

The Master of Arts (M.A.) degree in Counseling offers the opportunity for advanced study and professional development in the fields of Community, School, Addictions, Multicultural, Marriage and Family, and Sports Psychology Counseling. Students may earn credit toward a state-level counseling license to practice in community settings (Licensed Professional Counselor). Credit may also be earned toward a School Counselor endorsement on a Teacher's Certificate. A thesis option emphasizes the development of research competencies critical to continued graduate-level study.

Program Admission Requirements. Applicants must hold a 3.0 GPA during the last 60 hours of their undergraduate studies to be eligible for clear admission to the counseling program. Applicants with a GPA between 2.70 and 2.99 may be accepted into the program on a probationary basis. Applicants without adequate background for counseling will be required to take COU 3103 Helping Skills and, at the discretion of the admission committee, to complete up to 15 additional hours of preparatory courses as a condition of admission. Applicants must also take the Graduate Record Examination (GRE; with the writing sample). Letters of recommendation, a written statement of goals, and a personal interview may be required. Interested persons should contact the Student Development Specialist for the Counseling program or check the web site for more information. The number of students admitted to this program may be limited.

Degree Requirements. Candidates for the Master of Arts degree in Counseling must earn a minimum of 48 semester credit hours. Students must pass a comprehensive written examination toward the end of their formal coursework. The comprehensive examination may be repeated, but students who fail the examination two times must have permission from their supervisory committee to take the examination additional times. Students who fail to pass the examination should take coursework or other work to remedy deficiencies before they retake the examination.

A. 36–42 semester credit hours of required courses:

COU	5103	Introduction to School Counseling (for students specializing in School Counseling)
		or
COU	5203	Introduction to Community Counseling (for students specializing in Community Counseling)
COU	5213	Counseling Theories
COU	5223	Psychological Assessment for Counselors
COU	5233	Group Theory and Process
COU	5243	Counseling Individuals with Behavioral and Emotional Disorders
COU	5253	Child and Adolescent Counseling in a Systemic Context (for students specializing in School Counseling)
COU	5283	Counseling in a Multicultural Setting
COU	5393	Development of Counseling Skills
COU	5683	Practicum in Counseling
COU	5713	Community Counseling Internship (for students specializing in Community Counseling)
COU	5793	School Counseling Internship (for students specializing in School Counseling)
COU	6003	Consultation and Program Evaluation (for students specializing in School Counseling)
COU	6153	Career Development and Choice
EDP	5033	Human Development Across the Life Span
EDU	5003	Research Methods

B. 12 semester credit hours of elective courses:

Option 1. Thesis Option: 6 hours of thesis, a 3-hour elective, plus a 3-hour research methods or statistics course to be approved by Thesis Committee Chair (total of 48 semester credit hours).

Option 2. Nonthesis Option: 12 hours of electives (total of 48 semester credit hours).

Standards and Procedures

In order to complete counselor preparation programs and to be eligible to take certification or licensing examinations, students must:

- maintain scholastic performance meeting or exceeding department standards
- demonstrate the acquisition of and ability to apply counseling skills necessary to work effectively with persons having diverse needs, as generally accepted by practitioners in counseling
- demonstrate emotional and mental fitness in their interactions with others, and
- conform with the codes of ethics of professional associations in counseling and of the State of Texas (Texas Administrative Code, Title 19, Part 7, Chapter 247, Code of Ethics and Standard Practices for Texas Educators).

It is the duty of faculty members in the counseling program to evaluate all students according to these standards in all settings in which faculty members and students interact, in classes, in advising and counseling settings, and in personal conversations.

It is expected that students will respond to evaluations, formal or informal, in appropriate ways and in all cases, attempting to conform to standards as explained to them. Conformance with standards must be demonstrated by students throughout the period of time spent in the program; events of nonconformance must be followed by faculty judgments that satisfactory adjustments have been made.

Admission to the program does not guarantee fitness to remain in the program to completion. Only those students who meet program standards will be allowed to continue in the program. If and when a student is judged not to meet program standards sufficiently to be allowed to engage in counseling others, that student will be removed from continuation in the program. Refer to the Graduate Counseling Handbook for a detailed outline of the due process procedures related to this policy.

Only two courses with the grade of “C” will be accepted toward this degree. A minimum of a 3.0 grade point average will be required for graduation. Those who obtain more than two grades of “C” will be put on probation and may be required to do appropriate remedial work.

Doctor of Philosophy Degree in Counselor Education and Supervision

The Ph.D. in Counselor Education and Supervision is intended to prepare professionals for future careers in academic, clinical, research, and consultation settings. Program graduates will have been afforded the opportunity to acquire both the theoretical knowledge and clinical and research practical skills necessary to work in academic counselor education departments, and clinically supervise the next generation of counselor educators and school and community agency counselors. Students will be expected to formulate their own philosophy and approach to the counselor education field. Multicultural competencies will be emphasized throughout the program.

The Doctoral program objectives include:

- providing students with opportunities to initiate and contribute to existing research projects
- supervised clinical internships
- opportunities for providing counseling services to members of underrepresented populations in surrounding communities
- opportunities for students to focus on specialty areas such as multicultural, agency, school, marriage and family, addictions, student affairs, and sports psychology and advanced theoretical knowledge and applied clinical supervision training
- creating new knowledge through the dissertation research process
- providing students with opportunities for classroom teaching experiences, including course development.

Program Admission Requirements. Admission to the program is limited and competitive. Meeting the minimum admission requirements does not guarantee acceptance into the program. Competitive applicants often exceed minimum requirements.

1. A master’s degree in counseling or in a related mental health field requiring a minimum of 48 semester credit hours equivalent to the master’s degree requirements of the UTSA Counseling program and/or Council for Accreditation of Counseling and Related Educational Programs (CACREP). Students with fewer than 48 semester credit hours may be

considered for admission to the program with conditional status pending completion of the deficient hours and satisfactory completion of courses fulfilling CACREP core course requirements.

2. A minimum grade point average of 3.0 in master's level courses in counseling or in a related mental health field.
3. A portfolio consisting of the following items, which will be evaluated by the Doctoral Program Committee:
 - a. A 48-hour (or greater) master's degree transcript documenting a grade point average of 3.0 or better in counseling or an approved related mental health field;
 - b. For applicants whose native language is not English, a score of at least 550 on the Test of English as a Foreign Language (TOEFL paper version);
 - c. Three letters of recommendation attesting to the student's academic and personal attributes for success in the program and potential for contributing substantially to a field of study related to the degree;
 - d. A written personal statement/essay describing research interests and purpose for pursuing the Ph.D. in Counselor Education and Supervision;
 - e. Graduate Record Examination (GRE) test scores not older than five years;
 - f. Documented experience in a work environment (formal positions or internships) where counseling was the primary professional emphasis (may include but not limited to one-on-one counseling, counseling for couples, psychological assessment and testing, group or community counseling);
 - g. Professional résumé listing prior experiences in the field of Counseling.
4. Successful completion of a finalist interview with the admissions committee.

Degree Requirements. Students pursuing the Ph.D. in Counselor Education and Supervision will be required to pass a qualifying examination prior to admission to candidacy. All candidates will be required to submit a scholarly contribution in the form of a dissertation as partial fulfillment of requirements for this Doctorate (see Dissertation handbook). All students will be evaluated by the fitness to practice policy of the department (see Doctoral handbook).

A. Foundation courses:

48-semester-credit-hour Master's degree or equivalent

B. General core courses (40 semester credit hours):

BBL	6223	Anthropology and Education in Multicultural Contexts
COU	6003	Consultation and Program Evaluation
COU	6323	Advanced Psychological Assessment
COU	7121	College and University Teaching Seminar
COU	7133	Seminar in Professional Development
COU	7213	Advanced Theories of Counseling
COU	7283	Advanced Multicultural Counseling
COU	7313	Practicum in Counseling (must be taken twice for a total of 6 hours)
COU	7413	Internship I
COU	7513	Internship II
COU	7583	Supervision of Counseling
COU	7593	Practicum in Counseling Supervision
COU	7893	Research in Counseling

C. Research courses (9 semester credit hours):

COU	6893	Foundations of Research in Counseling and Development
EDU	7043	Educational Research Statistics: Descriptive and Comparative
EDU	7103	Qualitative Research Traditions

D. Approved emphasis curriculum area courses (9 semester credit hours)

E. Dissertation (9 semester credit hours):

COU	7993	Dissertation
COU	7996	Dissertation

Standards and Procedures

In order to complete counselor preparation programs and be eligible to take certification or licensing examinations, students must:

- maintain scholastic performance meeting or exceeding department standards
- demonstrate the acquisition of and ability to apply counseling skills necessary to work effectively with persons having diverse needs, as generally accepted by practitioners in counseling
- demonstrate emotional and mental fitness in their interactions with others
- conform with the codes of ethics of professional associations in counseling and of the State of Texas (Texas Administrative Code, Title 19, Part 7, Chapter 247, Code of Ethics and Standard Practices for Texas Educators).

It is the duty of faculty members in the counseling program to evaluate all students according to these standards in all settings in which faculty members and students interact, in classes, in advising and counseling settings, and in personal conversations.

It is expected that students will respond to evaluations, formal or informal, in appropriate ways and in all cases, attempting to conform to standards as explained to them. Conformance with standards must be demonstrated by students throughout the period of time spent in the program; events of nonconformance must be followed by faculty judgments that satisfactory adjustments have been made.

Admission to the program does not guarantee fitness to remain in the program for completion. Only those students who meet program standards will be allowed to continue in the program. If and when a student is judged not to meet program standards sufficiently to be allowed to engage in counseling others, that student will be removed from continuation in the program. Refer to the Graduate Counseling Handbook for a detailed outline of the due process procedures related to this policy.

Courses in which the student has earned a "C" will not be accepted toward this degree. A minimum of a 3.0 grade point average and a successful defense of a dissertation will be required for graduation.

COURSE DESCRIPTIONS COUNSELING (COU)

5103 Introduction to School Counseling

(3-0) 3 hours credit.

Orientation to the role and profession of school counseling and UTSA's counseling program. Investigation of institutional constraints, documentation, and the legal and ethical aspects of school counseling. Examines comprehensive developmental guidance program planning for students, teachers, administrators, parents, and the community. Also examines ASCA and TEA knowledge, skills and abilities for school counselors. (Formerly EDP 5253. Credit cannot be earned for COU 5103 and EDP 5253.)

5113 Ethical and Legal Issues in Counseling

(3-0) 3 hours credit.

Explores philosophical precepts on which counseling interventions are based. Examines ethical and legal standards related to professional practice and the impact of personal values on the counseling process. (Formerly EDP 5113. Credit can be earned only for one: COU 5113, EDP 5113, or EDU 5113.)

5203 Introduction to Community Counseling

(3-0) 3 hours credit.

Provides an overview of the counseling profession. Explores ethical and diversity issues of school and community counselors. Provides an orientation to the counseling program, information about professional credentials, and job roles. Requires observational experience. (Formerly EDP 5203. Credit cannot be earned for COU 5203 and EDP 5203.)

5213 Counseling Theories

(3-0) 3 hours credit.

Major counseling theories and techniques are presented. Students investigate affective, behavioral, and cognitive psychotherapeutic strategies. (Formerly EDP 5213. Credit cannot be earned for COU 5213 and EDP 5213.)

5223 Psychological Assessment for Counselors

(3-0) 3 hours credit. Prerequisites: COU 5243 and EDU 5003.

Introduction to measurement theory, assessment strategies, and individual- and group-administered techniques, including standardized tests. Emphasis on analysis and interpretation of assessment results for treatment planning. Casework is required. (Formerly EDP 5223. Credit cannot be earned for COU 5223 and EDP 5223.)

5233 Group Theory and Process

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, and COU 5213.

A study of small group theory, research, and procedures. Explores group membership and leadership behavior. Participation in group counseling is required. (Formerly EDP 5233. Credit cannot be earned for COU 5233 and EDP 5233.)

5243 Counseling Individuals with Behavioral and Emotional Disorders

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, and COU 5213.

Counseling interventions with behavioral and emotional disorders; symptoms for psychoses, emotional disorders, and maladaptive behavior patterns. (Formerly EDP 5243. Credit cannot be earned for COU 5243 and EDP 5243.)

5253 Child and Adolescent Counseling in a Systemic Context

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, and COU 5213.

The emotional and behavioral experiences of childhood and adolescence are discussed within the context of school and family. Counseling strategies are presented. Requires casework. (Formerly EDP 5263. Credit cannot be earned for COU 5253 and EDP 5263.)

5283 Counseling in a Multicultural Setting

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, and COU 5213.

A study of major issues of cross-cultural counseling. The impact of diversity (within and between group differences) is examined. (Formerly EDP 5283. Credit cannot be earned for COU 5283 and EDP 5283.)

5393 Development of Counseling Skills

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, COU 5213, COU 5243, COU 5283, plus 3 hours.

Focus on sequential learning of counseling skills and their practical application. Counseling sessions are recorded and evaluated. (Formerly EDP 5393. Credit cannot be earned for COU 5393 and EDP 5393.)

5613 Substance Abuse & Chemical Dependency Counseling

(3-0) 3 hours credit.

Uses cognitive-behavioral and systems-based strategies for treatment and relapse prevention in substance abuse and chemical dependence. Examines dual diagnosis with other Axis I disorders and comorbidity with Axis II disorders. Introduction to the ICRC/AODA 12 core functions and global criteria for substance abuse counselors. (Formerly EDP 5613. Credit cannot be earned for both COU 5613 and EDP 5613.)

5673 Youth Mentoring Programs and Practices

(3-0) 3 hours credit.

Examines natural and structured helping relationships between youth and older non-clinically trained persons. Topics include theory and research on mentoring in school and community settings; fostering and supervising non-professional helping relationships; establishing and evaluating programs; recruiting and training mentors; the role of age, sex, and culture in helping relationships. Fieldwork required.

5683 Practicum in Counseling

3 hours credit. Prerequisites: All core/required coursework. Students must apply for permission to enroll one semester in advance by completing the appropriate form and supplying evidence of readiness and fitness to practice counseling. Offers the first opportunity for supervised field work in a counseling setting. May be repeated for a maximum of six hours. (Formerly EDP 5693. Credit cannot be earned for COU 5683 and EDP 5693.)

5713 Community Counseling Internship

3 hours credit. Prerequisite: COU 5683.

Extensive supervised field work in a UTSA approved community counseling setting. May be repeated for credit for a maximum of 9 hours. Students must apply to enroll one semester in advance.

5793 School Counseling Internship

3 hours credit. Prerequisite: COU 5683.

Extensive supervised fieldwork in a UTSA-approved school counseling setting. May be repeated for credit for a maximum of 9 hours. Students must apply to enroll one semester in advance.

6003 Consultation and Program Evaluation

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, and COU 5213.

Provides a framework for understanding and practicing consultation in a school and/or community setting. Students examine the historical development, major models, and ethical and legal issues related to consultation. Students develop a personal model of consultation and apply theoretical material to case presentations.

6013 The Role of Sport in Society

(3-0) 3 hours credit.

Examination of sport and physical activity, sport's impact on society, and the affective roles sport takes as part of our social structure and the institution of education. (Same as KAH 6013. Credit cannot be earned for both COU 6013 and KAH 6013.)

6023 Exercise Psychology

(3-0) 3 hours credit.

A study of the theoretical models and research related to the determinates of exercise adoption and adherence. The relationship between exercise and mental health will be discussed. (Same as KAH 6023. Credit cannot be earned for both COU 6023 and KAH 6023.)

6033 Sport Psychology

(3-0) 3 hours credit.

A study of cognition and behaviors related to the participation in sport. This course will have a theoretical focus and will include topics such as self-efficacy, performance enhancement, cohesion, arousal and anxiety. Contemporary research will be discussed. (Same as KAH 6033. Credit cannot be earned for both COU 6033 and KAH 6033.)

6043 Applied Sport Psychology

(3-0) 3 hours credit. Prerequisite: COU 6033.

This course will provide a practical and comprehensive introduction to somatic, cognitive and behavioral interventions used in athletics to improve performance. Theoretical bases of psychological stress and performance will be explored and appropriate interventions discussed. Research findings related to athletics will be applied. (Same as KAH 6043. Credit cannot be earned for both COU 6043 and KAH 6043.)

6053 Qualitative Research Design

(3-0) 3 hours credit.

Introduction to the design and implementation of qualitative research projects. Particular attention is given to the development of research to improve practice, emphasizing action research and case study methods. Students will conduct a pilot study relevant to their program of study. (Credit cannot be earned for both COU 6053 and AHE 6053.)

6073 Research Colloquium

(3-0) 3 hours credit. Prerequisites: EDU 5003.

Guided discussion of research in planning stages, in process, and recently completed by participants. Opportunity for the organization of research teams to have effective interpersonal collaboration in planning and conducting research, and opportunity for students engaged in research to obtain assistance in planning, data collection, data analysis, and preparation of reports. (Credit cannot be earned for both COU 6073 and AHE 6073.)

6153 Career Development and Choice

(3-0) 3 hours credit.

A study of theories of occupational choice and career development and their application to the guidance and counseling process. Identification and utilization of various types of occupational information and resources in counseling interviews and guidance programs. (Formerly EDP 6153. Credit can be earned for only one of the following: COU 6153, EDP 6153, or C&I 6153.)

6203 Psychological Perspectives of Motor Learning and Control

(3-0) 3 hours credit.

Study of the individual processes of skill acquisition, including the involvement of transfer, timing, feedback, practice, retention as well as the processes of central and peripheral mechanisms involved in implementing physical and perceptual skills. (Same as KAH 6203. Credit cannot be earned for both KAH 6203 and COU 6203.)

6323 Advanced Psychological Assessment

(3-0) 3 hours credit. Prerequisite: COU 5223.

Theory and application of specific instruments and techniques, including administration and scoring. Emphasis on analysis, interpretation, and integration of ability, achievement, and personality assessment results for diagnostics as well as treatment planning. Casework is required. (Formerly COU 5323. Same as EDP 6323. Credit can be earned for only one of the following: COU 5323, COU 6323, EDP 5323, or EDP 6323.)

6523 Family Counseling Theories

(3-0) 3 hours credit.

This course examines the history of family therapy, major family counseling theories, and significant marriage and family theorists.

6533 Current Topics in Marriage and Family Counseling

(3-0) 3 hours credit. Prerequisite: COU 6523.

This course addresses current pressing topics within the marriage and family counseling literature, including but not limited to family, couple, and child assessment, contemporary or changing treatment interventions, and legal and ethical issues.

6543 Marriage and Family Practice

(3-0) 3 hours credit. Prerequisite: COU 6523.

This course provides a clinical addictions service practice component. It is a skills development course that provides an opportunity for students to become proficient in specific addictions related clinical practices.

6613 Addicted Families, Violence, and Life-Threatening Behaviors

(3-0) 3 hours credit. Prerequisites: COU 5613 and COU 6523.

This course explores the intertwined comorbidity of family addictions, violence, and life-threatening behaviors (e.g., suicide, child abuse, domestic violence, etc.) and provides an opportunity for students to obtain the basic knowledge and practice skills to provide thorough counseling practices to families presenting with this “triple threat.”

- 6623 Current Topics in Addictions**
 (3-0) 3 hours credit. Prerequisite: COU 5613.
 This course addresses current pressing topics within the addictions literature including but not limited to: substances of primary choice, treatment interventions, legal and ethical issues, prevention, and applied recovery techniques.
- 6633 Addictions Practice**
 (3-0) 3 hours credit. Prerequisite: COU 5613.
 This course provides a clinical addictions service practice component. It is a skills development course that provides students with an opportunity to become proficient in specific addictions related clinical practices.
- 6723 Counseling for Advocacy and Social Justice**
 (3-0) 3 hours credit. Prerequisite: COU 5283.
 Examination of the role of social responsibility within the counseling profession. Focuses on the exploration and application of social change strategies on behalf of diverse clients in communities and schools.
- 6733 Health Care Counseling and Diverse Cultures**
 (3-0) 3 hours credit. Prerequisite: COU 5283.
 Students will explore the historical context of the relationship between the U.S. government and health care disparities among racial and ethnic minorities. Students will examine how families and cultural competencies can be incorporated into the health counseling process.
- 6743 Special Topics in Multicultural Counseling**
 (3-0) 3 hours credit. Prerequisite: COU 5283.
 Critical analysis of pressing issues contained within the multicultural counseling literature. These issues will be creatively explored through the use of media and other novel means.
- 6893 Foundations of Research in Counseling and Development**
 (3-0) 3 hours credit.
 Examination of existing research and research methodology in the field of counseling and development. Describes approaches for conducting applied research, including design and data analysis strategies, emphasizing qualitative, quantitative, and mixed methods. Topics include measurement issues (reliability, validity), data collection approaches (interviews, surveys, case studies), and methods of data analysis.
- 6953 Independent Study**
 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
 Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.
- 6961 Comprehensive Examination**
 1 hour credit. Prerequisite: Approval of the Graduate Program Committee to take the Comprehensive Examination.
 Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).
- 6973 Special Problems**
 (3-0) 3 hours credit. Prerequisite: Consent of instructor.
 An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but no more than 6 hours, regardless of discipline, may be counted toward the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7121 College and University Teaching Seminar

(1-0) 1 hour credit.

Provides the student with experiences and theoretical knowledge in the process of higher education. Theories in instruction are explored and the students will be performing activities including but not limited to class preparation, class presentation, testing, and course organization. Classroom experiences are analyzed and discussed under supervision of qualified faculty.

7133 Seminar in Professional Development

(3-0) 3 hours credit. Prerequisite: Doctoral status or consent of instructor.

This course is intended to provide an overview of current research issues in counselor education, ethical and legal concerns and issues related to counselor identity.

7213 Advanced Theories of Counseling

(3-0) 3 hours credit. Prerequisite: Doctoral status.

In-depth study and analysis of the traditional and contemporary theories of counseling and analysis of original works by theorists. Critical evaluation of philosophical and psychological assumptions that underlie various theories will be required. Critical analysis of how theories "fit" in current counseling culture will be required.

7283 Advanced Multicultural Counseling

(3-0) 3 hours credit. Prerequisite: COU 7213 or consent of instructor.

Comprehensive investigation of multicultural issues, theory, research, and practice relevant to the field of counseling. Cultural identification and exploration of one's heritage and how it impacts therapeutic process will be required. Emphasis on the development of advanced multicultural counseling competencies will be explored. Extensive cultural experiential field exercises will be required.

7313 Practicum in Counseling

(3-0) 3 hours credit. Prerequisite: Doctoral status.

This practicum provides a counseling experience prior to the doctoral student entering his/her advanced internship. The course will offer opportunities for growth in skills, knowledge and personal development as a doctoral-level practitioner.

7383 Advanced Practicum in Multicultural Counseling

(3-0) 3 hours credit. Prerequisite: COU 7283 or consent of instructor.

Investigation and application of multicultural counseling content to clinical practice. This skills-development course assists students in their proficiency in counseling clients of diverse backgrounds.

7413 Internship I

3 hours credit. Prerequisite: Doctoral status.

Incorporates campus-based practicum experience with classroom experience focusing on client problems and the learning of relevant counseling skills.

7513 Internship II

3 hours credit. Prerequisites: Doctoral status and permission of instructor.

Involves field-based experience within one of several approved community settings including urban public schools, courts, detention centers, and mental health care centers. Students will engage in a variety of roles that include supervision and administration of counseling programs.

- 7583 Supervision of Counseling**
(3-0) 3 hours credit.
Introduces supervisors-in-training to knowledge and skills identified by the profession as basic to effective tutoring and mentoring skill development of counselors-in-training and practicing counselors. Students will be required to engage in supervision experiences to demonstrate competency in skill acquisition. This course is designed for students who have completed their Master's degree.
- 7593 Practicum in Counseling Supervision**
(3-0) 3 hours credit. Prerequisite: COU 7583.
An advanced experiential course aimed at translating supervision theory into practice. Students will be required to supervise master's level counselors-in-training. Current models of supervision and their application will be emphasized.
- 7773 Independent Study**
3 hours credit. Prerequisites: Doctoral standing and permission in writing (form available) of the instructor and student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work as part of the regular course offerings. May be repeated for credit, but no more than 6 semester credit hours will apply to the Doctoral degree.
- 7893 Research in Counseling**
(3-0) 3 hours credit. Prerequisites: COU 6323, COU 6893, and COU 7213.
Advanced study of scientific inquiry, research-related ethical issues, design, sampling procedures, and data analysis. Encourages development of research skills and inquiry in the context of student's dissertation by linking research questions to methods. Emphasis on dissertation data collection, analysis, and presentation.
- 7973 Special Topics in Counseling**
(3-0) 3 hours credit.
An organized course offering the opportunity for specialized study not normally or often available as part of the regular course offerings. This course may be repeated for credit when topics vary and will apply toward the Doctoral degree.
- 7993,6 Dissertation**
3 or 6 hours credit. Prerequisites: Admission to candidacy for the Doctoral degree and consent of student's Graduate Advisor of Record.
May be repeated for credit, but no more than 12 semester credit hours may be applied to the Doctoral degree. Credit will be awarded upon completion of the dissertation.

COURSE DESCRIPTIONS EDUCATIONAL PSYCHOLOGY (EDP)

- 5003 Psychological Learning Theories**
(3-0) 3 hours credit.
Provides a current and comprehensive overview of theory and research related to human learning. Covers major concepts of theory, human development considerations and research to applications in the classroom and other instructional settings. Appropriate for students in all areas of graduate study.
- 5033 Human Development Across the Life Span**
(3-0) 3 hours credit.
Provides a current and comprehensive overview of development psychology. Topics range from concepts of theory and research to physical and psychological development. The emphasis is on development as a holistic process. Appropriate for students in all areas of graduate study.

5043 Classroom Management and Motivation

(3-0) 3 hours credit.

A detailed investigation of various theories and models of classroom management and motivation. Topics include behavior modification, assertive discipline, control theory, and the concept of the democratic classroom. (Credit can be earned for only one of the following: EDP 5043, C&I 5023, or C&I 5043.)

5053 Psychosocial Contexts of Learning

(3-0) 3 hours credit.

Provides theory and research related to the “informal curriculum”, defined as those aspects of school life that are separate from the traditional goal of academic achievement. Course allows students to explore personal beliefs about the goals of schooling.

5273 Child Development

(3-0) 3 hours credit.

Course addresses classic and current conceptual methodological approaches to the social-scientific study of child development. Emphasis will include an examination of historical, theoretical, sociocultural and methodological issues central to child development.

5303 Principles and Techniques of Evaluation

(3-0) 3 hours credit.

Introduces the study of evaluation, the development and selection of instruments, fundamental research methodology (including both quantitative and qualitative approaches), data analysis, techniques for interpreting and communicating evaluation results, and the evaluation of evaluations. Appropriate for students in Adult and Higher Education, Counseling and Educational Psychology, and Educational Leadership.

5313 Assessment and Evaluation for Classroom Teachers

(3-0) 3 hours credit.

Course addresses principles and techniques necessary to develop sound assessment tools and strategies for evaluating student learning. Primary course focus will be on the creation of test items, administration procedures, classroom evaluation and the role of testing, measurement and evaluation in daily classroom practice.

5333 Adolescent Development

(3-0) 3 hours credit.

Course addresses classic and current conceptual methodological approaches to social-scientific study of adolescent development. Emphasis will include an examination of historical, theoretical, sociocultural and methodological issues central to adolescent development.

5603 Psychology of Human Motivation

(3-0) 3 hours credit. Prerequisite: Graduate standing or permission of the instructor.

Explores Human Motivation in a biopsychosocial context. Some of the goals of the course are to understand the evolution of various theories of motivation and to understand the influence of factors such as culture, race, emotion, etc. on human motivation. This course will synthesize research on motivation to provide an in-depth psychological inquiry into human motivation to facilitate the understanding of what motivates people to do what they do. Appropriate for students in Adult and Higher Education, Counseling and Educational Psychology, and Educational Leadership.

6323 Advanced Psychological Assessment

(3-0) 3 hours credit. Prerequisite: COU 5223.

Theory and application of specific instruments and techniques, including administration and scoring. Emphasis on analysis, interpretation, and integration of ability, achievement, and personality assessment results for diagnostics as well as treatment planning. Casework is required. (Formerly EDP 5323. Same as COU 6323. Credit can be earned for only one of the following: EDP 5323, EDP 6323, COU 5323, or COU 6323.)

6423 Development of Girls and Women

(3-0) 3 hours credit.

Course examines the theoretical approaches of development for girls and women. Focus will be placed on: feminist theories and development; socialization of women, sociocultural factors contributing to prevalent disorders among females (anxiety and phobias, eating disorders, dealing with violence and abuse, coping with stress, etc).

6643 Child and Adolescent Psychopathology

(3-0) 3 hours credit. Prerequisite: EDP 5033 or EDP 5273 and EDP 5333.

Course addresses DSM classification to discuss major emotional and behavioral disorders experienced by non-adult populations. Current state of knowledge with regard to the characteristics, etiological factors, and developmental outcomes of psychological disorders of childhood and adolescence will be considered.

6733 Multicultural Assessment and Interventions

(3-0) 3 hours credit. Prerequisite: COU 5243 or EDP 6643.

Course provides theory and research related to assessment, and intervention needs found with cultural diversity. Structured as a seminar, discussions include professional issues, trends, testing and assessment issues, intervention theories and techniques with regard to multiculturalism and cultural diversity.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.

DEPARTMENT OF EDUCATIONAL LEADERSHIP AND POLICY STUDIES

Master of Education Degree in Educational Leadership and Policy Studies

Students seeking to apply for administrative careers in public or private schools, school systems, and higher education institutions have two options for the Master of Education (M.Ed.) degree: (a) a concentration in educational leadership for K-12 school administrators and (b) a concentration in higher education administration for post-secondary administrators. The unique problems, processes, and expertise associated with effective personnel, instruction, and instructional leadership decisions are explored, developed, and tested in simulations with an emphasis on applied research and human relations methodologies. The 36-semester-credit-hour degree program with an educational leadership concentration for K-12 also is designed to meet principalship certification requirements. In addition, a superintendency/central office program of 15 semester credit hours is available for practicing K-12 school administrators. Successful completion of the program and passing the Texas Examinations of Educator Standards (TExES) can result in a recommendation to the State of Texas for principalship or superintendency certification.

Program Admission Requirements. The M.Ed. in Educational Leadership and Policy Studies is for students aspiring to be school administrators in K-16 schools and other educational settings. Admissions are based on the following criteria:

1. Applicants must hold a baccalaureate degree from a regionally accredited college or university in the United States or have proof of equivalent training at a foreign institution.
2. Evidence of relevant work experiences must be provided as documented by the submission of a résumé. For the educational leadership concentration, applicants must have at least two years teaching experience and have demonstrated a willingness to engage in leadership activities outside the classroom. Higher education administration concentration applicants must have at least one year of experience in student affairs or a related field.
3. Acceptance to the M.Ed. program is contingent on having a grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours of coursework for the baccalaureate degree, as well as in all graduate-level work taken. If an applicant's GPA is between 2.7 and 2.99, probationary admission may be granted and the student must maintain a minimum of a 3.0 GPA during the first 12 hours of coursework. Applicants who have a GPA below 2.7 are denied admission as degree-seeking students.
4. Applicants who lack appropriate academic background (e.g., Texas teaching certification) may be admitted conditionally, and specific coursework will be required to address their deficiency.

Degree Requirements

A. Core. 9 semester credit hours required:

EDL	5303	Human Relations in Educational Administration
EDU	5003	Research Methods
EDU	6223	Education in a Culturally and Linguistically Diverse Society

B. Support work. 27 semester credit hours required:

Educational Leadership Concentration

C&I	5003	Theory and Dynamics of Curriculum and Instruction
EDL	5003	Introduction to School Administration
EDL	5103	Introduction to School Finance
EDL	5203	School and Community Relations in Education
EDL	5403	The Principalship: Educational Unit and Site Administration
EDL	5503	Administration and Function of Special Programs
EDL	5703	Legal Foundations in Education

EDL	6023	Supervision: Tools and Techniques
EDL	6943	Internship in Educational Administration

or

Higher Education Administration Concentration

HSA	5003	History of American Higher Education
HSA	5023	Foundation and Function of College Student Personnel
HSA	5103	College Student Development
HSA	5203	Multicultural Issues in Higher Education
HSA	6003	Higher Education Law
HSA	6103	Assessing Higher Education Environments
HSA	6123	Program Planning and Evaluation in Higher Education and Student Affairs
HSA	6143	Administration of Student Services in Higher Education
HSA	6943	Internship in Higher Education

- C. Comprehensive Examination: A comprehensive examination is required as described separately in this catalog (see Chapter 5, Master's Degree Regulations).

Doctor of Education Degree in Educational Leadership

The primary objective of the doctoral degree program is to provide advanced academic training in educational leadership, particularly in the area of administrative leadership. Graduates should gain an advanced understanding of theories of education and learning; extensive theoretical background and experiences in emerging paradigms of organizational leadership; high-level research skills for developing, analyzing, and evaluating educational programs; and the knowledge, skills, and understanding to work effectively with English language learners in linguistically diverse educational settings. Students pursue an emphasis in administrative leadership, which focuses on managerial skills for improving educational effectiveness.

Program Admission Requirements. Applications are screened by the doctoral program faculty or a representative selection committee thereof. Applicants must meet or, as applicable, submit information related to the following criteria to be considered for admission:

- a bachelor's degree from an accredited institution;
- a master's degree in education or other appropriate field;
- a grade point average of 3.5 or better out of a possible 4.0 in a master's degree program;
- submission of an official score on any of the following three graduate admissions examinations: (a) Graduate Record Examination (GRE; verbal and quantitative sections required, analytical section recommended), (b) Graduate Management Admission Test (GMAT), or (c) Miller Analogies Test (MAT);
- for applicants whose native language is not English, a score of at least 550 on the Test of English as a Foreign Language (TOEFL; paper version);
- demonstrated experience in a work environment where education is the primary professional emphasis (teaching, administration, curriculum development in elementary, secondary, postsecondary, governmental, or private industry settings);
- three letters of recommendation from professionals who can discuss the applicant's potential administrative leadership capabilities; and
- a statement of purpose outlining, at a minimum, (1) the applicant's reasons for pursuing a doctorate in educational leadership, (2) a biographical sketch of the applicant's experiences relevant to the field of education, (3) career plans, (4) scholarly interests, and (5) views on and roles in current and future educational reform efforts.

Qualified applicants may be required to interview as part of the admissions process. Interviews are conducted by the Doctoral Program Committee or a subcommittee thereof. As part of the interview process, students will be asked to produce an extemporaneous writing sample. The number of students admitted to this program may be limited.

Degree Requirements. Degree candidates must complete 33–36 semester credit hours of core courses:

- A. Culture (9 hours). The social, cultural, and linguistic dynamics of current and future school populations, historical and cultural contexts of schooling in Texas and the Southwest, issues related to language and linguistic policies and education, and issues related to leadership within culturally diverse communities.
- B. Methodology (12 hours). Survey of quantitative and qualitative research designs and methods and the uses of technology for data collection and analysis.
- C. Leadership (12–15 hours). Procedures and techniques of inquiry-based organizational development and leadership, effective leadership of culturally diverse school personnel, issues related to leadership of majority-minority schools, and the ethics of leadership.

After completing the core requirements, students take an additional 15–18 semester credit hours of courses toward fulfilling the administrative leadership emphasis and cognate requirements:

- A. Area of emphasis (9–12 hours). This emphasis area targets the development of knowledge and skills in administrative leadership.
- B. Cognate support (6 hours). Students select a cognate area of support to enhance their emphases and the research for their dissertations. Courses are selected from graduate offerings throughout the University, and students must meet prerequisites for enrollment.

Dissertation Requirement. Upon completion of the required 51 semester credit hours, students must pass a written and oral qualifying examination. They must also take a minimum of 9 semester credit hours of dissertation. The dissertation must meet these objectives:

- 1. The dissertation format creates strong ties between the University and the selected educational setting.
- 2. The dissertation's research team consists of a doctoral student and faculty member who work in collaboration with an educational institution to focus on a single issue.
- 3. Dissertation topics are linked to the goal of improving program effectiveness.
- 4. The dissertation demonstrates the scholarly capabilities of the student working with his or her committee.

In addition, each student must:

- 1. Pass an oral defense of the doctoral dissertation proposal, conducted by the Dissertation Committee, that addresses the dissertation's potential for scholarly research as specified by University-wide requirements.
- 2. Maintain a grade point average of 3.0 or higher (on a 4.0 scale) each semester for the entire doctoral program, as specified by University-wide requirements.
- 3. Complete an on-campus residency taking at least 6 semester credit hours per semester or summer term for two consecutive long semesters, or two full summer terms and one long semester (consecutively), or three full summers. No transfer students will be admitted to the program; however, up to 6 hours of transfer credit toward the degree may be accepted, provided that the graduate courses were taken at an accredited institution within the past three years and were not part of a program that culminated in the award of a degree.

**COURSE DESCRIPTIONS
EDUCATIONAL LEADERSHIP
(EDL)**

5003 Introduction to School Administration

(3-0) 3 hours credit. Prerequisite: Program admission or consent of instructor.

Introduction to the roles, tasks, and problems of positions in educational administration and their relationship to local, state, and federal government agencies.

5103 Introduction to School Finance

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Introduction and survey of current designs in educational finance of public school districts, review of general concepts, and practices of the appropriate local, state, and federal government agencies.

5203 School and Community Relations in Education

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Introduction to the strategies and design models for informing local business taxpayers and clientele about educational activities. Study of models for participation and analysis of interaction models.

5303 Human Relations in Educational Administration

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Analysis and identification of group processes and individual behaviors that tend to enhance democratic interaction in the achievement of educational goals. Consideration of supportive roles requisite to the supervision of professionals in the educative process.

5403 The Principalship: Educational Unit and Site Administration

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Analysis of the principal's or comparable position's role and the requisite interaction with various referent groups. Emphasis is on administration of academic programs. Applicable to all levels of common school.

5503 Administration and Function of Special Programs

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Identification and analysis of models and designs for the administration, development, supervision, and support programming of special education, guidance, vocational and technical education, and other alternative and support functions in education.

5603 Applied Research Seminar in Educational Leadership

(3-0) 3 hours credit. Prerequisites: EDL 5003, EDU 5003, and consent of instructor.

Introduction to identification, analysis, and design formulation of applied research problems in educational leadership. Practice in conducting searches, elementary analysis, and deriving appropriate conclusions from applied studies. Students are required to complete and articulate an approved applied research design in prescribed form.

5703 Legal Foundations in Education

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Survey of current legal basis and practices in the policy administration of education and review of significant court decisions pertaining to educational operations. Emphasis on rights and responsibilities of teachers and students and legislation related to multicultural institutional operations.

6003 Supervision: Theoretical Basis

(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.

An application of theories of curriculum development, educational planning, learning, and human relations to instructional supervision. An examination of the role of the supervisor. (Same as C&I 6003. Credit cannot be earned for both EDL 6003 and C&I 6003.)

6013 Supervision: Teaching-Learning Process

(3-0) 3 hours credit. Prerequisite: C&I 6003, EDL 6003, or consent of instructor.

The analysis and application of models of the teaching and learning process to instructional supervision. The study and application of content, interaction, and climate analysis techniques. (Same as C&I 6013. Credit cannot be earned for both EDL 6013 and C&I 6013.)

6023 Supervision: Tools and Techniques

(3-0) 3 hours credit. Prerequisite: C&I 6003, EDL 6003, or consent of instructor.

A study of impact strategies in instructional supervision and the development of communication and interpersonal skills needed for working with teachers. (Same as C&I 6023. Credit cannot be earned for both EDL 6023 and C&I 6023.)

6203 Educational Facilities and Capital Funds Administration

(3-0) 3 hours credit. Prerequisite: EDL 5003 or consent of instructor.

Survey of models, policies, and procedures for the effective development, planning, use, and management of educational facilities and capital funds. Emphasis is on meeting curricular program needs.

6503 Superintendent's Seminar

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A field-based course designed for students preparing for educational leadership at the school district level. Enrollment is required each semester a student desires to fulfill a requirement for Texas school superintendent certification. Students develop an independent field-based study component in four certification areas: personnel administration, educational funds and facilities management, survey of organization and administration theory in education, and organizational systems analysis. Students are required to participate in 100 hours of clinical experience related to the certification area they seek to fulfill. May be taken four times for credit.

6941-3 Internship in Educational Administration

1 to 3 hours credit. Prerequisites: C&I 5003, EDL 5003, EDL 5103, EDL 5203 or EDL 5303, EDL 5403, EDL 5503, EDL 5703, EDL 6023, and consent of instructor.

Individually supervised field experience with unit-level or institutional-level educational administrators with related applied research activity. Must be taken for both principalship and superintendency certification. May be repeated for a total of 6 semester credit hours.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

- 7103 Administration of Urban/Multicultural Institutions**
(3-0) 3 hours credit.
Provides practicing and potential urban educational leaders with knowledge of contemporary conditions and positive models for effective educational administrative designs, including alternative educational delivery systems.
- 7133 Topics in Administration**
(3-0) 3 hours credit.
Study and analysis of contemporary issues related to administration, including educational facilities and capital fund administration, school finance, strategic and operational planning, personnel management, and program evaluation. May be repeated for credit when topics vary.
- 7273 Examining School Populations, Structures, and Culture**
(3-0) 3 hours credit. Prerequisite: EDU 7223 or consent of instructor.
Development of an analytical framework for intervening in political and organizational systems to accomplish educational missions and establish a sense of community in school culture.
- 7343 The Politics of Educational Change**
(3-0) 3 hours credit.
Examination of the political structure and processes through which many of the major issues in education are treated, analysis of the power structure and its influence on educational policymaking, exploration of the evolving roles of state and federal agencies, the courts, private organizations, and interest groups in shaping the policymaking process in education. (Formerly EDL 6333. Credit cannot be earned for both EDL 7343 and EDL 6333.)
- 7563 Research in Leadership Laboratory: Change Theory, Innovation, and Application**
(3-0) 3 hours credit. Prerequisite: EDU 7133 or consent of instructor.
Inquiry into the research of leadership and organizational change processes in field-based settings. Examination of cases involving organizational and leadership change agents.
- 7663 Technology in Educational Environments**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Examination of current models for use and application of technology, including computer-based, multimedia, and distance learning in educational settings.
- 7773 Independent Study**
3 hours credit. Prerequisites: Doctoral standing and permission in writing (form available) of the instructor and student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work as part of the regular course offerings. May be repeated for credit, but not more than 6 hours will apply to the Doctoral degree.
- 7783 Special Problems**
(3-0) 3 hours credit. Prerequisites: Doctoral standing and consent of instructor.
An organized course offering the opportunity for specialized study not normally or often part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours will apply to the Doctoral degree.
- 7893 Doctoral Research**
3 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.
May be repeated for credit, but not more than 6 hours may be applied to the Doctoral degree.

COURSE DESCRIPTIONS
EDUCATION
(EDU)

5003 Research Methods

(3-0) 3 hours credit. Prerequisite: Admission to graduate program or consent of instructor.

Basic concepts of research design, strategies of experimental, historical, and descriptive research, and basic statistical procedures are introduced. Participants use these concepts to read, interpret, and evaluate educational and counseling research and to plan such research.

5103 Contemporary Educational Philosophy

(3-0) 3 hours credit.

Philosophical analysis of issues in American education. Consideration is given to ethical and epistemological implications of issues with an emphasis on the evaluation of arguments for the adoption of educational policy.

6223 Education in a Culturally and Linguistically Diverse Society

(3-0) 3 hours credit.

The study of cultural and economic issues in education from philosophical, historical, political, and sociological perspectives. These issues will be related to educational leadership and equity in education.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7003 Survey of Research Methods

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A survey of research methodology including fundamental concepts employed in quantitative and qualitative research in education. May include computer applications for research.

7043 Educational Research Statistics: Descriptive and Comparative

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Review of descriptive statistics, study of comparative statistics including t-tests and ANOVA, reporting and plotting functions, and Chi-square applications. (Formerly EDU 7113. Credit cannot be earned for both EDU 7043 and EDU 7113.)

- 7063 Inferential Statistics**
(3-0) 3 hours credit. Prerequisite: EDU 7043 or equivalent.
The logic of inference in research with special emphasis on statistical techniques and the appropriate types of inference related to each. Computer programs will be used to analyze simulated data. (Formerly EDU 7053. Credit cannot be earned for both EDU 7063 and EDU 7053.)
- 7103 Qualitative Research Traditions**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Exploration of major research paradigms and qualitative research traditions. Includes the study of qualitative research designs with comprehensive exercises for the student in stating the research problem, reviewing the relevant research literature, specifying appropriate methods and procedures, and identifying analytic procedures. Students are required to produce an original qualitative research design as a major component of the course.
- 7123 Advanced Qualitative Data Analysis**
(3-0) 3 hours credit. Prerequisite: EDU 7103 or equivalent.
Advanced study of qualitative research methods in a laboratory mode that emphasizes the applied and computing aspects of qualitative research design, data analysis, and presentation of findings. The goal is to enable students to use computers effectively in the analysis of qualitative (text) data, and to enhance their understanding of interpretive research methods and designs. Lectures, demonstrations, discussions, hands-on work with software and data, and readings will be the main class activities. Students will be required to complete a pilot research project.
- 7133 The Role of Research in Educational Environments**
(3-0) 3 hours credit. Prerequisite: EDU 7043 or EDU 7103.
Application of research techniques in school-based settings. Students design research proposals using qualitative and quantitative perspectives and 'pilot test' them in an educational environment.
- 7213 School Reform**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Examination of the historical and philosophical roots of school reform during the last 100 years. The course will focus on different perspectives on analysis and evaluation of school reform efforts for culturally diverse populations.
- 7223 Learning in a Culturally and Linguistically Diverse Society: Infancy through Adulthood**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Examination of development changes throughout the lifespan from a variety of theoretical perspectives. Emphasis on psychological, anthropological, and sociolinguistic principles and their application to learning and teaching in a culturally and linguistically diverse society.
- 7403 Education, Cultural Differences, and Acculturation**
(3-0) 3 hours credit.
Advanced level consideration of the impact of cultural differences upon the education process. Interactions of schooling and social life with the process of acculturation. Study of procedures and techniques for identifying and ameliorating educational problems related to cultural differences.

**COURSE DESCRIPTIONS
HIGHER EDUCATION
(HSA)**

- 5003 History of American Higher Education**
(3-0) 3 hours credit.
This course covers the development of higher education from the 11th century to the present with an emphasis on its development in America since the founding of Harvard in 1636. (Formerly AHE 5003. Credit cannot be earned for both HSA 5003 and AHE 5003.)

5023 Foundation and Function of College Student Personnel

(3-0) 3 hours credit.

Provides initial insight into the student affairs profession. This survey course provides a concise and comprehensive understanding of student affairs using theory-based and application-oriented approaches.

5103 College Student Development

(3-0) 3 hours credit.

This course provides an opportunity for those who work or plan to work in post secondary educational institutions with an understanding of the student population in contemporary colleges and universities. (Formerly AHE 5203. Credit cannot be earned for both HSA 5103 and AHE 5203.)

5203 Multicultural Issues in Higher Education

(3-0) 3 hours credit.

This course surveys literature on multiculturalism, diversity, and racism in institutional settings. (Credit cannot be earned for more than one of the following: HSA 5203, AHE 5633, ALT 5633, and COU 5633.)

6003 Higher Education Law

(3-0) 3 hours credit.

This course examines the legal status of higher education in the United States, the rights and responsibilities of educators and students including fair employment, due process, tort liability and contracts, student rights, landmark court decisions, and federal and state legislation having an impact on education. (Formerly AHE 5333. Credit cannot be earned for both HSA 6003 and AHE 5333.)

6103 Assessing Higher Education Environments

(3-0) 3 hours credit.

This course explores the application of environmental theory to the assessment of human environments. A focus on the study of select campus environments and their influence on students.

6123 Program Planning and Evaluation in Higher Education and Student Affairs

(3-0) 3 hours credit.

An overview of program evaluation models and perspectives currently being applied in higher education. Emphasis will be on how to construct program plans and perform program evaluations, based on existing evaluation models, theories, and research methods.

6143 Administration of Student Services in Higher Education

(3-0) 3 hours credit.

Examines the organization and administration of student services in institutions of higher education. Theories, research, and methods are used to encourage the application of theory to practical experience. Topics will include the administrative environment of student affairs, organizational and management issues of student affairs, essential skills and competencies for student affairs managers, commitment to professional education, and challenges for the future.

6203 Contemporary Thought in Higher Education

(3-0) 3 hours credit.

A study of current thought as it relates to the management of institutions of higher education. (Formerly AHE 5103. Credit cannot be earned for both HSA 6203 and AHE 5103.)

6303 Seminar in Governance in Higher Education

(3-0) 3 hours credit.

Analysis of current practices and issues in the governance of higher education that affect students, faculty, and administration. Study of the scope and role of colleges and universities. (Formerly AHE 5313. Credit cannot be earned for a both HSA 6303 and AHE 5313.)

6403 Financing Higher Education

(3-0) 3 hours credit.

Examination of representative methods of state funding of public colleges and universities; elements of funding formulas; rationales for funding patterns; and policy implications of various funding methods for colleges and universities. (Formerly AHE 5323. Credit cannot be earned for both HSA 6403 and AHE 5323.)

6503 The Community College

(3-0) 3 hours credit.

The historical and philosophical foundations for the community junior college movement in the United States are analyzed and utilized as a basis for understanding contemporary trends and problems of community junior colleges. (Formerly AHE 6003. Credit cannot be earned for both HSA 6503 and AHE 6003.)

6943 Internship in Higher Education

3 hours credit.

Individually supervised field experiences in student personnel services, college administration, college teaching, institutional research, development, or other areas of college and university work. May be repeated for a total of 6 semester credit hours. (Formerly AHE 6943. Credit cannot be earned for both HSA 6943 and AHE 6943.)

**COURSE DESCRIPTIONS
LEADERSHIP
(LDR)**

7003 Proseminar in Educational Leadership

(3-0) 3 hours credit.

This course is intended to acclimate and provide first-year doctoral students with an opportunity to explore the main theories and areas of research in educational leadership. Readings include seminal work in organizational theory, educational administration, and related areas. Students will become familiar with areas of research of doctoral program faculty and will learn prerequisite material to successful doctoral work such as APA writing style, how to conduct literature reviews, and insights into the dissertation process.

7133 Majority-Minority Settings: Creating a Community of Leaders

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

This course focuses on organizational relationships and the tension between power and equality. A model of leadership in which organizational members are given shared visions to accomplish goals is presented.

7153 Reflective Leadership: The Personal Dimension

(3-0) 3 hours credit. Prerequisite: LDR 7133.

An in-depth study of the character and nature of leadership, including an examination of social ethics, educational policy issues, and the link of theory and practice. Students are required to clarify, critique, and develop personal perspectives on the public responsibility of leaders.

7183 Emerging Paradigms in Leadership

(3-0) 3 hours credit. Prerequisites: LDR 7133 and LDR 7153.

An overview of major leadership theories and an exploration of significant shifts in perspectives that affect the exercise of authority and power. A reexamination of traditional views of leadership and an analysis of views emerging from corporate, international, and transcultural perspectives.

7203 Leadership in Multiple Language Educational Settings

(3-0) 3 hours credit.

Advanced study of the educational aspects of language policy with an emphasis on the role of educational leaders in providing equitable and appropriate educational opportunities to students with non-English language proficiency or backgrounds. Major topics include the public policy process, historical and recent aspects of language policy in the United States, and issues and controversies surrounding language policy and education.

7303 Organizational Theory

(3-0) 3 hours credit.

The purpose of this course is to advance student understanding of organizations by exploring a variety of theoretical frameworks and applying these perspectives to aspects of public and private institutions. Each framework draws attention to significant aspects of the organizing process and provides a distinctive means of understanding and managing organizational situations.

7343 Principles of Ethical Leadership

(3-0) 3 hours credit. Prerequisites: LDR 7133, LDR 7153, and LDR 7183.

This course will expose doctoral students to multiple frameworks involved with ethical dilemmas. Using theoretical principles of ethics in the context of democratic values, students will examine and interpret educational policies from an ethical leadership perspective. Analysis of complex policy cases that raise ethical issues will be investigated.

7413 Sponsored Internship in Educational Leadership

(1-16) 3 hours credit. Prerequisites: LDR 7133, LDR 7153, LDR 7183, LDR 7343, and assessment and screening process administered by UTSA and cooperating sponsors (application available).

Individually designed internships in educational leadership in school systems, adult and higher education, human service institutions, government, and private industry. Jointly supervised by University faculty and field administrators from cooperating agencies. May be repeated for credit, but not more than 6 hours may be applied to a degree program.

7991-6 Dissertation

1 to 6 hours credit. Prerequisites: Admission to candidacy for the Doctoral degree and consent of student's Graduate Advisor of Record.

May be repeated for credit, but not more than 9 hours may be applied toward the Ed.D. degree requirements. Credit will be awarded upon completion of the dissertation.

DEPARTMENT OF HEALTH AND KINESIOLOGY

Master of Arts Degree in Education – Kinesiology and Health Promotion Concentration

The program is designed for students seeking advanced preparation for teaching physical and health education in school and community settings and pursuing careers in an area related to kinesiology or health. It is intended to offer students the opportunity to expand content knowledge and to apply such information to become more effective teachers and leaders. Graduates of this program proceed or continue their careers as teachers, coaches, researchers, supervisors, health workers, and administrators in public education and health or private sector. The minimum number of semester credit hours required for this degree is 36.

Degree Requirements

A. Core (12 semester credit hours):

C&I	5003	Theory and Dynamics of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Contemporary Educational Philosophy

B. Concentration (12 semester credit hours):

KAH	5003	Current Trends in Kinesiology and Health Education
KAH	5093	Statistics and Research in Health and Kinesiology

Two additional KAH courses selected after consultation with the Program Advisor or the Graduate Advisor of Record.

C. Support Work:

No more than 12 semester credit hours; support work may consist of additional KAH courses, and must be selected after consultation with the Program Advisor or the Graduate Advisor of Record.

As a partner in a University of Texas System collaborative program, The University of Texas at San Antonio offers graduate courses over the Internet. A complete list of the kinesiology courses and descriptions are located at www.telecampus.utsystem.edu. Students interested in Internet courses should contact their program advisors prior to enrollment.

COURSE DESCRIPTIONS KINESIOLOGY AND HEALTH PROMOTION (KAH)

5003 Current Trends in Kinesiology and Health Education

(3-0) 3 hours credit. Prerequisite: EDU 5003 or consent of instructor.

Students have the opportunity to examine current development in theories and practices of physical education. Recent research and literature are examined for causes and consequences of today's issues, trends, and problems.

5023 Management of Kinesiology and Health Programs

(3-0) 3 hours credit.

An examination of the various functions involved in the management of a sport-, health-, or recreation-related organization. Topics include budgeting, facilities, scheduling, promotion, and liability.

5043 Child and Adolescent Health Promotion

(3-0) 3 hours credit. Prerequisites: KAH 5063 and KAH 5073.

Examines the multifaceted determinants of health for children and adolescents (environmental, behavioral, developmental, biological, and social) with special emphasis on the roles of the family, school, and community. Models and theories of health behavior, risk-taking, and challenges to health care delivery for these populations will be investigated.

5053 Principles of Exercise Physiology

(3-0) 3 hours credit. Prerequisite: KIN 3433 or an equivalent.

A survey of exercise physiology, examining muscular, metabolic and cardiorespiratory adaptations to acute and chronic exercise.

5063 Health Behaviors

(3-0) 3 hours credit.

A study of the determinants of human behavior as they relate to current health issues. Health behavior models and underlying rationales for prevention and intervention strategies will be examined. For teachers and counselors, as well as kinesiology and health professionals.

5073 Health and Wellness/Health Promotion

(3-0) 3 hours credit.

The purpose of this course is to introduce students to the field of health promotion and to show how epidemiology, social and behavioral science theory, organization change, administration, and evaluation are related to the design and implementation of health education programs. This course serves as a foundation for other courses in health education and provides an overview of the field to the student from related areas.

5083 Epidemiology

(3-0) 3 hours credit. Prerequisites: KAH 5063 and KAH 5073.

The overall goal of this course is to increase the health professional's ability to analyze problems and make decisions based on applications of epidemiologic concepts and methods in a variety of settings, with a particular focus on applications from studies in health promotion. Social, psychological, and biological determinants of disease will be examined. Epidemiologic tools to be presented include use of vital statistics and rates, descriptive studies, observational studies, and experimental studies.

5093 Statistics and Research in Health and Kinesiology

(3-0) 3 hours credit.

This course is designed to provide students with knowledge of experimental designs and the statistical tools necessary for analyzing research data in the fields of Health and Kinesiology.

5103 Biomechanics

(3-0) 3 hours credit. Prerequisite: KIN 3323 or an equivalent.

A survey of principles and procedures related to mechanical analysis of human motion, with emphases on both kinematic and kinetic analysis.

5113 Advanced Structural and Functional Anatomy

(3-1) 3 hours credit. Prerequisite: KIN 3313 or an equivalent.

A detailed study of human musculoskeletal, cardiovascular, and respiratory anatomy with specific application to kinesiology.

5123 Research in Health and Kinesiology

(3-0) 3 hours credit. Prerequisite: KAH 5093.

Students have the opportunity to review various quantitative and qualitative research methods as well as conduct a review of the literature for a specific topic of interest. The final project will be a research proposal.

- 5133 Health Program Planning, Implementation, and Evaluation**
(3-0) 3 hours credit. Prerequisites: KAH 5063, KAH 5073, and KAH 5093.
This course is designed for students interested in planning, implementing, and evaluating health promotion/education programs in school, community, health care, and worksite settings. Students enrolled in this course should have prior knowledge of health behavior theories and general foundations of health promotion.
- 5143 Ethics in Health Education**
(3-0) 3 hours credit. Prerequisites: KAH 5063 and KAH 5073.
This course will examine the ethical complexities inherent in the practice of health education. The Society of Public Health Education (SOPHE) Code of Ethics will serve as the template from which students will assess and evaluate various ethical dilemmas in health education.
- 5153 Health Communication and Technology**
(3-0) 3 hours credit. Prerequisites: KAH 5063 and KAH 5073.
This course examines major concepts, theories, and research in health communication and provides students with a conceptual understanding of the nature, function and outcomes of communication processes in various health contexts. Special emphasis will be placed on the role of technology and media's influence on health issues.
- 5163 Grant Writing**
(3-0) 3 hours credit. Prerequisites: EDU 5003 and KAH 5093.
This course will provide the student with an overview of the grant writing process. Literature review/rationale, budget, and evaluation protocols, as well as Institutional Review Board requirements, will be examined. Local, state, national, government, and private funding sources will be reviewed. The final product will be a completed grant proposal.
- 5213 Measurement Techniques in Motor Behavior and Biomechanics**
(2-2) 3 hours credit. Prerequisite: KIN 3323 or an equivalent.
This course will introduce students to techniques and methods (e.g., videographic-motion-analysis system, electromyography, electroencephalography, and force platform) used in analysis of human movement.
- 5223 Neuromotor Control**
(3-0) 3 hours credit. Prerequisite: KIN 4403 or an equivalent.
Structure and function of the major systems underlying human motor control. Central and peripheral mechanisms controlling voluntary and reflexive movement, including normal behaviors and movement disorders.
- 5233 Measurement Techniques in Exercise Physiology**
(2-2) 3 hours credit. Prerequisite: KIN 3433 or an equivalent.
This course is designed to teach students key laboratory skills central to exercise physiology research and service provision in the field of sport and exercise. Exercise testing, blood lipid analysis, metabolic measurement, skeletal muscle properties, and body composition measurement are emphasized.
- 5243 Learning and Teaching Styles in Physical Education**
(3-3) 3 hours credit. Prerequisite: KAH 5003.
Techniques for analyzing and enhancing the learning environment to promote and improve physical and sport performance.
- 5253 Enhancing Behavior and Performance in the Physical Education Environment**
(3-0) 3 hours credit. Prerequisite: KAH 5003.
Techniques for effective behavior management and facilitating learning of individuals of all ages and levels of abilities. Underlying theories and research applications addressed.
- 5263 Appraisal and Programming for Individuals with Psychomotor Dysfunctions in Physical Education**
(3-0) 3 hours credit. Prerequisite: KAH 5003.
This course examines the conditions which delay psychomotor functioning; evaluation techniques and tools pertaining to the motor domain; role of physical educator on Annual Review and Dismissal (ARD) Committees and the Individual Education Plan (IEP).

5273 Aerospace and Environmental Physiology

(3-0) 3 hours credit. Prerequisite: KIN 3313, KIN 3433, or an equivalent, or approval of instructor.

This course focuses on published scientific literature documenting acute and chronic physiological adaptations to spaceflight, high altitude, and other environmental extremes. Specific emphasis is placed on physiological adaptations to the cardiovascular, musculoskeletal, nervous, and respiratory systems.

5303 Community Health

(3-0) 3 hours credit. Prerequisites: KAH 5063 and KAH 5073.

Study of community health problems, the function of public, private, and voluntary health agencies, and administration and supervision of health programs in the community, school, business, or industry setting.

5403 Cardiovascular Fitness

(3-0) 3 hours credit. Prerequisite: KIN 3433, KIN 3443, or an equivalent, or a human physiology course.

This course covers the physiology underlying the methods used for obtaining, maintaining, and rehabilitating the health of the cardiovascular system. Recent research findings in the areas of exercise and nutrition, related cardiovascular disease prevention and rehabilitation, weight control, and blood lipids are emphasized.

6013 The Role of Sport in Society

(3-0) 3 hours credit.

Examination of sport and physical activity, sport's impact on society, and the affective roles sport takes as part of our social structure and the institution of education. (Formerly KAH 5013. Same as COU 6013. Credit cannot be earned for both KAH 6013 and KAH 5013 or COU 6013.)

6023 Exercise Psychology

(3-0) 3 hours credit.

A study of the theoretical models and research related to the determinates of exercise adoption and adherence. The relationship between exercise and mental health will be discussed. (Same as COU 6023. Credit cannot be earned for both KAH 6023 and COU 6023.)

6033 Sport Psychology

(3-0) 3 hours credit.

A study of cognition and behaviors related to the participation in sport. This course will have a theoretical focus and will include topics such as self-efficacy, performance enhancements, cohesion, arousal and anxiety. Contemporary research will be discussed. (Formerly KAH 5033. Same as COU 6033. Credit cannot be earned for both KAH 6033 and KAH 5033 or COU 6033.)

6043 Applied Sport Psychology

(3-0) 3 hours credit. Prerequisite: KAH 6033.

This course will provide a practical and comprehensive introduction to somatic, cognitive and behavioral interventions used in athletics to improve performance. Theoretical bases of psychological stress and performance will be explored and appropriate interventions discussed. Research findings related to athletics will be applied. (Same as COU 6043. Credit cannot be earned for both KAH 6043 and COU 6043.)

6053 Nutrition in Health and Disease

(3-0) 3 hours credit.

Study of basic nutrients, nutritional needs at various stages of life, and therapeutic diets for selected disease states.

6203 Psychological Perspectives of Motor Learning and Control

(3-0) 3 hours credit.

Study of the individual processes of skill acquisition, including the involvement of transfer, timing, feedback, practice, and retention as well as the processes of central and peripheral mechanisms involved in implementing physical and perceptual skills. (Formerly KAH 5203. Same as COU 6203. Credit cannot be earned for both KAH 6203 and KAH 5203 or COU 6203.)

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

DEPARTMENT OF INTERDISCIPLINARY LEARNING AND TEACHING

Master of Arts Degree in Education

The course of study for the Master of Arts degree in Education consists of:

A. Core courses required of all Master of Arts in Education degree-seeking students (12 semester credit hours):

C&I	5003	Theory and Dynamics of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Contemporary Educational Philosophy

B. Concentration courses (12 to 24 semester credit hours).

C. Support courses (0 to 12 semester credit hours).

D. A comprehensive examination is required.

Applicants for the Master of Arts Degree in Education may choose a thesis option or nonthesis option. A minimum of 36 semester hours are required in the nonthesis option. A minimum of 33 semester hours are required in the thesis option.

Master of Arts Degree in Education – Curriculum and Instruction Concentration

The program emphasizes the theoretical and practical aspects of curriculum planning, development, implementation, and evaluation in all subject fields and at all educational levels. The concepts of curricular innovation and teaching excellence are stressed in conjunction with expanded knowledge of content fields and applied research. Students who want to specialize in a teaching field may do so by taking courses in that field to support the concentration in Curriculum and Instruction. Within this concentration, a student may specialize in the supervision of instruction, or an initial teacher's certificate may be earned in specified areas of public school programs. The program is flexible, but C&I 5013 Classroom Instruction and Evaluation is required of all students and is an orientation course. One option for students who wish to certify with the Masters program is MAECIT, which requires special admission and a specific plan. Please see graduate advisor regarding teaching option.

Curriculum and Instruction Concentration emphases:

Curriculum Specialist
Teaching (MAECIT; by admission only, separate from degree admission)
Science Education
Teacher Leadership

Master of Arts Degree in Education – Early Childhood and Elementary Education Concentration

This concentration is designed to allow professionals the opportunity to acquire knowledge and skills for effective instruction and care, leadership, and advocacy in early childhood and elementary education in a diverse society. Emphasis is on integrating reflective practices with current research perspectives for practical applications. The focus is also on advancing the research and knowledge base in fields of early childhood and elementary education. The program is flexible within areas of emphasis that include child development, early childhood leadership and advocacy, early literacies, family studies, inclusive education and teaching. Teaching emphasis is for individuals seeking teacher certification. Please see graduate advisor regarding teaching option.

Master of Arts Degree in Education – Instructional Technology Concentration

The Instructional Technology concentration focuses on the uses and applications of technology in EC-20 instructional environments. Emphasis is placed on the development, function and utilization of a variety of technologies within educational settings. This concentration is designed for students seeking to expand their knowledge of instructional technology as well as those seeking leadership roles in this area. Courses required for this concentration are:

IST	5003	Foundations of Instructional Technology
IST	5703	Technology and Learning Cultures
IST	6353	Multimedia Production
IST	6503	Advanced Topics in Instructional Technology

Master of Arts Degree in Education – Literacy Education Concentration

This concentration is designed to provide theory, research, knowledge, and field experiences for students who plan to teach literacy. Reading and writing are presented as linguistic, cognitive, and sociocultural processes in relation to other language arts. Students select from three specialized areas of study: teaching focus, research focus, and Reading Specialist Certification. The teaching area is designed for teachers and offers flexibility to pursue an area of one's own interest. The research area is designed for students who want to pursue research in literacy; students in this area typically pursue the thesis option. The reading specialist certification area leads to completion of requirements of the State Board for Educator Certification as a reading specialist. This area includes the five courses for Master Reading Teacher (MRT) endorsement.

Master of Arts Degree in Education – Special Education Concentration

The concentration in Special Education program is designed for those students seeking an opportunity for initial, additional, or advanced preparation for educating individuals with disabilities in a variety of settings. It is intended to offer students the opportunity for the acquisition of knowledge, competencies and understanding, through both classroom and clinical experience, to develop and apply skills for effective instructional practices in working with children and youth with disabilities. Applicants who hold a valid Texas teaching certificate may obtain a teaching certificate in special education as a part of their program of study. An emphasis in teaching is available for students who wish to obtain postbaccalaureate certification in generic special education; students must complete 24 semester credit hours of specified coursework in special education in addition to foundational prerequisites in education. Please see graduate advisor regarding teaching option. For noncertification-seeking students, the special education and related courses must be approved by the student's program advisor prior to enrolling in courses. These preparation programs will include practica. Graduates of the program often go on to or continue their careers serving children, youth, and adults with intellectual, academic, social and behavioral disabilities as teachers, supervisors, administrators and researchers in public and private education and service agencies.

Required courses for this concentration (12 semester credit hours):

SPE	5403	Exceptional Children and Youth in the Schools
SPE	5503	Applied Behavior Analysis for Classroom Teachers and Counselors
SPE	5613	Legal Issues in Special Education
SPE	5623	Seminar on Current and Critical Issues in Special Education

Approved support courses for students studying high incidence disabilities (12 semester credit hours):

SPE	5433	Children and Youth with Behavior Disorders
		or
SPE	5453	Children and Youth with Learning Disabilities
SPE	5513	Curriculum and Instructional Applications for Children and Youth in Special Education
SPE	5533	Assessment and Evaluation of Children and Youth with Disabilities
SPE	5633	Instruction and Educational Interventions for Individuals with High Incidence Disabilities

Approved support courses for students studying low incidence disabilities (12 hours):

SPE	5413	Children and Youth with Developmental Disabilities or
SPE	5463	Educating Individuals with Autism Spectrum Disorders
SPE	5523	Language Development and Cognitive Intervention for Individuals with Disabilities
SPE	5533	Assessment and Evaluation of Children and Youth with Disabilities
SPE	5643	Instruction and Educational Interventions for Individuals with Low Incidence Disabilities

COURSE DESCRIPTIONS ADULT LEARNING AND TEACHING (ALT)

5203 The Student, Community, and Instructor in Adult Learning and Teaching

(3-0) 3 hours credit.

The college student's role in contemporary society; characteristics, basic values, peer group influence, campus culture, needs, and pressures. (Formerly AHE 5203 and COU 5603. Credit cannot be earned for both ALT 5203 and AHE 5203 or COU 5603.)

5343 Curriculum, Instruction, and Assessment in Adult Learning and Teaching

(3-0) 3 hours credit.

Overview of the theories and practices of adult learning. Particular attention is given to the concepts of andragogy, self-directed learning, situated learning, and transformational learning. The course also explores situational and cultural factors that influence adult learning, as well as effective methods of instruction in various contexts. (Formerly AHE 5343. Credit cannot be earned for both ALT 5343 and AHE 5343.)

5603 Post Secondary Contexts, Governance, and Content/Disciplines/Standards in Adult Learning and Teaching

(3-0) 3 hours credit.

Exploration of forms of continuing and adult education conducted by business and industry, the armed forces, educational institutions, and private foundations, including federal and state programs of support; external and alternative degree programs; the open university concept and self study programs; general treatment of historical development. (Formerly AHE 5603. Credit cannot be earned for both ALT 5603 and AHE 5603.)

5623 Evaluation of Adult Learning and Teaching Programs

(3-0) 3 hours credit.

Organization for adult and continuing education within a college or university and its relationship to the entire institution; staffing, training, directing, and controlling the continuing education effort; planning, programming, and budgeting; marketing and public relations; methods of determining the market; evaluation of administrative and academic performance. (Formerly AHE 5623. Credit cannot be earned for both ALT 5623 and AHE 5623.)

5633 Multicultural Issues and Social Action in Adult Learning and Teaching

(3-0) 3 hours credit.

Overview of cultural diversity in the adult educational context. Topics include cultural self-awareness, perspectives of multicultural education, adult and continuing education settings, and strategies for implementing diversity. Various psychosocial development factors of diverse cultural and ethnic groups and the influence of these variables on the helping relationship will be explored. (Formerly AHE 5633 and COU 5633. Credit cannot be earned for both ALT 5633 and AHE 5633 or COU 5633.)

- 5813 Adult Literacy**
(3-0) 3 hours credit.
Examination of the acquisition and development of reading and writing in adult populations. Reviews research and issues relevant to the teaching of reading and writing to adults. (Formerly AHE 5813. Same as C&I 5813. Credit cannot be earned for both ALT 5813 and AHE 5813 or C&I 5813.)
- 6003 The Community College**
(3-0) 3 hours credit.
The historical and philosophical foundations for the community junior college movement in the United States are analyzed and utilized as a basis for understanding contemporary trends and problems of community junior colleges. (Formerly AHE 6003. Credit cannot be earned for both ALT 6003 and AHE 6003.)
- 6063 Research in Adult Learning and Teaching**
(3-0) 3 hours credit. Prerequisite: EDU 5003.
Consideration of the major research problem areas in adult and higher education, identification of problems in need of research, examination of research literature in selected areas, and study of research procedures unique to or especially useful in adult and higher education. (Formerly AHE 6063. Credit cannot be earned for both ALT 6063 and AHE 6063.)
- 6103 Effective Teaching in Higher Education I**
(3-0) 3 hours credit.
This seminar focuses on the image of the college professor and reviews the current research on the teaching and learning process at the college or university level. Includes a review of educational psychology of the late adolescent and adult, an investigation of new and effective instructional methods, and an appraisal of evaluation procedures. (Formerly AHE 6103. Credit cannot be earned for both ALT 6103 and AHE 6103.)
- 6123 Effective Teaching in Higher Education II**
(3-0) 3 hours credit. Prerequisites: ALT 6103 and consent of instructor.
An examination of traditional and innovative instructional strategies for use in college teaching. Special emphasis will be placed on the integration of classroom theory and practice. (Formerly AHE 6123. Credit cannot be earned for both ALT 6123 and AHE 6123.)
- 6943 Internship in Adult Learning and Teaching**
3 hours credit. Prerequisites: Consent of instructor and Graduate Advisor of Record.
Individually supervised field experience in adult or higher education setting. (Formerly AHE 6943. Credit cannot be earned for both ALT 6943 and AHE 6943.)
- 6951,3 Independent Study**
1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 hours, regardless of discipline, may be counted toward the Master's degree. (Formerly AHE 6953.)
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Approval of the Graduate Program Committee to take the Comprehensive Examination.
Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required for each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). (Formerly AHE 6961.)

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, may be counted toward the Master's degree. (Formerly AHE 6973. Same as EDU 6973.)

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. (Formerly AHE 6983.)

**COURSE DESCRIPTIONS
CURRICULUM AND INSTRUCTION
(C&I)**

5003 Theory and Dynamics of Curriculum and Instruction

(3-0) 3 hours credit.

An examination of theoretical structures underlying curriculum considerations and the implications of these for the work of responsible curriculum decision-makers at all levels, including administrators, instructional supervisors, and classroom teachers.

5013 Classroom Instruction and Evaluation

(3-0) 3 hours credit.

Examination of different pedagogical approaches to the teaching and learning process in schools, with emphasis on the development of curriculum for classroom instruction, evaluation, organization, and management.

5043 Classroom Management and Motivation

(3-0) 3 hours credit. Prerequisite: Graduate standing.

A detailed investigation of various theories and models of classroom management and motivation. Topics include behavior modification, assertive discipline, control theory, and the concept of the democratic classroom. (Credit cannot be earned for both C&I 5043 and EDP 5043.)

5403 Instructional Design and Development

(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.

The design of instruction. Special attention is given to theory and method of design based on congruence between identified needs and approaches to curriculum development.

5503 Theoretical Foundations of Early Childhood and Elementary Education

(3-0) 3 hours credit.

Opportunity is provided for a systematic analysis of theoretical foundations of early childhood and elementary education, including an application of theoretical principles to instructional objectives, organizational schemes, teaching strategies, and materials. (Same as ECE 5503. Credit cannot be earned for both C&I 5503 and ECE 5503.)

5523 Metacognitive Thinking and Learning Strategies

(3-0) 3 hours credit.

An exploration of metacognition in personal and school environments, where an understanding of one's own thinking and learning strategies assist in defining strengths and areas of growth in teaching. An emphasis is made on the development of critical pedagogical thinking and teaching, and its unification of elements into classroom practice that has meaning-making applications for all life situations. (Same as ECE 5523. Credit cannot be earned for both C&I 5523 and ECE 5523.)

5603 Curricula for Elementary and Middle School Children

(3-0) 3 hours credit.

A systematic analysis of elementary and middle school curricula. A critical study of the objectives, methods of curricular organization, and content used with elementary school children grades 1–8. (Credit cannot be earned for both C&I 5603 and ECE 5603.)

5613 Nature and Meaning of Science in Education

(3-0) 3 hours credit.

This course focuses on the nature and meaning of science, with special emphasis on the role of science in educational environments. Participants will be asked to take a critical perspective on questions, such as: “What is science?” and “What about science is most important for a student to know?” The course will address: the nature of scientific disciplines (the theories and problems which characterize them); the relationship between theory and empirical work; and the role of science learning and teaching in pre-K–16 environments. This course provides a broad foundation for subsequent curriculum development, instructional design, and research into the teaching and learning of the sciences.

5623 Inquiry in Science Education

(3-0) 3 hours credit.

This course focuses on how to choose and develop appropriate “hands-on, minds-on” science inquiry explorations for EC-16 grade levels. Settings include laboratory and classroom contexts, as well as informal science education. Students enrolled in this course will have the opportunity to become critical consumers by ‘doing’ inquiry, ‘thinking’ about inquiry, and ‘applying’ inquiry through a metacognitive process. Learners have opportunities to reflect on traditional science classroom environments in comparison with multiple inquiry methodologies.

5633 Science for All? Equity and Agency in Science Education

(3-0) 3 hours credit.

Focus on equity and agency issues in science education as they relate to diverse demographics and communities. Questions such as “Whose science and for whom? Who participates, and who does not? Whose voice is heard, and who is silent?” are the threads that connect investigations, such as whether and how policy demands are met in practice and how federal, state, and local institutional policies impact classroom contexts. Agency is explored both as a process of becoming aware of and confident in one’s ability to impact the community at large, as well as an expression and hallmark of democratic settings. Participants will critically evaluate assessment models that are intended to provide alternatives to standardized testing practice. Topics include, but are not limited to, large-scale issues such as existing models and changing paradigms, curricular ownership, and systemic reform, as well as more fine-grained issues such as the practice and effects of ability grouping and tracking.

5663 Topics in Curriculum and Instruction

(3-0) 3 hours credit.

Students are provided the opportunity for in-depth study of specialized areas of curriculum and instruction. The course may be repeated for credit when topics vary.

5673 Critical Issues in Teaching

(3-0) 3 hours credit.

Study of critical issues in school. Investigation of research, practices, and positions related to special education, bilingual and multicultural education, early childhood education, middle and secondary schools and other current broad-based social issues.

5703 Secondary School Curricula

(3-0) 3 hours credit.

A systematic analysis of secondary school curricula. A critical study of objectives, methods of organization, content, methods, and learning materials for youth.

5723 Integrating Reading and the Language Arts

(3-0) 3 hours credit.

Study of reading processes and instructional practices and examination of ways reading can be related to writing, speaking, and listening. Emphasizes development of integrated language arts curriculum and instruction from primary through secondary school.

5743 Reading in Secondary School

(3-0) 3 hours credit.

Principles and techniques for teaching higher-level reading and comprehension skills to adolescents. Attention to developing reading programs and to literacy learning in various academic subjects in middle and high schools. Strategies for meeting the needs of the wide range of ability levels found in secondary schools.

5753 Literature for Children

(3-0) 3 hours credit.

Examines the selection and uses of children's literature in the classroom. Emphasizes literary response and ways to integrate literature into the elementary and secondary school curriculum.

5763 Diagnosis and Practicum in Reading

(3-0) 3 hours credit. Prerequisite: C&I 5723.

Multidisciplinary approach to diagnosis and remediation of reading problems, with special attention to cognitive, sociolinguistic, and emotional factors that may impede learning. Application of diagnostic and remedial procedures with individual children through a guided field-based practicum.

5793 Seminar in Reading Supervision

(3-0) 3 hours credit.

Organization of developmental and remedial reading and writing programs. Selection of appropriate materials. Techniques and procedures for maintaining quality programs, including staff selection and in-service training. The role of research in improving the teaching of reading and writing.

5813 Adult Literacy

(3-0) 3 hours credit.

Examination of the acquisition and development of reading and writing in adult populations. Reviews research and issues relevant to the teaching of reading and writing to adults. (Same as ALT 5813. Credit cannot be earned for both C&I 5813 and ALT 5813 or AHE 5813.)

5823 Reading and Writing Development in Early Childhood

(3-0) 3 hours credit.

Study of the literacy development of young children from birth to the point of acquisition of conventional reading and writing ability. Examines young children's emergent literacy concepts and behaviors and considers ways that early childhood educators can develop appropriate approaches to teaching reading and writing in classroom settings.

5843 Young Adult Literature

(3-0) 3 hours credit.

This course is designed to provide opportunities for students to become familiar with young adult literature and to examine current issues, practices, and perspectives about this field of study.

5853 Study Strategies and Cognitive Processes in Reading

(3-0) 3 hours credit.

Reviews research that examines study strategies and cognitive processes for reading and learning in schools. Focuses on upper elementary-through-college study practices and higher-level reading and thinking. Field experience may be required. (Formerly C&I 5583. Credit cannot be earned for both C&I 5853 and C&I 5583.)

- 5863 Russian Contributions to Literacy, Psychology and Learning**
(3-0) 3 hours credit.
Examines the contributions of Russian psychologists to reading and writing, social and cultural development, and special needs of learners. Focuses on contributions of Lev Vygotsky; application of his thinking to contemporary educational, psychological, and social-bicultural issues.
- 5873 Assessment Issues and Practices in Reading**
(3-0) 3 hours credit.
Examination of techniques to assess student reading and writing. Considers strengths and weaknesses of assessment tools such as standardized tests, informal observations, and portfolios, and ways educators may best use the results from these approaches to provide appropriate instruction for all students.
- 5883 Storytelling: Enjoyment, Teaching, Learning, Assessing, and Researching**
(3-0) 3 hours credit.
This course provides opportunities for teachers to develop a personal storytelling style, confidence, and repertoire. The course paints broad-brush strokes providing opportunities for the students to perceive storytelling in multiple constructs: cultural, methods, strategies, and purposes. Students apply cognitive theories into practice as they use storytelling strategies in their professional settings.
- 5903 Higher Education Curricula**
(3-0) 3 hours credit.
A systematic analysis of higher education curricula. A critical study of objectives, methods of organization, content, methods, and learning materials used with college students. (Formerly C&I 5803. Credit cannot be earned for both C&I 5903 and C&I 5803.)
- 5923 Mentoring**
(3-0) 3 hours credit.
Description, analysis, and appraisal of mentoring for prospective and practicing teachers. In addition to learning about the review of research on mentoring, the course focuses on the examination of content, processes, roles, and responsibilities in interactions of mentors and teachers of prekindergarten through high school.
- 5933 Service-Learning**
(3-0) 3 hours credit.
History, rationale, research, methodology, and outcomes of service-learning. Students will conceptualize, plan, and participate in a service-learning project. Emphasis is on how service can be incorporated into curriculum with a primary focus on learning.
- 6003 Supervision: Theoretical Basis**
(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.
An application of leadership theory, curriculum development theory, educational planning theory, general learning theory, and theories of adult learning to instructional supervision; an examination of the role of the supervisor. (Same as EDL 6003. Credit cannot be earned for both C&I 6003 and EDL 6003.)
- 6013 Supervision: Teaching-Learning Process**
(3-0) 3 hours credit. Prerequisite: C&I 6003 or consent of instructor.
The analysis and application of theories related to the teaching and learning process; study of the principles and practices in the professional development of teachers. (Same as EDL 6013. Credit cannot be earned for both C&I 6013 and EDL 6013.)
- 6023 Supervision: Tools and Techniques**
(3-0) 3 hours credit. Prerequisite: C&I 6003 or consent of instructor.
A study of impact strategies in instructional supervision and the development of communication and interpersonal skills needed for working with teachers. (Same as EDL 6023. Credit cannot be earned for both C&I 6023 and EDL 6023.)

6033 Survey of Reading Research

(3-0) 3 hours credit. Prerequisites: C&I 5723, C&I 5763, and EDU 5003.

A review of past and current literature and research concerning the reading process, curricula, and instructional practice. Provides an opportunity for students to acquire critical analysis skills in evaluating research. (Formerly C&I 5783. Credit cannot be earned for both C&I 6033 and C&I 5783.)

6043 Survey of Writing Research

(3-0) 3 hours credit.

This course is designed to review theory, research, and school practices on the writing process and assessment of writing. Theory and research across the fields of the history of, and human development in, writing, rhetoric and written communication, genre studies, author-audience relations, and creative expression will be considered. The course examines relationships between inside of school and outside of school writing, and the transition from oral to written communication. Approaches for analyzing and helping students overcome writing difficulties across the disciplines will be examined.

6103 Action Research

(3-0) 3 hours credit.

Action research across diverse contexts. The course includes a consideration of history and definitions of action research, and an analysis of its purpose, process, and theoretical foundations. Students will engage in practitioner-based research strategies such as observations, interviews, and document analysis and conceptualize, plan, and conduct an action research study.

6303 Advanced Methods in Subject-Matter Fields

(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.

Course sections are designed to offer students the opportunity to develop skill in instructional methodology specifically related to and derived from the characteristics of the discipline taught.

- Science
- Mathematics
- Social Studies
- Language Arts
- Foreign Languages
- Physical and Health Education
- Interdisciplinary

May be repeated for credit when disciplines vary.

6513 Grant Writing

(3-0) 3 hours credit.

Grant writing basics and specifics. The course is designed to help educators learn how to conceptualize, write, and submit a grant application. Students will learn how to identify funding entities, develop a theoretical and research base for grants, create timelines, and utilize grant-writing strategies.

6943,6 Instructional Internship in Teaching

3 or 6 hours credit. Prerequisite: Consent of student's graduate advisor.

Individually supervised full-time field experience in assigned classrooms for one semester (12 weeks) with related applied research activity. May be taken for teaching internship or student teaching. May be repeated for credit, but not more than 6 hours may be applied toward the M.A. in Education degree.

6951,3 Independent Study

1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

COURSE DESCRIPTIONS
EARLY CHILDHOOD AND ELEMENTARY EDUCATION
(ECE)

5123 Seminar in Development in Early Childhood and Infancy

(3-0) 3 hours credit. Prerequisite: EDP 5003 or consent of instructor.

Studies of the results of stimulating sensory equipment in the early years and investigation of insufficient psychological and physiological nourishment. Includes relevant research-suggested practices that may enable future generations to avoid developmental disruptions and alleviate existing developmental handicaps.

5133 Language and Discourse Development in Preschool-Primary Children

(3-0) 3 hours credit.

Study of early acquisition and development of language skills. Emphasis on identifying the sequence of normal expressive and receptive language development in terms of the child's related abilities and learning experiences. Language acquisition and discourse in linguistically and culturally diverse children. Identification of atypical patterns of language development.

5443 Guidance of Social/Emotional Development in Children

(3-0) 3 hours credit.

Study of behavioral issues encountered by educators in elementary and early childhood classrooms. Emphasis on understanding factors that influence the development of problem behavior within the context of children's social and emotional development. Focus on prevention, early identification, and intervention methods and techniques. Study of curricular, environmental, and socio-organizational strategies for educators. (Formerly ECE 5453. Credit cannot be earned for both ECE 5443 and ECE 5453.)

5503 Theoretical Foundations of Early Childhood and Elementary Education

(3-0) 3 hours credit.

Opportunity is provided for a systematic analysis of theoretical foundations of early childhood and elementary education, including an application of theoretical principles to instructional objectives, organizational schemes, teaching strategies, and materials. (Same as C&I 5503. Credit cannot be earned for both ECE 5503 and C&I 5503.)

5513 Curriculum, Methods and Materials in Early Childhood and Elementary Education

(3-0) 3 hours credit.

A study of curriculum and instructional methods in diverse early childhood and elementary classrooms. Emphasis on planning and curriculum design, methods of instruction and materials for teaching at the level of student ability.

5523 Metacognitive Thinking and Learning Strategies

(3-0) 3 hours credit.

An exploration of metacognition in personal and school environments, where an understanding of one's own thinking and learning strategies assist in defining strengths and areas of growth in teaching. An emphasis is made on the development of critical pedagogical thinking and teaching, and its unification of elements into classroom practice that has meaning-making applications for all life situations. (Same as C&I 5523. Credit cannot be earned for both ECE 5523 and C&I 5523.)

6123 Administration of Early Childhood Programs

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

This course is designed for those who are interested in managing the care and education of young children in various contexts, including community child care and public school settings. Students explore the various components related to administration of early childhood programs in inclusive settings including leadership and advocacy, human resource management, curriculum development, strategic planning, parental involvement, and legal issues.

6163 Biological Basis of Child Development: Brain Based Research and Learning

(3-0) 3 hours credit. Prerequisite: One course in general biology or general psychology or consent of instructor.

Analysis of biological and psychological perspectives on child growth and development. Emphasis on theoretical aspects of biopsychological and social and cultural factors influencing cognitive and learning functions.

6183 Seminar in Early Childhood Education in Cross-Cultural Perspective

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An examination of contrasting strategies of socialization employed by societies around the world, past and present; limit of and alternatives to formal early childhood education in the current Western sense. Readings are drawn from ethnographic and theoretical sources in anthropology, psychology, and education.

6213 Current Issues in Early Childhood and Elementary Education

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Studies of current issues in preschools and elementary schools and other educational settings. Investigation of research, practices, and positions related to the issues studied. Exploration of available models for possible solutions or resolution of issues, as well as factors that may have an impact on desired outcomes.

6303 Advanced Methods in Early Childhood and Elementary Education

(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.

Specialized studies in early childhood and elementary education are offered through course section in these areas:

- Science
- Mathematics
- Social Studies
- Literacy
- Fine and Performing Arts
- Play and Play Environments
- Nutrition and Health
- Gifted Education

May be repeated for credit when curriculum areas vary.

6363 Differential Instruction in a Diverse Classroom

(3-0) 3 hours credit.

Application of instructional strategies for promoting the learning of diverse groups of children in typical classrooms. Implementing teaching strategies and techniques matched to individual learners, characteristics of subject matter and demands of the learning environment. Emphasis on acquiring a variety of teaching strategies to differentiate instruction within a social learning environment. (Formerly ECE 5473 and ECE 6373. Credit cannot be earned for both ECE 6363 and ECE 5473 or ECE 6373.)

6453 Assessment and Evaluation in Early Childhood and Elementary Education

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Evaluation and research on student development and learning, educational programs, processes, products, instructional objectives, and alternative approaches to attain objectives. A disciplined inquiry into trends and issues in assessment and evaluation in early childhood and elementary education.

- 6473 Seminar in Early Childhood and Elementary Education**
(3-0) 3 hours credit.
Examination of issues in early childhood and elementary education, including an extensive study of research findings, publications of related professional organizations, and research methodology applied to early childhood and elementary programs.
- 6513 Advanced Approaches to Interdisciplinary Teaching**
(3-0) 3 hours credit.
Examination of theory and practice that impacts current interdisciplinary teaching and learning elementary education. Emphasis is on the interrelationships of subject area concepts and themes as they are applied to the early childhood elementary curriculum.
- 6523 Social Policy for Families and Children**
(3-0) 3 hours credit.
Examination of social policy and its implications for communities, families and children. Students analyze national, state, and local policy for educational settings and investigate local and regional resources for the teaching and learning process.
- 6653 Action Research in Childhood Settings**
(3-0) 3 hours credit. Prerequisite: EDU 5003.
Application of research concepts and skills in field studies. Participants conduct directed research in early childhood and elementary school settings. (Formerly ECE 6643. Credit cannot be earned for both ECE 6653 and ECE 6643.)
- 6723 Integrating Technology Across the Early Childhood and Elementary Curriculum**
(3-0) 3 hours credit.
An investigation into the design and use of innovative technological tools and instructional techniques across the early childhood and elementary education curriculum. Opportunities for design and use of educational experiences for children incorporating technological innovations. Includes use of technology to customize instruction to meet the individual learning needs of children.
- 6943,6 Instructional Internship in Teaching**
3 or 6 hours credit. Prerequisite: Consent of student's graduate advisor.
Individually supervised full-time field experience in assigned classrooms for one semester (12 weeks) with related applied research activity. May be taken for teaching internship or student teaching. May be repeated for credit, but not more than 6 hours may be applied toward the M.A. in Education degree.
- 6951,3 Independent Study**
1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.
- 6973 Special Problems**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

COURSE DESCRIPTIONS INSTRUCTIONAL TECHNOLOGY (IST)

5003 Foundations of Instructional Technology

(3-0) 3 hours credit.

This introductory course provides an overview of the field of Instructional Technology. Course content and activities will help students develop an awareness and understanding of the history, theories, and philosophies driving the field. In addition, this course will introduce common technologies utilized across fields of study.

5011 Technology Skills and Abilities

(1-0) 1 hour credit.

The ever-changing body of knowledge and requisite skills needed for competency in instructional technology necessitates ongoing technical development. This course provides an orientation to specific skills and abilities for students who require updating, for students who may want to add to current skills, or for those students whose skills may be lacking. May be repeated for credit when specific skills vary.

5313 New Media Design

(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.

An overview of assessment and measurement techniques, tools, and philosophies as they apply to current and developing applications of technology in learning environments. (Formerly C&I 5313. Credit cannot be earned for both IST 5313 and C&I 5313.)

5323 Concepts of Teaching and Learning

(3-0) 3 hours credit.

A study of technologies, pedagogies, and theories as they relate to the design of instruction and practices that support effective teaching and learning. Investigation of how theories of knowing and learning are reflected in and supported by technology. Focus on current and emerging learning theories and how these relate to applications in technology-delivered and -supported learning environments.

5343 Instructional Design Theory

(3-0) 3 hours credit. Prerequisite: C&I 5003 or consent of instructor.

An investigation of theories, principles, and processes of instructional design including their application to instructional product development. (Formerly C&I 5343. Credit cannot be earned for both IST 5343 and C&I 5343.)

5353 Instructional Technology and Learning

(3-0) 3 hours credit.

Investigation of how theories of knowing and learning are reflected in and supported by technology. Focus on current learning and detaching theories and how these relate to applications in technology-delivered and -supported learning environments.

5363 Distance Learning

(3-0) 3 hours credit.

Examination of the application of tools, resources, and strategies to support, deliver, and enhance technology-supported curriculum. Students actively engage in online activities as they identify and plan a curriculum.

5383 Technology Training and Management in Educational Systems

(3-0) 3 hours credit.

The dynamic nature of technology development and innovation requires strategies to ensure service populations are informed and skilled. This course will review models of technology, professional development, issues of change and technology adoption, and policy issues.

5703 Technology and Learning Cultures

(3-0) 3 hours credit.

An examination of technology-delivered and -mediated instruction as it interacts with the learners' views of the world and themselves. Course activities explore the implications of culture on the design, delivery, and evaluation of instruction. (Formerly EDU 5703. Credit cannot be earned for both IST 5703 and EDU 5703.)

6353 Multimedia Production

(3-0) 3 hours credit.

The design and development of interactive materials and resources for information retrieval, learning, and performance support. Course activities include the use of specific technologies to develop multimedia/new media prototypes. Can be taken in addition to MUS 6353. (Formerly C&I 6353. Credit cannot be earned for both IST 6353 and C&I 6353.)

6373 Analysis of Instructional Technology Trends

(3-0) 3 hours credit.

An overview of evaluation approaches, techniques, tools, and philosophies as they apply to current and future applications of technology in education.

6503 Advanced Topics in Instructional Technology

(3-0) 3 hours credit. Prerequisite: IST 5323 or consent of instructor.

Course develops skills in instructional technology related to and derived from the characteristics of the topics.

- Action Research
- Technology Systems in Education
- Distance Learning
- Leadership, Project Management and Assessment

May be repeated for credit when topics vary. (Formerly C&I 6503. Credit cannot be earned for both IST 6503 and C&I 6503.)

6951,3 Independent Study

1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course that offers graduate students the opportunity to engage in specialized study not normally or not often available as part of the program's regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours regardless of discipline, will apply to the Master's degree.

COURSE DESCRIPTIONS SPECIAL EDUCATION (SPE)

5403 Exceptional Children and Youth in the Schools

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An introduction to and survey of the field of special education for general and special education teachers and students in related fields of study. The course focuses on characteristics, etiology, definition, and prevalence of exceptional children; description of available services. (Formerly EDP 5403. Credit cannot be earned for both SPE 5403 and EDP 5403.)

5413 Children and Youth with Developmental Disabilities

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

This course presents the opportunity for special education teachers, counselors, and students in related fields of study to acquire knowledge and skills associated with contemporary theories and practices used in the assessment, diagnosis, and treatment of individuals with developmental disabilities in school and community settings. Trends and research in education of students with developmental disabilities are studied. (Formerly EDP 5413. Credit cannot be earned for both SPE 5413 and EDP 5413.)

5433 Children and Youth with Behavior Disorders

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

Presents opportunities for general and special education teachers, counselors, and students in related fields of study to obtain an understanding of various theories and practices used in the identification, treatment, and education of behavior disorders. Research on the education of children and adolescents with behavior disorders, as well as practical implications for the classroom teacher and school counselor are emphasized. (Formerly EDP 5433. Credit cannot be earned for both SPE 5433 and EDP 5433.)

5443 Conference and Consultative Skills in Special Education

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

This course presents the opportunity for general and special education teachers, counselors, and students in related fields of study to acquire knowledge and skill working with parents, teachers, and other professionals to optimize the educational and therapeutic experiences of exceptional children and youth. Students plan, implement, and evaluate a series of parent conferences, staff development, and consultative activities. Requires 5–10 hours of field experience. (Formerly EDP 5443. Credit cannot be earned for both SPE 5443 and EDP 5443.)

5453 Children and Youth with Learning Disabilities

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

This course presents a study of the incidence, prevalence, etiology, and characteristics of the student with learning disabilities (LD) for general and special education teachers, counselors, and students in related fields. The relationship between LD, child development, school environment, and academic performance is studied. Emphasis is on a critical analysis of instruction and assessment techniques used with this population. (Formerly EDP 5453. Credit cannot be earned for both SPE 5453 and EDP 5453.)

5463 Educating Individuals with Autism Spectrum Disorders

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

This course presents a study of the incidence, prevalence, and characteristics of individuals with autism spectrum disorders (ASD) for general and special education teachers, counselors, and students in related fields. Research and best practices in assessment, treating, and educating individuals with ASD are explored and practical implications for classroom teachers and school counselors are emphasized. Approaches emphasized include treatment of social, communication, academic, and behavior skill deficits.

5503 Applied Behavior Analysis for Classroom Teachers and Counselors

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

This course presents principles and procedures of applied behavior analysis and classroom management for teachers, counselors, and students in related fields of study to facilitate the acquisition and improvement of social, academic, and life skills of children and youth with disabilities. Requires an applied project. (Formerly EDP 5423 and EDP 5503. Credit cannot be earned for both SPE 5503 and EDP 5423 or EDP 5503.)

5513 Curriculum and Instructional Applications for Children and Youth in Special Education

(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.

Provides the opportunity for general and special education teachers, counselors, and students in related fields to evaluate and design curriculum and instructional interventions in order to provide students with disabilities access to the general education curriculum across content areas as well as to evaluate, design, and implement alternate curricula, and provide community-based and social skills instruction. (Formerly EDP 5513 and EDP 6203. Credit cannot be earned for both SPE 5513 and EDP 5513 or EDP 6203.)

- 5523 Language Development and Cognitive Intervention for Individuals with Disabilities**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
This course provides an opportunity for general and special education teachers, counselors, and students in related fields of study to acquire knowledge and skills for assisting individuals identified as mildly to moderately disabled to achieve communicative competence through language acquisition and remedial and corrective interventions. Emphasis is on addressing the language and literacy development needs (listening, speaking, reading, writing, mathematics) of individuals with learning and behavior disabilities. (Formerly EDP 5463 and EDP 5523. Credit cannot be earned for both SPE 5523 and EDP 5463 or EDP 5523.)
- 5533 Assessment and Evaluation of Children and Youth with Disabilities**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
Offers students in education, special education, counseling, and related fields of study the opportunity to develop knowledge and skills in selection, administration, and interpretation of instruments and procedures to evaluate individuals with disabilities. Emphasis is on assessment techniques, instruments, and procedures relevant to the education of disabled children and youth. (Formerly EDP 5533 and EDP 5553. Credit cannot be earned for both SPE 5533 and EDP 5533 or EDP 5553.)
- 5613 Legal Issues in Special Education**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Survey of current legal basis and practices and review of significant court decisions pertaining to special education.
- 5623 Seminar on Current and Critical Issues in Special Education**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Examination of issues in special education, including a study of research-supported practices, controversial issues, and critical topics in special education.
- 5633 Instruction and Educational Interventions for Individuals with High Incidence Disabilities**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
Emphasis on research-supported strategies for individuals with high incidence disabilities. Will provide hands-on experiences and practice implementing interventions.
- 5643 Instruction and Educational Interventions for Individuals with Low Incidence Disabilities**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
Emphasis on research-supported strategies for individuals with low incidence disabilities. Will provide hands-on experiences and practice implementing interventions.
- 5793 Practicum in Special Education: Children and Youth with Disabilities**
(3-0) 3 hours credit. Prerequisites: SPE 5403 and consent of instructor.
This course focuses on the application of theoretical principles to field settings. Students are required to develop, implement, and evaluate educational programs for children and youth with disabilities. (Formerly EDP 5563 and EDP 5793. Credit cannot be earned for both SPE 5793 and EDP 5563 or EDP 5793.)
- 6951,3 Independent Study**
1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction a faculty member. The course is intended for students needing specialized work not normally, or not often available as part of the program's regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.
- 6973 Special Problems**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
An organized course that offers graduate students the opportunity to engage in specialized study not normally or not often available as part of the program's regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

**COURSE DESCRIPTIONS
SECONDARY EDUCATION
(SED)**

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

**COURSE DESCRIPTIONS-DOCTORAL LEVEL
CURRICULUM AND INSTRUCTION
(C&I)**

7003 Technology in Curriculum and Instruction

(3-0) 3 hours credit.

Advanced study of modern instructional technologies with special emphasis on their use in educational settings. Consideration of distance-learning procedures and their implications for curriculum planning and supervision.

7013 Advanced Methods in Subject-Matter Fields

(3-0) 3 hours credit.

Advanced investigation of teaching procedures and the relationship of supervisors, administrators, and curriculum designers with instructors. Course may be offered as a general course or subject area. Sections may be offered as listed:

- Science
- Mathematics
- Social Studies
- Language Arts
- Foreign Languages
- Physical and Health Education

May be repeated for credit when disciplines vary.

**COURSE DESCRIPTIONS-DOCTORAL LEVEL
INSTRUCTIONAL LEADERSHIP
(ILR)**

7113 Paradigms in Instructional Leadership

(3-0) 3 hours credit. Prerequisite: LDR 7133.

Pluralistic alternatives and advanced approaches in instructional leadership, including research related to models of instruction and student achievement, frameworks for identifying and analyzing models of teaching, and decision making.

7123 Cases in Instructional Development and Reform

(3-0) 3 hours credit. Prerequisite: LDR 7183.

Examines historical developments in instruction and schooling and the results. Focuses on social, achievement, and cultural criteria for evaluating curricular effects and factors in positive curriculum developments.

7203 Leadership in Curriculum Development

(3-0) 3 hours credit.

An examination of processes related to the facilitation and management of curricular innovation and delivery systems in varied educational settings including school systems, higher education, and other human service institutions.

7643 Advanced Research on Instruction

(3-0) 3 hours credit. Prerequisite: ILR 7123 or consent of instructor.

Design and development of advanced research studies on classroom instruction. Participants conduct directed research into critical issues of classroom practice.

7771,3 Independent Study

1 or 3 hours credit. Prerequisites: Doctoral standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work as part of the regular course offerings. May be repeated for credit, but not more than 6 hours will apply to the Doctoral degree.

7783 Special Problems

(3-0) 3 hours credit. Prerequisites: Doctoral standing and consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours will apply to the Doctoral degree.

7893 Doctoral Research

3 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.

May be repeated for credit, but not more than 6 hours may be applied to the Doctoral degree.

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COLLEGE OF

ENGINEERING

COLLEGE OF ENGINEERING

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COLLEGE OF ENGINEERING

Graduate programs in engineering include the Master of Science in Civil Engineering, the Master of Science in Computer Engineering, the Master of Science in Electrical Engineering, the Master of Science in Mechanical Engineering, the Doctor of Philosophy in Biomedical Engineering, the Doctor of Philosophy in Electrical Engineering, and the Doctor of Philosophy in Environmental Science and Engineering. These programs offer opportunities for advanced study and research designed to prepare students for leadership roles in engineering careers with industry, government, educational institutions, and research organizations. A thesis option is recommended for students who are planning a career in research or who contemplate pursuing a doctorate in one of the engineering disciplines. A nonthesis option is also available for students who desire a practical industrial applications-oriented degree.

The Department of Civil and Environmental Engineering includes programs of study in structures, environmental engineering – transportation, water resources, hydrology, geotechnical engineering, solid mechanics, and materials. The Department of Electrical and Computer Engineering includes programs of study in signal processing, digital systems, communications, instrumentation, and control systems. The Department of Mechanical Engineering includes programs of study in thermal and fluid systems, mechanical systems and design, mechanics and materials, and manufacturing engineering and systems.

A Doctor of Philosophy Degree in Biomedical Engineering will train students in the fundamental sciences and engineering related to medicine. Areas of focus include biomechanics, biomaterials, bioimaging, and the following systems: musculoskeletal/dental, cardiovascular, and neurological.

A Doctor of Philosophy Degree in Electrical Engineering offers an in-depth and integrated study focused in one of the following areas: communications, signal and image processing, digital systems, and control.

A limited number of assistantships and fellowships are available to qualified students. Financial assistance is awarded on a competitive basis.

COURSE DESCRIPTIONS ENGINEERING (EGR)

5023 Numerical Techniques in Engineering Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Advanced methods of applied mathematics, including numerical linear algebra, initial value problems, stability, convergence, partial differential equations, and optimization.

5093 Special Topics in Engineering Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

A comprehensive treatment of advanced methods of applied mathematics needed for the study of advanced courses in engineering. May be repeated for credit as topics vary.

5113 Advanced Engineering Economic Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering.

Examination of the factors required to transform technological innovations into products. Elements of business planning are examined through a case-study approach.

5213 Topics in Systems Modeling

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering.

Systems analysis approach to formulating and solving engineering problems. Topics include operational research, mathematical modeling, optimization, linear and dynamic programming, decision analysis, and statistical quality control.

Topic 1: Applied Operations Research. Application of operations research methods to practical engineering problems.

Topic 2: Engineering Systems Modeling. Modeling of modern engineering systems for operational and management control.

May be repeated for credit as topics vary.

5233 Advanced Quality Control

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Methods and techniques for process control, process and gage capabilities, inspection plans, American National Standard, and recent advanced techniques. Tour of manufacturing industry. Case studies in process control, outgoing quality, and costs. A project, assigned by a manufacturing company, is required, along with a final presentation of the project.

5613 New and Emerging Technologies

(3-0) 3 hours credit.

Examines entrepreneurial and managerial perspectives on the process of technology innovation. Design is the organizing concept used to study the continuum from idea to sale of products and services that are spawned by innovators using new and emerging technologies. Seminar format, case-study preparation, presentation, and cooperative learning are defining characteristics of this course.

5623 Issues in Engineering Management

(3-0) 3 hours credit.

Examines issues facing managers of technology in terms of their implications for people. The context is the cycle from conception to use/disposal of products and services. The framework for analysis and synthesis is ecological, historical, and institutional. Seminar format, issue paper preparation and presentation, and cooperative learning are defining characteristics of this course.

5633 Technological Foundations of Management of Technology

(3-0) 3 hours credit.

This course examines the activities used to transform viable products and processes. Project planning and management, incorporating fundamentals of engineering economic analysis, are examined via case analysis. Explicit consideration is given to “green design” within a systems context. Design is used as the rubric to integrate the activities. (Same as MOT 5023. Credit cannot be earned for both EGR 5633 and MOT 5023.)

6013 Analytic Techniques in Engineering Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Advanced methods of applied mathematics, including linear algebra, vector differential calculus, integral theorems, differential equations, and calculus of variations.

DEPARTMENT OF BIOMEDICAL ENGINEERING

Doctor of Philosophy Degree in Biomedical Engineering

A Doctor of Philosophy degree in Biomedical Engineering (BME) is offered through a joint graduate program with The University of Texas Health Science Center at San Antonio (UTHSCSA). A matrix of academic tracks are offered based on segments of biomedical engineering or areas of clinical emphasis. Specifically, the program has emphases in the following areas: biomaterials, biomechanics, and bioimaging. The biological areas covered are orthopedics/dental tissues, cardiovascular systems, and neurological systems. The Ph.D. in Biomedical Engineering will be awarded to candidates who have displayed an in-depth understanding of the concepts that are necessary for critically judging scientific literature, for formulating novel hypotheses, designing experimental protocols to test the hypotheses and interpreting their results subject matter, and moreover, have demonstrated the ability to make an original contribution to knowledge in the field.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. The minimum requirements for admission to the Doctor of Philosophy in Biomedical Engineering degree program are as follows:

Students who hold an undergraduate or master's degree may apply to the program.

- Applicants must have a grade point average of 3.0 or better in the last 60 semester credit hours of coursework with a major in a recognized science or engineering discipline. All students should have had sufficient background in engineering, chemistry, biology, or physics prior to being admitted to the program. It will be expected that these students will have B.S. degrees with emphasis in engineering, physical, or biological disciplines. The Committee on Graduate Studies in BME may also consider applicants who have a strong educational or research background in bioengineering.
- Applicants with a master's degree must have a grade point average of 3.0 or better in their master's degree program. Applicants with a Master's degree in Biomedical Engineering or in a related field may apply a maximum of 30 semester credit hours of previously earned graduate credit toward their doctoral degree. The Doctoral Studies Committee will evaluate each student's transcript and credit will be designated on a course-by-course basis to satisfy the formal coursework requirements of the degree. A maximum of 6 semester credit hours may be awarded for a master's thesis.
- A satisfactory score, as specified by the Doctoral Studies Committee for Biomedical Engineering, is required on the Graduate Record Examination (GRE). Students whose native language is not English must achieve a minimum score of 550 on the Test of English as a Foreign Language (TOEFL; paper version). Applicant's performance on a standardized test will be considered with other criteria when making admissions or competitive scholarship decisions and will not be used as the sole criterion for consideration of the applicant or as the primary criterion to end consideration of the applicant.
- Letters of recommendation, preferably three, attesting to the applicant's readiness for doctoral study.

A complete application includes the application form, official transcripts, letters of recommendation, GRE scores, a résumé, a statement of research experience, interests, goals, and the TOEFL score for those applicants whose native language is not English. Admission is competitive. Satisfying these requirements does not guarantee admission.

Degree Requirements and Program of Study. Typical doctoral studies will consist of 81 semester credit hours beyond the bachelor's degree. Undergraduate courses, general education courses, and prerequisites for graduate courses cannot be counted toward this total. For students with a master's degree, the number of hours will be decided on a case-by-case basis. In the joint degree program, courses are also offered throughout the course of study at The University of Texas Health Science Center at San Antonio (UTHSCSA). To enroll in UTHSCSA courses, students must complete a course card obtainable from the UTHSCSA Office of Admissions.

- A. 28.5 semester credit hours of Required Core Courses. Regardless of their specialized areas, all students are required to take the following core courses:

Required Core Courses offered at UTSA

BME	6001	Laboratory Rotations (Equivalent to ORTO 6002 Laboratory Rotation, UTHSCSA)
BME	6011	Research Seminar
BME	6203	Physiology for Engineers
BME	6703	Biomedical Image Processing
BME	6803	Biomechanics I
BME	6903	Biomaterials
EGR	6013	Analytic Techniques in Engineering Analysis

Required Core Courses at UTHSCSA

CSBL	5013	Gross Human Anatomy
CSBL	5095	Experimental Design and Data Analysis
INTD	6002	Ethics in Research
ORTO	6003	Introduction to Clinical Practices
ORTO	6004	Biology for Bioengineers

Upon approval of the supervising professor and the program director, students may substitute:

EGR 5093 Special Topics in Engineering Analysis, for EGR 6013 Analytic Techniques in Engineering Analysis (at UTSA)

- B. 9 semester credit hours (minimum) of Prescribed Elective Courses selected from the following (any course from these lists can be taken with the approval of the program director, supervising professor, and course instructor):

UTSA Prescribed Elective Courses

BIO	5433	Neurophysiology
BIO	5483	Computational Neuroscience
BIO	5503	Sensory Physiology
BME	6093	Topics in Biomedical Engineering
BME	6513	Mechanical Behavior of Living Tissues
BME	6713	Biomedical Signal Processing
BME	6793	Topics in Image and Signal Processing
BME	6823	Biomechanics II
BME	6893	Topics in Biomechanics
BME	6923	Tissue Engineering
BME	6993	Topics in Biomaterials
CHE	5263	Advanced Analytical Chemistry
EE	5243	Topics in Systems and Control
EE	5263	Topics in Digital Signal Processing and Digital Filtering
EE	5353	Topics in Multimedia Signal Processing
EE	5463	Artificial Neural Networks
EE	6343	Advanced Topics in Systems and Control
EE	6363	Advanced Topics in Signal Processing
ME	5013	Topics in Mechanical Engineering
ME	5133	Mechanical System Identification
ME	5413	Advanced Solid Mechanics
ME	5473	Viscoelasticity
ME	5483	Finite Element Methods

ME	5613	Advanced Fluid Mechanics
ME	5653	Computational Fluid Dynamics
STA	5103	Applied Statistics

UTHSCSA Prescribed Elective Courses

INTD	5005	Biochemistry
INTD	5006	Molecular Biology
INTD	5041	Neuroscience – Medical
MICR	5016	Concepts and Techniques in Biotechnology
MICR	5051	Introduction to Immunology
PHAR	5013	Principles of Pharmacology
PHYL	5040	Cell and Neural Physiology
PHYL	6091	Selected Topics in Physiology
RADI	5015	Physics of Diagnostic Imaging I
RADI	6014	Physics of Dental Imaging
RADI	6016	Physics of Diagnostic Imaging II
RADI	6017	Human Behavioral Imaging
RADI	6019	Medical Image Processing
RESD	6102	Advanced Dental Materials

- C. 9 semester credit hours (minimum) of free electives can be selected from any graduate course offered at UTSA or UTHSCSA with the approval of program director, supervising professor, and course instructor.
- D. 15 semester credit hours (minimum) of biomedical engineering research: doctoral dissertation, seminar, laboratory rotation, and supervised teaching.

The entire program of study must be approved by the student's dissertation advisor, dissertation committee, and doctoral studies committee and must be submitted to the Dean of the Graduate School for final approval. The courses are intended to focus and support the individual's mastery of his or her particular area of expertise.

Advancement to Candidacy. All students seeking a doctoral degree at UTSA must be admitted to candidacy. One of the requirements for admission to candidacy is passing a doctoral qualifying examination. Students should consult the University's Doctoral Degree Regulations in Chapter 6 of this catalog for the other requirements.

Satisfactory Performance on the Doctoral Qualifying Examination for Admission to Candidacy. The qualifying examination will be administered before the student commences the chosen dissertation research. This examination will be comprehensive in nature and may be written, oral, or both. Topics covered will include not only information provided in courses taken by the student but also the basic knowledge necessary for work in the student's chosen area of study. The Committee on Graduate Studies (COGS) will determine the format of the examination and the composition of the Qualifying Examination Committee (QEC), with the provision that both UTSA and UTHSCSA will be represented. The QEC will administer the examination, evaluate the student's performance, and report its judgment to the Committee on Graduate Studies. Admission to candidacy will be contingent on passing the qualifying examination. Students who do not pass the qualifying examination may be accommodated with a terminal degree through existing master's programs.

Doctoral Dissertation. A dissertation will be required of every candidate and must be an original contribution to scholarship, based on independent investigation (doctoral research) in the major area. The doctoral research will be conducted by the student under the guidance of the Supervising Professor and advised by the Dissertation Committee. Prior to starting the doctoral research, each student will submit a dissertation proposal to the COGS for approval. The doctoral dissertation will be the responsibility of the student and the Supervising Professor. Registration for the dissertation must be for a period of more than one semester. During each semester or term that a student receives advice and/or assistance from a faculty member or supervision by the Dissertation Committee or uses UTSA or UTHSCSA resources, he or she will be required to enroll in the appropriate dissertation course. The form and format of the dissertation will be guided by rules already in effect at the two institutions.

Composition of the Dissertation Committee. The Dissertation Committee will consist of at least six members, including the Supervising Professor and three members of the BME Graduate Faculty. No more than three members of the Dissertation Committee may be from the same institution (UTSA or UTHSCSA). The Dissertation Committee will also include a member of the graduate faculty outside of the BME Graduate Faculty from either institution and one member from outside both institutions. The student's dissertation proposal and the proposed composition of the Dissertation Committee will be evaluated and approved by the COGS. The Program Director or designee will sit as a member of the UTHSCSA Graduate Faculty Council and report on the result of that evaluation.

Final Oral Examination (Defense of Dissertation). A satisfactory final oral examination will be required for the approval of a dissertation. Acceptance of the dissertation examination will be contingent upon the approval of the Dissertation Committee.

The examination shall cover the dissertation, the general field of the dissertation, and other parts of the student's program as determined by the committee. Members of the Dissertation Committee must be satisfied that the student has:

1. Completed the work assigned by the committee.
2. Passed all examinations required by the program's graduate studies committee, including the final oral examination.
3. Completed the minimum requirements for coursework.
4. Completed a dissertation that is an independent investigation in the major field and constitutes a contribution to the discipline.
5. Submitted an abstract for publication in Dissertation Abstracts International that meets with the approval of the committee.

Once these requirements are complete, the Dissertation Committee members will sign the approval sheets for the Doctoral dissertation and make an official recommendation to the Graduate School of Biomedical Sciences at the UTHSCSA and the Graduate Council at UTSA that the Doctoral degree be awarded. More than one dissenting vote will constitute failure of the defense.

COURSE DESCRIPTIONS BIOMEDICAL ENGINEERING (BME)

6001 Laboratory Rotations

(0-3) 1 hour credit. Prerequisite: Graduate standing.

A minimum of five rotations of three weeks each through different laboratories in the program is required prior to the student identifying his or her supervising professor. Participation in ongoing research projects in each laboratory and a written report for each rotation is required.

6011 Research Seminar

(1-0) 1 hour credit. Prerequisites: Ph.D. student standing and consent of instructor and the Graduate Advisor of Record.

May be repeated for a maximum credit of 18 hours. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).

6051-3 Independent Study in Biomedical Engineering

1 to 3 hours credit. Prerequisites: Ph.D. student standing and consent of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

- 6093 Topics in Biomedical Engineering**
 (3-0) 3 hours credit. Prerequisites: Ph.D. student standing and consent of instructor and the Graduate Advisor of Record.
 May be repeated as topics vary.
- 6203 Physiology for Engineers**
 (3-0) 3 hours credit. Prerequisite: Permission of the instructor or completion of ORTO 6004.
 Designed to provide students with the essential graduate background for the application and practice of biomedical engineering. The integration of the nervous, skeletal, muscle, cardiovascular, and other systems from the sub-cellular level to the whole-organism level.
- 6513 Mechanical Behavior of Living Tissues**
 (3-0) 3 hours credit. Prerequisite: Permission of instructor.
 Stress strain relationships, viscoelasticity, mechanical properties, and mechanical modeling of collagenous and mineralized human tissues.
- 6703 Biomedical Image Processing**
 (3-0) 3 hours credit. Prerequisite: Graduate standing.
 Digital image fundamentals, digital image enhancement in the spatial domain, digital image enhancement in the frequency domain, optimal image filtration in the frequency domain, image restoration and order-statistics filters, morphological image processing, processing of microarray images, segmentation and gene-expression calculation, processing of FISH stacked images, automated analysis of gene copy numbers by fluorescence in situ hybridization, fundamental methods of image reconstruction by projections and their applications in computerized tomography. (Same as EE 5353 Topic 4. Credit cannot be earned for both BME 6703 and EE 5353 Topic 4.)
- 6713 Biomedical Signal Processing**
 (3-0) 3 hours credit. Prerequisite: Permission of instructor.
 Theory and classification of biological signals such as EEG, EKG, EMG, etc. Data acquisition and analysis procedures for biological signals, including computer applications.
- 6793 Topics in Image and Signal Processing**
 (3-0) 3 hours credit. Prerequisite: Permission of the instructor.
 May be repeated for credit when topics vary.
- 6803 Biomechanics I**
 (3-0) 3 hours credit. Prerequisite: Graduate standing.
 Fundamentals in applications of engineering mechanics for studying and modeling fluid flow, tissues, organs, and the whole human body. (Formerly BME 6833. Same as ME 6833. Credit cannot be earned for both BME 6803 and BME 6833 or ME 6833.)
- 6823 Biomechanics II**
 (3-0) 3 hours credit. Prerequisite: Graduate standing.
 This course covers the biomechanics of biological tissue deformation and their constitutive equations. Topics may include elasticity, viscoelasticity, deformation, stress analysis, strain measurement, stress and strain in organs, and constitutive equations. Tissues covered may include heart, blood vessels, cartilage, and bone.
- 6893 Topics in Biomechanics**
 (3-0) 3 hours credit. Prerequisite: Permission of instructor.
 May be repeated for credit when topics vary. (Same as ME 6893. Credit cannot be earned for both BME 6893 and ME 6893 when the topic is the same.)

6903 Biomaterials

(3-0) 3 hours credit. Prerequisite: Permission of instructor.

Fundamentals in applications of biomaterials science and engineering principles and concepts for repairing, replacing, and protecting human tissues and organs. (Formerly BME 6813. Same as ME 6813. Credit cannot be earned for both BME 6903 and BME 6813 or ME 6813.)

6923 Tissue Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing.

Basic principles of tissue engineering will be introduced. The three main approaches consisting of 1) use of host cells capable of differentiating into tissues; 2) the development of bioactive factors to induce cells to differentiate into tissues; and 3) the development of delivery scaffolds for the cells and/or bioactive factors will be covered. (Formerly BME 6853. Credit cannot be earned for both BME 6923 and BME 6853.)

6993 Topics in Biomaterials

(3-0) 3 hours credit. Prerequisite: Permission of instructor.

May be repeated for credit when topics vary.

7952,3,6 Doctoral Research

2, 3, or 6 hours credit. Prerequisites: Ph.D. student standing and consent of instructor and the Graduate Advisor of Record.

May be repeated for a maximum of 18 credit hours.

7992,3,6 Doctoral Dissertation

2, 3, or 6 hours credit. Prerequisite: Consent of the Doctoral Advisor of Record and Dissertation Advisor.

May be repeated for a maximum of 18 credit hours.

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Master of Science Degree in Civil Engineering

The Master of Science degree in Civil Engineering is designed to provide civil engineering professionals with the opportunity to prepare for careers concerned with the critical problems of a multifaceted society. Civil engineering education and research activities focus on projects that are typically large and costly, with potentially profound environmental, social, and financial impacts.

Both a thesis option and a nonthesis option are available. The thesis option is intended to be a research-oriented option for students looking to gain research experience in their field of specialization and possibly go on to a doctoral program. The nonthesis option is intended to be a professionally oriented option for students looking to practice the engineering profession at an advanced level. Areas of study or specialization could include environmental engineering, geo-environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering.

Program Admission Requirements. In addition to the University-wide graduate admission requirements for unconditional admission, applicants must satisfy the following, and admission decisions will be based on the following criteria:

- a satisfactory score, as specified by the Graduate Program Committee for Civil Engineering, on the Graduate Record Examination (GRE),
- an undergraduate degree in civil engineering or a closely related field from an accredited institution of higher education, or proof of equivalent training at a foreign institution,
- a statement of research/specialization interest, and
- a favorable recommendation by the Master of Science in Civil Engineering Admissions Committee.

A student who does not qualify for unconditional admission may be admitted on a conditional basis as determined by the Master of Science in Civil Engineering Admissions Committee.

Degree Requirements. The minimum number of semester credit hours required for the degree, in addition to any conditional course requirements, is 34 semester credit hours for the nonthesis option and 30 semester credit hours for the thesis option. At least 24 semester credit hours must be taken at UTSA. Each candidate is required to pass either a comprehensive examination and/or a thesis defense administered by his or her advisory committee, which is chaired by a full-time graduate faculty member.

<u>Thesis Option</u>	<u>Hours</u>
Degree Core Courses (Substitutions must be approved by the student's advisory committee)	6
CE 5143 Numerical Methods in Civil Engineering	
CE 6813 Applied Statistics and Decision Analysis in Civil Engineering	
Electives chosen from courses offered by the Department of Civil and Environmental Engineering*	18
CE 6983 Thesis and thesis defense (includes a presentation)	6
Total semester credit hours required	30
 <u>Nonthesis Option</u>	 <u>Hours</u>
Degree Core Courses (Substitutions must be approved by the student's advisory committee)	6
CE 5143 Numerical Methods in Civil Engineering	
CE 6813 Applied Statistics and Decision Analysis in Civil Engineering	
Electives chosen from courses offered by the Department of Civil and Environmental Engineering*	24
CE 5973 Special Project (includes a presentation)	3
CE 6961 Comprehensive Examination	1
Total semester credit hours required	34

*Chosen with the approval of the Civil Engineering Graduate Program Committee.

Doctor of Philosophy Degree in Environmental Science and Engineering

The Institute for Research in Water and Environmental Resources offers the opportunity for advanced study and research leading to the Doctor of Philosophy degree in Environmental Science and Engineering. The degree program encompasses two colleges, the College of Sciences and the College of Engineering, and two departments, the Department of Earth and Environmental Science and the Department of Civil and Environmental Engineering, which share responsibilities in providing classes, research, and facilities for the program. Areas of research emphasis include water resources, environmental quality, environmental remediation, pollution control, conservation ecology, spatial analysis, remote sensing, and natural hazards. The Ph.D. in Environmental Science and Engineering is awarded to candidates who display an in-depth understanding of the subject matter and demonstrate the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, all prospective students must have a Bachelor of Arts or Bachelor of Science degree and a Master of Science degree from an accredited university, and a minimum grade point average of 3.0 in upper-division and graduate work. The degree should be in biology, ecology, environmental science, chemistry, geology, geography, engineering, or other related scientific discipline. Applicants with only a Bachelor of Science degree may apply to the program and will be considered on a case-by-case basis.

Applicants whose native language is not English must score at least 550 on the Test of English as a Foreign Language (TOEFL; paper version). Three letters of recommendation from persons familiar with the applicant's academic potential, Graduate Record Examination (GRE) scores, a letter of research interest, and résumé/CV by the applicant are required and should be sent to the Doctoral Studies Committee Chair. Incomplete applications will not be considered until all required items are in an applicant's file. The Doctoral Studies Committee, comprised of members selected from the graduate faculty from both departments, will be responsible for recommending acceptance into the program and will take the lead in advising students initially. Some teaching assistantships, research assistantships, or research fellowships are available, but require a separate application.

Degree Requirements. The Ph.D. in Environmental Science and Engineering will require students to complete a minimum of 60 semester credit hours beyond the master's degree. This coursework will include courses that have been designed to provide advanced instruction in areas considered to form the foundation for the disciplines of environmental science and engineering. Enrollment in the Graduate Seminar is required for a minimum of 6 semester credit hours. A minimum of 15 semester credit hours of Doctoral Research and 15 semester credit hours minimum of Doctoral Dissertation must be completed and applied for graduation. Any grade lower than "B" in a graduate course or in remedial coursework at the undergraduate level will not count toward the 60 semester credit hours. Students can apply, with approval from their Chair Advisor, up to 12 semester credit hours of graduate coursework to elective courses (see below), if not applied toward their M.S. degree.

Students with only a baccalaureate degree are required to have a minimum of 75 semester credit hours to graduate with approval of the Doctoral Studies Committee.

Program of Study

A. Core Curriculum (9 semester credit hours required):

CE	6113	Global Change
		or
EES	5043	Global Change
CE	6273	Analyses of Environmental Problems
		or
EES	6273	Analyses of Environmental Problems

Choose a minimum of one of the following:

CE	5813	Risk and Decision Analysis in Civil Engineering
EES	5233	Experimental Design and Analysis
CE	6033	Multivariate Analysis in Environmental Science and Engineering
		or
EES	6033	Multivariate Analysis in Environmental Science and Engineering

B. Seminars (minimum 3 semester credit hours):

CE	6221	Graduate Seminar in Environmental Science and Engineering
		or
EES	5981	Graduate Seminar in Environmental Science and Engineering

C. Doctoral Research and Dissertation (minimum 30 semester credit hours):

CE	7211-3	Doctoral Research (15 hours minimum)
CE	7311-3	Doctoral Dissertation (15 hours minimum)

OR

EES	7211-3	Doctoral Research (15 hours minimum)
EES	7311-3	Doctoral Dissertation (15 hours minimum)

D. Electives (18 semester credit hours are required):

The 18 semester credit hours of electives that are required will be determined by the student in conjunction with their Chair Advisor and must be approved by the student's Examination Committee. The elective hours may come from classes from the Departments of Biology, Chemistry, Civil and Environmental Engineering, Computer Science, Earth and Environmental Science, Mathematics, Management Science and Statistics, or other appropriate areas.

Approved course offerings and descriptions are listed both in the College of Sciences, Department of Earth and Environmental Science, and in the College of Engineering, Department of Civil and Environmental Engineering.

Dissertation Committee. Students must choose a Dissertation Committee that consists of five graduate faculty members, including their Chair Advisor, and a minimum of one graduate faculty member from each department. Students must submit the names of the Dissertation Committee to the Doctoral Studies Committee Chair by the end of the second semester.

Advancement to Candidacy. Students must complete the core curriculum required courses before attempting written qualifying examinations. The student must submit in writing his or her request to take the examination to the Doctoral Studies Committee Chair by the fourth week of the semester the student wants to attempt the written examinations. The written qualifying examinations will cover core coursework and elective coursework taken that emphasize the student's research focus, and should be designed to provide students the opportunity to demonstrate their knowledge of environmental science and engineering. The Examination Committee chosen by the student will decide how many written examinations to administer with a minimum of three, with at least one from each of the CE and EES departments, to a maximum of five. The Examination Committee will evaluate the examinations administered to the student and notify the student of the results. Upon successful completion of the written examinations, the oral qualifying examination portion can be scheduled. No more than two attempts to pass the written examinations are permitted.

Students must take the oral qualifying examination within one semester after passing the written qualifying examinations. Students should notify the Doctoral Studies Committee Chair in writing three weeks before the oral examination is scheduled.

The oral qualifying examination is a research proposal defense. The research proposal defense consists of the student's dissertation topic, the experimental approach, the research novelty, and the potential contribution to his or her scientific field. The student's Chair Advisor will approve the student's research proposal before scheduling the oral examination. No more than two attempts to pass the oral examination are permitted.

Results of the written and oral examinations must be reported to the Doctoral Studies Committee Chair and the Dean of the Graduate School. Admission into the Doctoral program does not guarantee advancement to candidacy. After advancement to candidacy, the student may keep their Dissertation Committee as is or may change the members of the Dissertation Committee at this time.

Dissertation. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation. The Dissertation Committee guides and critiques the candidate's research. The format of the dissertation document will follow the guidelines and rules published by the Graduate School and general University regulations in Chapter 6, Doctoral Degree Regulations.

Final Oral Dissertation Defense. The student must notify the Graduate School in writing two weeks prior to the final scheduled oral defense. The final oral defense consists of public presentation of the dissertation, followed by a closed oral defense. Results of the oral defense must be reported to the Dean of the Graduate School. Awarding of the degree is based on the approval of the Dissertation Committee and the Dean of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements.

COURSE DESCRIPTIONS CIVIL ENGINEERING (CE)

5113 **Advanced Structural Analysis**

(3-0) 3 hours credit. Prerequisite: CE 3113 or an equivalent.

Moment distribution, force-deformation relations, stiffness matrix method, prismatic and nonprismatic members, flexibility method, beam column, frame stability, and inelastic effects.

5143 **Numerical Methods in Civil Engineering**

(3-0) 3 hours credit. Prerequisite: Graduate standing.

Mathematical equation root finding and optimization methods, matrix equations solution methods, eigenvector and eigenvalue solution methods, finite difference methods, curve-fitting methods, numerical integration and differentiation techniques, and introduction to finite element formulations.

5213 **Industrial Waste Treatment**

(3-0) 3 hours credit. Prerequisite: CE 3633 or consent of instructor.

Survey of industrial wastewater characteristics, design methodology for biological, chemical and physical treatment processes, selection of appropriate processes, and economic optimization.

5223 **Solid Waste Engineering**

(3-0) 3 hours credit. Prerequisite: CE 3633 or consent of instructor.

Basic concepts in planning, designing, and operating solid waste systems, with emphasis placed on state-of-the-art technology and the interrelationship of economic, environmental, and institutional aspects.

5233 **Topics in Water Quality Control**

(3-0) 3 hours credit. Prerequisite: CE 3633 or an equivalent, or consent of instructor.

Topic 1: Physical and Chemical Treatment Operations. Physical and chemical unit operations for water and wastewater treatment, with emphasis on treatment process combinations for drinking water supply.

Topic 2: Biological Treatment Operations. Application of principles of biological processes, fluid dynamics, and process engineering to define and solve water and wastewater treatment problems.

Topic 3: Stream Sanitation. Biological impact of pollution on the ecosystems of rivers and streams.

Topic 4: Groundwater Pollution Control. Control approach and transport mechanisms of pollutants in different types of aquifers.

May be repeated for credit as topics vary.

5243 Topics in Environmental Monitoring and Analysis

(2-3) 3 hours credit. Prerequisites: CE 3633 and CHE 1113, or consent of instructor.

Topic 1: Methods of Environmental Monitoring and Measurement. Functions, terminology, method development, and QA/QC for drinking, ground, and wastewater analysis; soil analysis; and air sampling and analysis, including EPA methods and industrial application.

Topic 2: Unit Process for Water Quality Control. Laboratory and pilot plant studies of physical, chemical, and biological processes for the treatment of wastewaters and sludges.

May be repeated for credit as topics vary.

5273 Hazardous Material Control

(3-0) 3 hours credit. Prerequisite: CE 3633 or consent of instructor.

Analysis of advanced or specialized hazardous waste treatment methods. Emphasis on physical, chemical, and biological processes in treatment of hazardous wastes and processing of treatment residuals. Definitions of problems and objectives and evaluation of alternatives for special cases. Development of concepts for preliminary process design. Design-oriented class project and field trips.

5313 Topics in Water Resource Engineering

(3-0) 3 hours credit. Prerequisites: CE 3713 or an equivalent, and consent of instructor.

Topic 1: Water Resources Systems Engineering. Applications of engineering systems and analysis techniques to the design of water systems.

Topic 2: Application of Water Quantity and Water Quality Modeling in Water Resources Planning.

Topic 3: Advanced Surface Water Hydrology. Statistical analysis of hydrologic data, frequency analysis of extreme events, maximum probable precipitation and floods, watershed hydrology, and hydrologic time series.

Topic 4: Advanced Hydraulic Engineering. Open-channel flow, sediment transport, and hydraulics for special structures.

Topic 5: Special Topics in Water Resources. Irrigation engineering, coastal engineering, conjunctive use, regime theories, universal soil loss equation, and other selected topics.

May be repeated for credit as topics vary.

5323 Topics in Construction Management

(3-0) 3 hours credit. Prerequisites: Graduate standing and consent of instructor.

Topic 1: Large Project Management. Large engineering project implementation and optimization of manpower, schedule, and material.

Topic 2: Urban Project Management. Application of engineering fundamentals and analysis to urban construction activities.

Topic 3: Forensic Engineering. Construction responsibilities, risks, and quality control.

May be repeated for credit as topics vary.

5333 Topics in Dynamics of Structures

(3-0) 3 hours credit. Prerequisites: Graduate standing and consent of instructor.

Topic 1: Dynamics of Structures. Fundamentals of structural dynamics; single- and multiple-degrees-of-freedom structural systems; lumped and distributed parameters systems; undamped and damped motions; and response to general dynamic loading.

Topic 2: Advanced Dynamics of Structures. Finite element formulation of dynamics of structural system, reduction of dynamic matrices, numerical methods, response spectrum and time-history analysis, seismic response analysis, and base isolation.

Topic 3: Design of Structures for Dynamic Loads. Static equivalent load design vs. dynamic load design, design of structures for general dynamic loading, seismic design of reinforced concrete and masonry buildings, and base isolation design.

Topic 4: Earthquake Engineering. Earthquake characteristics, strong ground motion, seismic loads, elastic and inelastic response, analysis and design of buildings for earthquakes.
May be repeated for credit as topics vary.

5343 Topics in Structures

(3-0) 3 hours credit. Prerequisites: Graduate standing and consent of instructor.

Topic 1: Stability of Structures. Concepts of stability of structures; buckling of columns, beams, beam-columns, rigid frames, and plates; flexural-torsional buckling of columns and beams; design for buckling; and energy and numerical methods.

Topic 2: Advanced Reinforced Concrete Structures. Torsion design, biaxial loads on columns, slenderness effects, joint design, yield line theory, strut-and-tie methods, seismic detailing, relationship between research and building code.

Topic 3: Prestressed Concrete. Theory, advantages, and limitations; various systems of prestressing.

Topic 4: Advanced Steel Design. Analysis and design of bolted and welded connections under eccentric and combined loads, stiffened and unstiffened connections, continuous beam-to-column connections, and design of steel buildings.

Topic 5: Design of Shell Structures. Analysis and design of cables, arches, plates, folded plates, domes, shell roofs, and shell walls.

Topic 6: Masonry Design. Material properties; masonry block properties; design of masonry beams, columns, walls, joints, retaining walls, and highrise buildings; construction techniques.

Topic 7: Ductile Behavior of Structures: Ductile behavior of reinforced concrete and steel structures, strength theories of concrete and steel under combined stresses, limit analysis of concrete structures, plastic analysis of steel structures, and yield-line analysis of concrete slabs.

Topic 8: Bridge Engineering. Design loads and load distribution. Design of superstructures and substructures. Load rating capacity of bridges.

Topic 9: Long Span Structures. Behavior of cables. Space trusses suspension and cable stayed bridges. Dynamics of long span structures.

May be repeated for credit as topics vary.

5353 Topics in Geotechnical Engineering

(3-0) 3 hours credit. Prerequisites: CE 3413, graduate standing, and consent of instructor.

Topic 1: Advanced Soil Mechanics. A study of soil constitutive behavior and testing, including nonlinear elastic hyperbolic models, incremental plasticity, soil chemistry, shear strength, and consolidation theory. Slope stability and seismic stability of earth embankments. Soil testing includes triaxial tests, the direct shear test, and consolidation tests.

Topic 2: Advanced Foundation Engineering. A study of foundation engineering design, including excavation slopes and retaining walls, cofferdams, sheetpile walls, caissons, drilled shafts, piles, settlement control methods, engineered fills, and foundations on expansive soils.

Topic 3: Soil and Site Improvement. A study of techniques available to improve poor soils and marginal construction sites, including lime stabilization, stone columns, deep dynamic compaction, geogrid reinforcement, geotextiles, slurry walls, grouting, construction dewatering, wick drains, and HDPE liners.

Topic 4: Soil Dynamics and Foundation Vibrations. Fundamentals of soil vibration, stress waves in elastic medium, dynamic soil testing and field measurements, foundation vibration, vibration isolation, foundation design, and liquefaction site assessment.

Topic 5: Soil Plasticity. Modern concepts of soils plasticity. Yield criteria, and associated and non-associated flow rules, and strain softening rules. Cam-clay, strain dilatancy, and endocronic models.

Topic 6: Computational Geotechnical Engineering. Analysis of stress and strains in soils in two and three dimensions. Soil properties as random variables, probabilistic approach to geotechnical design.

Topic 7: Offshore Geotechnical Engineering. Site investigation and testing for offshore structures. Wave dynamics. Modeling of soil and structural elements.

May be repeated for credit as topics vary.

5413 Topics in Civil Engineering

(3-0) 3 hours credit. Prerequisites: Graduate standing and consent of instructor.

Topic 1: Civil Engineering Project Analysis. Planning, implementation, control, and evaluation methods for special civil engineering projects.

Topic 2: Advanced Civil Engineering Technology Transfer. Civil engineering technology development and transfer for real-world problems.

Topic 3: Advanced Civil Engineering Design. Project-oriented design course involving advanced civil engineering knowledge and other engineering expertise.

Topic 4: Topics in Geotechnical Engineering. Advanced soil mechanics, advanced geotechnical engineering, soil mechanics theory, advanced soil testing, soil dynamics, and earthquake engineering.

May be repeated for credit as topics vary.

5513 Topics in Transportation Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing.

Topic 1: Transportation Systems Design. Multimode transportation networks and systems design methods.

Topic 2: Urban Transit. Planning and implementation of mass transit systems, airports, streets, and highways to satisfy the needs of urban residents and urban-based businesses.

Topic 3: Urban Transportation Engineering. Traffic studies, scheduling and routing, design and construction, and economic and environmental impacts.

Topic 4: Pavement Management Systems. Methodologies to evaluate and summarize pavement network conditions and priorities for rehabilitation and replacement.

Topic 5: Pavement Design. Design and analysis of pavement structural systems.

Topic 6: Advanced Geometric Design. Application of geometric design to street and highway projects.

Topic 7: Multi-Modal Transportation. Principles of multi-modal transportation applied to the movement of people and goods. Other topics include principles of transportation economics and transportation planning, Rail, Highway, Air and Sea; Multi-modal yards, containerization and Inland Ports; Airport design, Transit facilities design, Port design.

Topic 8: Principles of Traffic Engineering. Course covers vehicular stream models, interrupted flow and uninterrupted flow; Capacity analysis, Highway capacity Manual; vehicular emissions for uninterrupted flow and interrupted flow.

May be repeated for credit as topics vary.

5813 Risk and Decision Analysis in Civil Engineering

(3-0) 3 hours credit. Prerequisite: EGR 3713 or equivalent, or consent of instructor.

Perspective of risk assessments, risk estimation, event tree analysis, fault tree analysis, risk classifications, risk acceptability, probabilistic modeling, anatomy of risks with revealed preference method, decisions under uncertainties, utility theory, multiattribute utility functions, and case studies.

5923 Topics in Air Pollution Control

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Topic 1: Air Quality Monitoring and Analysis. Measurement and monitoring methods, including various laboratory and process development procedures.

Topic 2: Air Pollution Control Design. Design principles for pollution control equipment for both gaseous and particulate emissions.

Topic 3: Air Resources. Various types and characteristics of industrial air emissions; survey and control approach.

May be repeated for credit as topics vary.

5973 Special Project

3 hours credit. Prerequisites: Permission in writing (form available) from the instructor and the student's Graduate Advisor of Record.

The directed research course may involve either a laboratory or a theoretical problem.

5991 Graduate Seminar

(1-0) 1 hour credit. Prerequisites: Graduate standing and consent of instructor.
May be repeated for credit up to a limit of 2 semester credit hours.

6033 Multivariate Analysis in Environmental Science and Engineering

(3-0) 3 hours credit. Prerequisites: EES 5023 and EES 5233 or their equivalents, or consent of instructor.
Fundamental concepts of Multivariate Analysis in Environmental Science and Engineering will be presented. Students will examine principle components, factor analysis, cluster analysis, multidimensional scaling, discriminate analysis, factor analysis, multivariate normal distributions, mean vectors and covariance matrix and tests of covariance matrices. (Same as EES 6033. Credit cannot be earned for both CE 6033 and EES 6033.)

6053 Topics in Geo-Environmental Engineering

(3-0) 3 hours credit. Prerequisite: CE 2633, CHE 1113, or consent of instructor.
Topic 1: Fate and Transport of Contaminants in Environmental System. Principles of thermodynamics, fluid flow, flow in porous media, mass transport, reactive flow, bioremediation, and chemical reactions in natural environments.
Topic 2: Remediation Geotechnics. Site characterization; geo-environmental sampling and monitoring; clean-up geotechnics including pump and treat, soil vapor extraction, and air sparging; containment geotechnics including cut off walls and permeable reactive barriers (PRBs).
Topic 3: Waste Geotechnics. Containment systems; clay mineralogy; landfill design; geosynthetic liners; chemical compatibility of liners; leachate collection system; landfill covers and caps.
Topic 4: Modeling for Fate and Transport of Contaminants. Analytical, numerical, and geochemical modeling for fate and transport of reactive/non-reactive and degradable contaminants.
May be repeated for credit as topics vary. (Same as EES 6053. Credit cannot be earned for both CE 6053 and EES 6053.)

6113 Global Change

(3-0) 3 hours credit. Prerequisite: Graduate standing in the program or consent of instructor.
Changes in the global distribution of plants and animals and the causes of the changes will be examined. Factors that are apparently coupled to changes in the atmosphere and environmental temperature will be examined. (Same as EES 5043. Credit cannot be earned for both CE 6133 and EES 5043.)

6221 Graduate Seminar in Environmental Science and Engineering

(1-0) 1 hour credit.
Will include presentations of current research by faculty and invited guests who are experts in various aspects of research in the environmental sciences and engineering, and advanced graduate students who are about to complete their dissertation research. May be repeated for credit.

6273 Analyses of Environmental Problems

(3-0) 3 hours credit. Prerequisite: Graduate standing in the program or consent of instructor.
Problems will be presented and potential solutions will be explored from a variety of areas including soil, air, water, coastal and marine systems. Also examined will be potential impact on biotic and abiotic resources in terrestrial, aquatic, and marine systems. (Same as EES 6273. Credit cannot be earned for both CE 6273 and EES 6273.)

6723 Advanced Environmental Regulations

(3-0) 3 hours credit. Prerequisite: EES 5503 or equivalent, or consent of instructor.
A study of the environmental regulatory apparatus, and rules and regulations implemented to achieve those objectives of the environmental laws. (Same as EES 6723. Credit cannot be earned for both CE 6723 and EES 6723.)

6813 Applied Statistics and Decision Analysis in Civil Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing.
Statistical analysis methods include Descriptive Statistics, Interval Estimation and Hypothesis Testing, Analysis of Variance, Design of Experiments, Regression Analysis, and Time Series Analysis. Decision analysis methods include Reliability Analysis applied to Civil Engineering Systems, and Probabilistic methods in Civil Engineering problems.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Civil Engineering Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated for credit as many times as approved by the Civil Engineering Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, may be applied to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Consent of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7211-3 Doctoral Research

1 to 3 hours credit. Prerequisites: Admission to candidacy for the Doctoral degree, consent of the Graduate Advisor of Record and the Dissertation Director.

A research class designed specifically for the student to include the research work necessary to complete the Doctoral dissertation. May be repeated as necessary, but not more than 15 hours may be applied to the Doctoral degree.

7311-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisites: Admission to candidacy for the Doctoral degree, consent of the Graduate Advisor of Record and the Dissertation Director.

Consists of the specific work required to prepare the dissertation document. May be repeated as necessary, but not more than 15 hours may be applied to the Doctoral degree.

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Master of Science Degree in Electrical Engineering

The Master of Science degree in Electrical Engineering is designed to offer students the opportunity to prepare for leadership roles in careers with industry, government, or educational institutions. A thesis option is offered for students who want the opportunity to obtain some expertise in research. A nonthesis option is available for students who want a practical industrial applications-oriented degree.

Program Admission Requirements. In addition to the University-wide graduate admission requirements, admission decisions will be based on a combination of the following:

- a satisfactory score, as specified by the Electrical Engineering Graduate Studies Committee, on the Graduate Record Examination (GRE)
- a bachelor's degree in electrical engineering from an ABET-accredited institution of higher education or related field
- a minimum grade point average of 3.0 in the last 60 semester credit hours.

A student who does not qualify for unconditional admission may be admitted on a conditional basis as determined by the Electrical Engineering Graduate Studies Committee. Applicants with an electrical engineering background who wish to continue their education but do not intend to pursue the Master of Science degree in Electrical Engineering are encouraged to seek admission as special graduate students.

Degree Requirements. The degree requirements for different options are as follows:

A. The following five core courses form the basis for the program:

EE	5123	Computer Architecture
EE	5143	Linear Systems and Control
EE	5153	Random Signals and Noise
EE	5163	Digital Signal Processing
EE	5183	Foundations of Communication Theory

B. The requirements for each option, with minimum semester-credit-hour requirements and their distribution, are as follows:

<u>Thesis Option</u>		<u>Hours</u>
Core courses (any two)		6
Additional graduate electrical engineering courses*		12
Electives (may be courses from outside electrical engineering)*		6
EE	6983 Master's Thesis	6
Minimum total semester credit hours required		30
<u>Nonthesis Option</u>		<u>Hours</u>
Core courses (any three)		9
Additional graduate electrical engineering courses*		15
Electives (may be courses from outside electrical engineering)*		6
EE	6963 Graduate Project	3
Minimum total semester credit hours required		33

*Chosen with approval of the Electrical Engineering Graduate Program Committee.

Degree plans must be consistent with the guidelines established by the Electrical Engineering Graduate Program Committee. In addition to other University-wide requirements for the Master's degree, candidates are required to pass a project and/or a thesis defense administered by the student's advisory committee, chaired by a tenured or tenure-track graduate faculty member.

Master of Science Degree in Computer Engineering

The Master of Science degree in Computer Engineering is designed to offer students the opportunity to prepare for leadership roles in careers with industry, government, or educational institutions. Students enrolled in the M.S. degree program in Computer Engineering will have two different options to obtain their degree: (1) Thesis Option and (2) Nonthesis Option. A thesis option is offered for students who want the opportunity to obtain expertise in research and who may be interested in pursuing the doctoral degree in computer engineering or electrical engineering. A nonthesis option is offered for students who want a practical industrial applications-oriented degree.

Program Admission Requirements. In addition to the University-wide graduate admission requirements, admission decisions will be based on a combination of the following:

- a satisfactory score, as specified by the Computer Engineering Graduate Studies Committee, on the Graduate Record Examination (GRE)
- a bachelor's degree in electrical or computer engineering from an ABET-accredited institution of higher education or related field
- a minimum grade point average of 3.0 in the last 60 semester credit hours of undergraduate studies.

A student who does not qualify for unconditional admission may be admitted on a conditional basis as determined by the Computer Engineering Graduate Studies Committee. Applicants with an electrical or computer engineering background who wish to continue their education but do not intend to pursue the Master of Science degree in Computer Engineering are encouraged to seek admission as special graduate students.

Degree Requirements. The minimum number of semester credit hours required for the degree, excluding required coursework to remove admission deficiencies, is 30 for the thesis option and 33 for the nonthesis option.

A. The courses are divided into three groups as follows:

Group A. The following four core courses of this group form the basis for the program:

EE	5103	Engineering Programming
EE	5113	VLSI System Design
EE	5123	Computer Architecture
EE	5193	FPGA and HDL

Group B. Additional computer engineering courses:

CS	5103	Software Engineering
EE	5223	Topics in Digital Design (may be repeated when topic varies)
EE	5323	Topics in VLSI Design (may be repeated when topic varies)
EE	5423	Topics in Computer Architecture (may be repeated when topic varies)
EE	5453	Topics in Software Engineering (may be repeated when topic varies)

Group C. Free elective courses:

CS	5113	Computer Graphics
CS	5233	Artificial Intelligence
CS	5253	Expert Systems
CS	5363	Programming Languages and Compilers

CS	5523	Operating Systems
CS	6103	Distributed Software Development
EE	5163	Digital Signal Processing
EE	5353	Topics in Multimedia Signal Processing: Computer Vision and Application
EE	5353	Topics in Multimedia Signal Processing: Digital Image Processing
EE	5463	Artificial Neural Networks
EE	5583	Topics in Digital Communication: Digital Information Theory
EE	5583	Topics in Digital Communication: Computer Communication Networks
EE	6951-3	Independent Study
EE	6971-3	Special Problems

B. The requirements for each option, with minimum semester-credit-hour requirements and their distribution, are as follows:

<u>Thesis Option</u>			<u>Hours</u>
Core courses (any two from Group A)			6
Additional computer engineering courses from Group A or B*			12
Elective courses from Group A or B or C*			6
EE	6983	Master's Thesis	6

Minimum total semester credit hours required	30
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<u>Nonthesis Option</u>			<u>Hours</u>
Core courses (any two courses from Group A)			6
Additional computer engineering courses from Group A or B*			18
Elective courses from Group A or B or C*			9

Minimum total semester credit hours required	33
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*Chosen with approval of the Computer Engineering Graduate Program Committee.

Degree plans must be consistent with the guidelines established by the Computer Engineering Graduate Program Committee.

Doctor of Philosophy Degree in Electrical Engineering

The Department of Electrical and Computer Engineering offers advanced coursework integrated with research leading to the Doctor of Philosophy degree in Electrical Engineering. The program has emphases in Signals and Systems (communications, signal processing, digital systems, and control). The Ph.D. in Electrical Engineering will be awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. The minimum requirements for admission to the Doctor of Philosophy in Electrical Engineering degree program are as follows:

- Normally, a student must hold a master's degree before being granted admission to the program. Some exceptionally talented students may enter the Doctor of Philosophy program directly upon receiving a bachelor's degree in electrical engineering, with the special approval of the Electrical Engineering Doctoral Studies Committee.
- Applicants without a master's degree program must have a grade point average of 3.3 or better in the last 60 semester credit hours of undergraduate coursework in electrical engineering.

- Applicants with a master's degree must have a grade point average of 3.3 or better in their master's degree program. Applicants with a master's degree in electrical engineering or in a related field may apply a maximum of 30 semester credit hours of previously earned graduate credit toward their doctoral degree. Each student's transcript will be evaluated by the Doctoral Studies Committee and credit will be designated on a course-by-course basis to satisfy the formal coursework requirements of the degree. A maximum of 6 semester credit hours credit may be awarded for a master's thesis.
- A satisfactory score, as evaluated by the Doctoral Studies Committee for Electrical Engineering, is required on the Graduate Record Examination (GRE). If an applicant's performance on the GRE is used for that purpose, it will be considered with other criteria when making an admissions or competitive scholarship decision and will not be used as the sole criterion for consideration of the applicant or as the primary criterion to end consideration of the applicant. Students whose native language is not English must achieve a minimum score of 550 on the Test of English as a Foreign Language (TOEFL; paper version).
- Letters of recommendation, preferably three, attesting to the applicant's readiness for doctoral study.

A complete application includes the application form, official transcripts, letters of recommendation, GRE scores, a résumé, a statement of research experience, interests and goals, and the TOEFL score for those applicants whose native language is not English. Admission is competitive. Satisfying these requirements does not guarantee admission.

Degree Requirements and Program of Study. Typical doctoral studies will consist of 90 semester credit hours beyond the bachelor's degree or 60 hours beyond the master's degree. Undergraduate courses, general education courses, and prerequisites for graduate courses cannot be counted toward this total. The hours are divided as follows:

A. 9 semester credit hours of Required Courses selected from the following:

EE	5123	Computer Architecture
EE	5143	Linear Systems and Control
EE	5153	Random Signals and Noise
EE	5163	Digital Signal Processing
EE	5183	Foundations of Communication Theory

B. 24 semester credit hours of Prescribed Elective Courses selected from the following:

EE	5103	Engineering Programming
EE	5113	VLSI System Design
EE	5193	FPGA and HDL
EE	5223	Topics in Digital Design
EE	5243	Topics in Systems and Control
EE	5263	Topics in Digital Signal Processing and Digital Filtering
EE	5283	Topics in Communication Systems
EE	5293	Topics in Microelectronics
EE	5323	Topics in VLSI Design
EE	5343	Intelligent Control and Robotics
EE	5353	Topics in Multimedia Signal Processing
EE	5373	Wireless Communication
EE	5393	Solid State Microfabrication Technology
EE	5423	Topics in Computer Architecture
EE	5443	Discrete-Time Control Theory and Design
EE	5453	Topics in Software Engineering
EE	5463	Artificial Neural Networks
EE	5473	Fiber Optic Communication
EE	5493	Topics in MEMS
EE	5583	Topics in Digital Communication

EE	6323	Advanced Topics in Computers
EE	6343	Advanced Topics in Systems and Control
EE	6363	Advanced Topics in Signal Processing
EE	6383	Advanced Topics in Communications
EE	6951-3	Independent Study
EE	6971-3	Special Problems
EE	7423	VLSI for Signal Processing
EE	7443	Nonlinear Control Systems
EE	7463	Pattern Analysis and Machine Vision
EE	7483	Communication Networks

C. 21 semester credit hours of Free Electives:

Students may select free electives from the courses listed above, and from approved graduate courses in mathematics, statistics, computer science, physics, and other engineering disciplines. At least two courses must be from outside of Electrical Engineering. Sample courses in related fields are listed below:

CS	6513	Advanced Architecture
CS	6643	Parallel Processing
EGR	5093	Special Topics in Engineering Analysis
MAT	5293	Numerical Linear Algebra
MAT	5313	Algebra II
MAT	5403	Functional Analysis I
ME	5143	Advanced Dynamics
STA	5103	Applied Statistics
STA	5253	Applied Time Series Analysis
STA	5513	Mathematical Statistics II

D. Electrical Engineering Research (18 hours):

EE	6983	Master's Thesis
EE	6991	Research Seminar
EE	7953	Doctoral Research

Doctoral Dissertation (18 hours):

EE	7993-6	Doctoral Dissertation
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The entire program of study must be approved by the student's dissertation advisor, dissertation committee, and doctoral studies committee and must be submitted to the Dean of the Graduate School for final approval. The courses are intended to focus and support the individual's mastery of his or her particular area of expertise.

Advancement to Candidacy. All students seeking a doctoral degree at UTSA must be admitted to candidacy. One of the requirements for admission to candidacy is passing a doctoral qualifying examination. Students should consult the University's Doctoral Degree Regulations (Chapter 6 in this catalog) for other requirements.

Qualifying Examination. The qualifying examination is divided into written and oral portions.

Written Portion of the Qualifying Examination. Prior to taking the written examination, the student must have a Program of Study on file. The written portion of the Doctoral Qualifying Examination is scheduled near the end of the Fall and Spring Semesters. Students wishing to take the examination must submit their request in writing to the Doctoral Advisor of Record by the fourth week of the semester during which they intend to take the examination. Normally, the written examination is taken in the Fall Semester of the student's second year. Students who fail their first attempt at the written examination are allowed to make a second attempt on the next written examination. No more than two attempts to pass the written examination are permitted.

Students must select and pass three examinations from the five areas corresponding to the five core courses in the graduate program. One of the three examinations must be from the area of specialization declared on the student's Program of Study.

Oral Portion of the Qualifying Examination. The oral examination must be taken within one year after passing the written portion of the qualifying examination. No more than two attempts to pass the oral examination are permitted.

A four-member Oral Examination Committee, chaired by the student's Supervising Professor, conducts the oral examination. A written dissertation proposal should be submitted to the student's Oral Examination Committee at least two weeks before the oral presentation. The format of the oral examination consists of a public presentation of the student's dissertation proposal, followed by a period of questioning by the Committee based on the proposal and on relevant background from the student's Program of Study. Unanimous approval of the Oral Examination Committee is required to pass the oral examination. After the student passes both the written and oral portions of the Doctoral Qualifying Examination, he or she is admitted to candidacy. Admission into the Doctoral program does not guarantee advancement to candidacy.

Final Oral Dissertation Defense. After admission to candidacy, the next steps are writing the dissertation and passing the final oral defense. The final oral defense is administered and evaluated by the student's Dissertation Committee and covers the dissertation and the general field of the dissertation. The final oral defense consists of a public presentation of the dissertation, followed by a closed oral defense. The Dissertation Committee must unanimously approve the dissertation.

COURSE DESCRIPTIONS ELECTRICAL ENGINEERING (EE)

5103 Engineering Programming

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Object Oriented programming for engineering design problems; C++ and Java programming; software development for mathematical modeling and simulation of hardware systems; individual class projects. (Formerly EE 5453 Topic 4: Engineering Programming Languages. Credit cannot be earned for both EE 5103 and EE 5453 Engineering Programming Languages.)

5113 VLSI System Design

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

VLSI Circuit Design, CMOS technology and device modeling, structured digital circuits, VLSI systems; computer-aided design tools, placement, routing, extraction, design rule checking, graphic editors, simulation, verification, minimization, silicon compilation, test pattern generation; theory for design automation; chip design. (Formerly EE 5323 Topic 1: VLSI I. Credit cannot be earned for both EE 5113 and EE 5323 VLSI I.)

5123 Computer Architecture

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Description of digital computer systems, arithmetic algorithms, central processor design, memory hierarchies and virtual memory, control unit and microprogramming, input and output, coprocessors, and multiprocessing.

5143 Linear Systems and Control

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Advanced methods of analysis and synthesis of linear systems, continuous and discrete-time systems, analytical approach to linear control theory.

5153 Random Signals and Noise

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Study of probability theory, random processes, mean and autocorrelation, stationarity and ergodicity, Gaussian and Markov processes, power spectral density, noise, and linear systems.

5163 Digital Signal Processing

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Study of discrete-time signals and systems, including Z-transforms, fast Fourier transforms, and digital filter theory. Filter design and effects of finite register length, and applications to one-dimensional signals.

5183 Foundations of Communication Theory

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor, completion of EE 5153 recommended.

Basis functions, orthogonalization of signals, vector representation of signals, optimal detection in noise, matched filters, pulse shaping, intersymbol interference, maximum likelihood detection, channel cutoff rates, error probabilities, bandwidth, and power-limited signaling.

5193 FPGA and HDL

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Fundamental digital systems principles. HDL modeling concepts and styles: structural, RTL, and behavioral; modeling for synthesis and verification; modeling combinatorial and sequential logic circuits; modeling finite state machines; testbench developments; performance estimation and improvement. (Formerly EE 5223 Topic 2: FPGA and HDL. Credit cannot be earned for both EE 5193 and EE 5223 FPGA and HDL.)

5223 Topics in Digital Design

(3-0) 3 hours credit. Prerequisite: EE 5123 or consent of instructor.

Topics may include the following:

Topic 1: Graph Theory and Networking. Introduction to graphs and digraphs, applications of graphs, Eulerian and Hamiltonian graphs, connectivity, trees, planar graphs, decomposition problems, graph models for electrical and communications networks and computer architectures, communications network application examples, analysis and design.

Topic 2: Microcomputer-Based Systems. 8- and 16-bit microprocessors, bus timing analysis, interfacing principles, LSI and VLSI chip interfacing, use of software development tools such as assemblers, compilers, and simulators, and hardware development tools including logic analyzer.

Topic 3: PCI System Design. Understanding PCI specifications including protocol, electrical, mechanical, and timing. Study the protocol for high-speed, high-bandwidth data throughput. Designing a PCI-based system design and implementing in FPGA.

May be repeated for credit as topics vary.

5243 Topics in Systems and Control

(3-0) 3 hours credit. Prerequisite: EE 5143.

Topics may include the following:

Topic 1: Adaptive Systems and Control. Current methods in adaptive systems and control including stability, convergence, robustness, system identification, recursive parameter estimation, and design of parameterized controllers.

Topic 2: Optimal Control. Optimal and suboptimal techniques for controller design using the principle of optimality, min-max principles, and induced norm minimization.

Topic 3: Nonlinear Control Systems. Nonlinear systems modeling, existence and uniqueness of solutions, phase plane analysis, Lyapunov stability, and advanced nonlinear techniques.

Topic 4: Computational Intelligence. A study of neuron models, basic neural nets and parallel distributed processing, and sound mathematical intuition and applications about neural network algorithms and architectures. Includes theory of fuzzy sets, foundations of fuzzy logic, and genetic algorithms. Course emphasizes engineering applications; control, pattern recognition, damage assessment, and decisions.

Topic 5: System of Systems Science and Engineering. Introduction to Systems Engineering, Large-Scale Complex Systems, System of Systems (SoS). Architecture and Modeling of System of Systems Engineering, Distributed and Cooperative Control of SoS, Discrete-event simulation systems (DEVS) principles and applications, Autonomous Control Systems via Computational Intelligence Tools, Principle component analysis and data mining techniques for SoS, V-Lab® a Virtual Laboratory and Matlab software for intelligent SoS, Case studies: Sensor Networks, System of Robots, Future Combat Systems, Wireless Networks, System of Energy.

May be repeated for credit as topics vary.

5263 Topics in Digital Signal Processing and Digital Filtering

(3-0) 3 hours credit. Prerequisite: EE 5153 or EE 5163, or consent of instructor.

Topics may include the following:

Topic 1: Nonlinear Filters. Order statistic filters, morphological filters, stack/Boolean filters, and other related topics.

Topic 2: Detection and Estimation Theory. Minimum variance unbiased estimation, Cramer-Rao low bound, maximum likelihood estimation, Bayesian estimation, Neyman-Pearson detector, Bayesian detector, matched filter, Generalized Likelihood Ratio Test.

Topic 3: Orthogonal Transforms, Wavelets and Fractals with Applications. Fast orthogonal transform (Cosine, Sine, Hartley, Haar, Slant, Short-time Fourier and Gabor and Walsh), subband decomposition, Fractals, Fractal Dimension, Iterated Function Systems, de-noising and others.

Topic 4: Wavelet Transforms and Applications. Subband decompositions; Wavelets and wavelet packets: construction, properties, decomposition and reconstruction, multiresolution analyses; image and video international compression standards, signal and image de-nosing; steganography, and watermarking.

Topic 5: Signal Processing for Wireless Systems. Usage of transforms for the analysis and design of wireless systems. FIR and IIR filter design and adaptive signal processing for wireless systems.

May be repeated for credit as topics vary.

5283 Topics in Communication Systems

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Topics may include the following:

Topic 1: Spread Spectrum Systems and GPS. A hands-on study of modern wireless communications and ranging systems based on spreading technologies. Theory and implementation of data and code modulations; transmitters and receivers; multiple access protocols; signal acquisition and tracking. CDMA standards; GPS; FCC E911.

Topic 2: Simulation of Communication Transceivers. A hands-on study of communication systems. FIR and IIR filter design and implementation for communications. Algorithms, implementation and simulation of modulations, AGC, pulse shaping, matched filters, carrier synchronization, timing recovery, equalization, and coding. Simulation of complete software radios.

Topic 3: Introduction to Microwave and Antennas. Electromagnetic wave propagation and principles of antenna design. Microwave and antennas for microwave communications.

May be repeated for credit as topics vary.

5293 Topics in Microelectronics

(3-0) 3 hours credit. Prerequisite: EE 4313.

Topics may include the following:

Topic 1: Analog Integrated Circuit Design. Introduction to MOS devices and analog circuit modeling. Analog circuits: active resistors, current sources, current mirrors, current amplifiers, inverting amplifier, differential amplifier, cascade amplifier, MOS switches, and the output amplifier. Complex circuits: comparators, operational amplifiers, and other commonly used building blocks for mixed signal systems. Use of CAD tools to layout and simulate analog circuits.

Topic 2: Mixed Signal Circuits and Systems. Introduction to the circuits of systems in which analog and mixed signal integrated circuit design are employed. The topics are A/D and D/A converters, including Nyquist-rate and over-sampled S-D A/D converters, switched capacitor filters, multipliers, oscillators, the PLL, and circuit design issues, testing, digital calibration and correction.

May be repeated for credit as topics vary.

5323 Topics in VLSI Design

(3-0) 3 hours credit. Prerequisite: EE 5113 or consent of instructor.

Topic 1: Advanced VLSI Design. Microelectronic systems architecture; VLSI circuit testing methods; integration of heterogeneous computer-aided design tools; wafer scale integration; advanced high-speed circuit design and integration. Engineering design of large-scale integrated circuits, systems, and applications; study of advanced design techniques, architectures, and CAD methodologies.

Topic 2: Low Power VLSI Design. Hierarchy of limits of power, source of power consumption, voltage scaling approaches; circuit, logic, architecture and system level power optimization; power estimation; advanced techniques for power optimization; software design for low power.

Topic 3: VLSI Testing. Fault Models, Test Pattern Generation, hardware and software reliability analysis of digital systems, design for testability, self-diagnosis, fault-tolerant logic design, Built-in Self Test (BIST) – Techniques and architectures, System-on-a-Chip (SOC) Testing.

May be repeated for credit as topics vary.

5343 Intelligent Control and Robotics

(3-0) 3 hours credit. Prerequisite: EE 5143.

Study of artificial neural networks control, knowledge-based control, and fuzzy-logic control. Analytical techniques and fundamental principles of robotics; dynamics of robot arms, motion control, robot sensing, and robot intelligence.

5353 Topics in Multimedia Signal Processing

(3-0) 3 hours credit. Prerequisite: EE 5153 or EE 5163, or consent of instructor.

Topics may include the following:

Topic 1: Multimedia Signal Processing and Secure Communications. Signal representation systems and their based coders; the basic concepts of digital steganography and cryptography; multimedia data hiding and detection techniques; secure information transmission over mobile channels; the various object recognition techniques; performance and effectiveness assessment.

Topic 2: Digital Image Processing. Study of binary image processing; histogram and point operations; algebraic and geometric image operations; 2-D digital Fourier transforms; convolution; linear and nonlinear filtering; morphological filters; image enhancement; linear image restoration (deconvolution); digital image coding and compression; and digital image analysis. (Formerly EE 5363. Credit cannot be earned for both EE 5353 Topic 2 and EE 5363.)

Topic 3: Computer Vision and Application. Image perception, edge detection in the visual system, feature vectors, image enhancement, shape from shading, image segmentation by textural perception in humans, chain codes, B-splines, classification (SVM and others).

Topic 4: Biomedical Image Processing. Digital image fundamentals, digital image enhancement in the spatial domain, digital image enhancement in the frequency domain, optimal image filtration in the frequency domain, image restoration and order-statistics filters, morphological image processing, processing of microarray images, segmentation and gene-expression calculation, processing of FISH stacked images, automated analysis of gene copy numbers by fluorescence in situ hybridization, fundamental methods of image reconstruction by projections and their applications in computerized tomography. (Same as BME 6703. Credit cannot be earned for both EE 5353 Topic 4 and BME 6703.)

Topic 5: Development of Multimedia Applications for Wireless Devices. Programming on wireless systems. Multimedia (image, audio and video) formats. Multimedia Processing. Development of sample applications.

May be repeated for credit as topics vary.

5373 Wireless Communication

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

This course offers in-depth study of wireless communication systems at the physical layer, propagation modeling for wireless systems, modulation schemes used for wireless channels, diversity techniques and multiple antenna systems, and multiple access schemes used in wireless systems.

5393 Solid State Microfabrication Technology

(3-0) 3 hours credit. Prerequisites: EE 3213 and EE 4313.

In this course the fundamentals of modeling and microfabrication schemes for semiconductor active devices and MEMS are introduced. Techniques for both silicon and compound semiconductor processing are studied. Topics include: wafer growth, oxidation, diffusion, ion implantation, lithography, etch and deposition. The course will include software skills on the layout of semiconductor devices and hands-on, clean-room exposure where students will fabricate simple representative microdevices. (Same as ME 5873. Credit cannot be earned for both EE 5393 and ME 5873.)

5423 Topics in Computer Architecture

(3-0) 3 hours credit. Prerequisite: EE 5123 or consent of instructor.

Topic 1: Parallel and Distributed Computing. Multiprocessor and multicomputer systems, shared-memory and distributed memory systems, exploitation of parallelism, data partitioning and task scheduling, multiprocessor system interconnects, message passing and data routing, parallel programming.

Topic 2: RISC Processor Design, RISC Concept. RISC versus CISC, RISC advantages and disadvantages, various processor survey and applications, study of software development tools: assemblers compilers, simulators, RISC implementations.

Topic 3: Superscalar Microprocessor Architecture. Definition of superscalar, superpipelined, and VLIW processors; available parallelism in programs; branch prediction techniques; memory systems for superscalar processors; trace caches; memory disambiguation and load/store recording; performance evaluation techniques; multimedia extensions in superscalar processors.

Topic 4: Fault Tolerance and Reliable System Design. Reliability and availability techniques, maintainability and testing techniques, evaluation criteria, fault-tolerant computing, fault-tolerant multiprocessors, design methodology for high reliability systems.

Topic 5: Computer Arithmetic. Fundamental principles of algorithms for performing arithmetic operations in digital computers. Number systems, fast implementations of arithmetic operations and elementary functions, design of arithmetic units using CAD tools.

Topic 6: Advanced Computer Architecture. Superscalar and vector processors, advanced pipelining techniques, instruction-level parallelism and dynamic scheduling techniques, advanced memory hierarchy design.

May be repeated for credit as topics vary.

5443 Discrete-Time Control Theory and Design

(3-0) 3 hours credit. Prerequisite: EE 5143.

Control theory relevant to deterministic and stochastic analysis and design of computer-controlled systems using both state-space and input-output models.

5453 Topics in Software Engineering

(3-0) 3 hours credit. Prerequisite: EE 5123 or consent of instructor.

Topic 1: Large Domain-Specific Software Architectures. Software engineering approaches; scenario-based design processes to analyze large problem domains; domain modeling and representations; creation of component-based architecture providing an object-oriented representation of system requirements; development of large software class project.

Topic 2: Embedded Software Systems Design. Dataflow models, uniprocessor and multiprocessor scheduling, hardware/software co-design, hierarchical finite state machines, synchronous languages, reactive systems, heterogeneous systems.

Topic 3: Embedded Software Testing and Quality Assurance. Systematic testing of embedded software systems; unit (module), integration and system level testing; software verification; hardware/software cotesting; code inspections; use of metrics; quality assurance; measurement and prediction of software reliability; software maintenance; software reuse and reverse engineering.

May be repeated for credit as topics vary.

5463 Artificial Neural Networks

(3-0) 3 hours credit. Prerequisite: EE 5163 or consent of instructor.

Study of parallel optimization algorithms using Hopfield networks, perceptrons, backpropagation competitive systems, and other unsupervised techniques.

5473 Fiber Optic Communication

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

In-depth study of fiber optic principles, performance of optical receivers, devices, digital and analog fiber optic transmission systems, wavelength division multiplexing systems, optical amplifiers, and fiber optic measurements.

5493 Topics in MEMS

(3-0) 3 hours credit. Prerequisite: EE 3213.

Topic 1: Microwave Integrated Circuits. This course will focus on the analysis and fabrication of MEMS structures operating in the microwave regime. The course will include the actual microfabrication of transmission lines, resonators, couplers and antennas.

Topic 2: Advanced Topics in Sensors and Actuators. The purpose of this course is to explore specific microfabrication approaches for a variety of sensors, such as magnetic, acoustic, mechanical, radiation, thermal, chemical and biological.

Different actuation schemes are also covered (electrostatic, piezoelectric, thermal, magnetic and shape-memory-alloys). (Credit cannot be earned for both EE 5493 Topic 2 and ME 5893.)
May be repeated for credit as topics vary.

5583 Topics in Digital Communication

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Topics may include the following:

Topic 1: Digital Information Theory. Entropy and mutual information; Huffman coding; source and channel coding theorems; channel capacity; block coding error bounds; random coding bounds; cutoff rate; multiuser information theory; random access channels and protocols; multiaccess coding methods.

Topic 2: Digital Modulation Schemes. In-depth study of digital modulation; information sources and source coding, quantization, representation of digitally modulated signals; synchronization and timing issues in digital communications.

Topic 3: Computer Communication Networks. Fundamentals of communication networks, data communication and transmission systems, peer-to-peer protocols, local/wide area networks, multiple access methods, and service integration.

Topic 4: Coding and Error Correction. Algebraic Coding Theory; groups and fields, linear codes, Hamming distance, cyclic codes, minimum distance bounds, BCH codes and algebraic decoding, Reed-Solomon codes, Reed-Mueller codes and maximum likelihood decoding, suboptimal decoding, and applications of coding.

May be repeated for credit as topics vary.

6323 Advanced Topics in Computers

(3-0) 3 hours credit. Prerequisites: Consent of Graduate Advisor of Record and Dissertation Director.

Current topics in the computer area. May be repeated for credit as topics vary.

6343 Advanced Topics in Systems and Control

(3-0) 3 hours credit. Prerequisites: Consent of Graduate Advisor of Record and Dissertation Director.

Current topics in the systems and control area. May be repeated for credit as topics vary.

6363 Advanced Topics in Signal Processing

(3-0) 3 hours credit. Prerequisites: Consent of Graduate Advisor of Record and Dissertation Director.

Current topics in the signal processing area. May be repeated for credit as topics vary.

6383 Advanced Topics in Communications

(3-0) 3 hours credit. Prerequisites: Consent of Graduate Advisor of Record and Dissertation Director.

Current topics in the communications area. May be repeated for credit as topics vary.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.

6963 Graduate Project

3 hours credit. Prerequisites: Consent of the Graduate Advisor of Record and Projector Advisor.

A semester-long project with approval of a supervising faculty. Credit will be awarded upon successful submission of a written report and oral presentation to a project committee consisting of at least two faculty members. The grade report for the course is either "CR" or "NC".

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, may be applied to the degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Consent of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6991 Research Seminar

1 hour credit.

Presentation and analysis of literature in a selected area of research. The grade report for the course is either "CR" or "NC".

7423 VLSI for Signal Processing

(3-0) 3 hours credit. Prerequisite: EE 5123.

VLSI applications in signal processing and telecommunications. General purpose DSP architecture. ASIC architectures: systolic arrays, data-flow multiprocessing, wavefront arrays. Case histories: modems, echo cancellers, digital PLL, High-speed arithmetic and algorithms.

7443 Nonlinear Control Systems

(3-0) 3 hours credit. Prerequisite: EE 5143.

Principles of nonlinear systems modeling and analysis: Lyapunov stability, input-output stability, and homogeneous theory. Control of nonlinear systems: integrator backstepping, feedback domination, Lyapunov-based design, small control technique, output feedback design, and applications to physical systems.

7463 Pattern Analysis and Machine Vision

(3-0) 3 hours credit. Prerequisite: EE 5163.

Image formations, early vision, binary machine vision, 2-D representation, 3-D representation, image segmentation, statistical pattern recognition, and knowledge-based vision.

7483 Communication Networks

(3-0) 3 hours credit. Prerequisite: EE 5183.

Networking, circuit and packet switching, layered architectures, protocols, and network performance. Local and wide-area networks; Internet; ISDN principals. Broadband networks; SONET, SDH, ATM and BISDN. Applications to data/voice/video/multimedia traffic.

7953 Doctoral Research

3 hours credit. Prerequisites: Ph.D. student standing and consent of instructor and the Graduate Advisor of Record.

May be repeated for a maximum credit of 18 hours.

7993-6 Doctoral Dissertation

3 to 6 hours credit. Prerequisite: Consent of the Doctoral Advisor of Record and Dissertation Advisor.

May be repeated for a maximum credit of 18 hours.

DEPARTMENT OF MECHANICAL ENGINEERING

Master of Science Degree in Mechanical Engineering

The Master of Science program in Mechanical Engineering is designed to offer students the opportunity to prepare for leadership roles in careers with industry, government, or educational institutions. A thesis option is offered for research-oriented students. A nonthesis option is available for students who prefer a practice-oriented degree in engineering.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, admission will be based on a combination of factors: a bachelor's degree in mechanical engineering (or a closely related field) from an accredited institution of higher education or proof of equivalent education at a foreign or unaccredited institution, satisfactory performance on the Graduate Record Examination (GRE), and satisfactory undergraduate grade point average (GPA) in engineering coursework.

An applicant may be admitted on a conditional basis as determined by the Master of Science in Mechanical Engineering Admission Committee. Applicants with a degree in a discipline other than mechanical engineering may be required to make up the deficiencies in the undergraduate mechanical engineering curriculum. Courses listed as deficiencies do not count toward the graduate degree.

Applicants with a mechanical engineering background who wish to continue their education but do not intend to pursue a Master of Science degree in Mechanical Engineering are encouraged to seek admission as special graduate students.

Degree Requirements. The minimum number of semester credit hours required for the degree, excluding required coursework to remove admission deficiencies, is 30 for the thesis option and 33 for the nonthesis option.

A. Degree candidates must complete any two courses selected from the following list of core courses:

ME	5013	Topics in Mechanical Engineering (with consent of Graduate Committee)
ME	5113	Advanced Controls
ME	5143	Advanced Dynamics
ME	5243	Advanced Thermodynamics
ME	5413	Advanced Solid Mechanics
ME	5613	Advanced Fluid Mechanics

B. Degree candidates must complete the following course requirements for one of the degree options:

<i>Thesis Option</i>		<u>Hours</u>
Core courses (any two)		6
Designated electives (with approval of the student's committee chair)		18
ME	6983 Master's Thesis	6
Minimum total semester credit hours required		30
 <i>Nonthesis Option</i>		 <u>Hours</u>
Core courses (any two)		6
Designated electives (with approval of the student's committee chair)		24
ME	5973 Special Project	3
Comprehensive Examination		0
Minimum total semester credit hours required		33

In addition to the coursework and other University requirements for the Master's degree, candidates must pass a thesis defense administered by the student's advisory committee, chaired by a full-time graduate faculty member. A successful defense satisfies the University's comprehensive examination requirement.

Degree-seeking students must select a major advisor and a graduate advisory committee (with a minimum of three members) in the first 9 semester credit hours of graduate coursework. The chair of the student's advisory committee, who must be a full-time member of the graduate faculty, is the student's primary advisor. Within the first 9 hours of graduate coursework, degree candidates must meet with the committee chair to develop a degree plan for their program of study. New students who have not selected a graduate advisory committee should seek advice from the Graduate Advisor of Record on course selection during the first semester.

COURSE DESCRIPTIONS MECHANICAL ENGINEERING (ME)

5013 Topics in Mechanical Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Current topics in mechanical engineering, such as advanced fracture mechanics, lean manufacturing, and advanced manufacturing engineering. May be repeated for credit with consent of Graduate Committee as topics vary.

5113 Advanced Controls

(3-0) 3 hours credit. Prerequisite: ME 4523 or an equivalent.

Lyapunov theory of stability of a dynamic system, control of nonlinear systems, robust controller for nonlinear systems, design of adaptive control system, controllability and observability, state estimation and Kalman filter.

5133 Mechanical System Identification

(3-0) 3 hours credit. Prerequisites: ME 4523 and STA 2303, or their equivalents.

Review of digital signal processing, review of random processes, models of linear time-invariant systems, models of time-varying and nonlinear systems, nonparametric identification methods: frequency response analysis, spectral analysis; parameter estimation methods: least-square method, maximum likelihood methods; recursive estimation methods: recursive iv method, recursive prediction-error method.

5143 Advanced Dynamics

(3-0) 3 hours credit. Prerequisite: EGR 2513 or consent of instructor.

Review of Newtonian mechanics, 3-D particle kinematics, dynamics of a system of particles, analytical mechanics, Lagrange's equations, kinematics and rigid-body dynamics, Eulerian angles, computational analysis using a symbolic language.

5153 Structural Dynamics

(3-0) 3 hours credit. Prerequisite: EGR 2513 or consent of instructor.

Matrix methods for analysis of dynamics of complex structures, computer solutions, systems identifications, and experimental modal analysis.

5183 Mechanical Vibrations

(3-0) 3 hours credit. Prerequisite: EGR 2513 or consent of instructor.

Free and forced vibration of single and multi-degree-of-freedom systems; response to harmonic, periodic, and nonperiodic excitations; continuous systems; computational techniques for the response.

5243 Advanced Thermodynamics

(3-0) 3 hours credit. Prerequisite: ME 3293 or an equivalent.

Concepts and postulates of macroscopic thermodynamics; formulation of thermodynamic principles; stability of thermodynamic systems.

5263 Combustion

(3-0) 3 hours credit. Prerequisites: ME 4293 or an equivalent and graduate standing in engineering or consent of instructor.

Thermochemistry and transport theory applied to combustion; gas phase equilibrium; energy balances; reaction kinetics; flame temperatures, speed, ignition, and extinction; premixed and diffusion flames; combustion aerodynamics; mechanisms of air pollution.

5303 Advanced Heat and Mass Transfer

(3-0) 3 hours credit. Prerequisite: ME 4313 or an equivalent.

Derivation of energy and mass conservation equations with constitutive laws for conduction, convection, radiation, and mass diffusion. Dimensional analysis, heat exchangers, boiling and condensation, steady and transient solutions.

5333 Conduction

(3-0) 3 hours credit. Prerequisite: ME 4313 or an equivalent.

Derivation of governing equations, steady and transient solutions, variable property effects, numerical methods.

5343 Convection

(3-0) 3 hours credit. Prerequisite: ME 4313 or an equivalent.

Derivation of equations of convection of mass, momentum, and energy; scale analysis; boundary layer solutions; classical, laminar convection problems; turbulent convection.

5353 Radiation

(3-0) 3 hours credit. Prerequisite: ME 4313 or an equivalent.

Thermal radiation laws, geometric factors, black bodies, gray enclosures, nongray systems, combined conduction, convection, and radiation.

5413 Advanced Solid Mechanics

(3-0) 3 hours credit. Prerequisite: ME 3813 or an equivalent.

Variational mechanics, energy methods, elementary viscoelastic/plastic problems, and wave propagation. (Formerly EGR 5543. Credit cannot be earned for both ME 5413 and EGR 5543.)

5453 Advanced Strength of Materials

(3-0) 3 hours credit. Prerequisite: ME 3813 or an equivalent.

Failure theories, energy methods, advanced topics in bending, torsion, and elastic stability. (Formerly EGR 5553. Credit cannot be earned for both ME 5453 and EGR 5553.)

5463 Fracture Mechanics

(3-0) 3 hours credit. Prerequisites: ME 3243 and ME 3813, or their equivalents.

Introduction to failure and fracture of engineering materials, Griffith's energy balance, stress intensity and strain energy release rate approaches to brittle fracture, Dugdale and Irwin approaches to ductile fracture. Application to modern engineering materials. (Formerly EGR 5313. Credit cannot be earned for both ME 5463 and EGR 5313.)

5473 Viscoelasticity

(3-0) 3 hours credit. Prerequisite: ME 3813 or an equivalent.

Principle of fading memory, integro-differential constitutive laws, mechanical models, time and temperature superposition, and linear and nonlinear methods. Applications to polymers, composites, and adhesives. (Formerly EGR 5323. Credit cannot be earned for both ME 5473 and EGR 5323.)

- 5483 Finite Element Methods**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
Derivation and computer implementation of the finite element method for the solution of boundary value problems.
- 5513 Advanced Mechanism Design**
(3-0) 3 hours credit. Prerequisite: ME 3513 or an equivalent.
Advanced topics in kinematic synthesis of linkage, static and dynamic force analyses, and computer-aided design of mechanisms.
- 5533 Advanced Machine Design**
(3-0) 3 hours credit. Prerequisite: ME 3823 or an equivalent.
Advanced problems in machine design, including bearings, brakes, clutches, gears, shafts, springs, and advanced stress analysis.
- 5543 Probabilistic Engineering Design**
(3-0) 3 hours credit. Prerequisite: STA 2303 or an equivalent.
Development and application of probabilistic methods in engineering: random variable definitions, probability distributions, distribution selection, functions of random variables, numerical methods including Monte Carlo sampling, First Order Reliability Methods, and component and systems reliability.
- 5553 Advanced Design of Cams and Gears**
(3-0) 3 hours credit. Prerequisites: ME 3513 and ME 3823, or their equivalents.
Advanced problems in design of cam follower systems, gear trains and spur, helical, bevel, and worm gears.
- 5613 Advanced Fluid Mechanics**
(3-0) 3 hours credit. Prerequisite: ME 3663 or an equivalent.
Dynamics of incompressible fluid mechanics viscous flow, Navier-Stokes equations, boundary layer theory, and numerical operations for incompressible fluid flow.
- 5633 Gas Dynamics**
(3-0) 3 hours credit. Prerequisite: ME 3663 or an equivalent.
Integral and differential forms of the conservation equations, one-dimensional flow, oblique shock and expansion waves, and supersonic, transonic, and hypersonic flows.
- 5653 Computational Fluid Dynamics**
(3-0) 3 hours credit. Prerequisite: ME 3663 or an equivalent.
The mathematical models for fluid-flow simulations at various levels of approximation, basic description techniques, and the nature of flow equations and their boundary conditions.
- 5683 Advanced Design of Thermal and Fluid Systems**
(3-0) 3 hours credit. Prerequisites: ME 3663 and ME 4313, or their equivalents.
Development of energy systems, power systems, and the mechanics of combustion.
- 5713 Mechanical Behavior of Materials**
(3-0) 3 hours credit. Prerequisites: ME 3243 and ME 3813, or their equivalents.
Mechanical behavior of engineering materials (metals, alloys, ceramics, and polymers) elasticity, dislocation theory, strengthening mechanism, fracture, fatigue, creep, and oxidation.
- 5743 Composite Materials**
(3-0) 3 hours credit. Prerequisites: ME 3243 and ME 3813, or their equivalents.
Introduction to mechanics of composites, micromechanics, macromechanics, lamination theory, design, and applications of fiber-reinforced composites and particulate composites. (Formerly EGR 5413. Credit cannot be earned for both ME 5743 and EGR 5413.)

5843 Security and Response Applications of Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Application of engineering principles to the analysis of high consequence events. Use of analytical and computational modeling tools. Examination of various scenarios and demonstration of solution techniques.

5853 Simulation and Modeling Applications in Security

(3-0) 3 hours credit. Prerequisite: ME 5483 or ME 5653 or consent of instructor.

Application of computational modeling techniques in the solution of security problems. Will address scenarios such as chemical dispersion, explosion loads, and structural response.

5863 Risk Analysis for Security

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Application of risk analysis techniques in the assessment of security problems. Hazard and consequence identification processes.

5873 Solid State Microfabrication Technology

(3-0) 3 hours credit. Prerequisite: EGR 3323 or an equivalent.

Fundamentals of modeling and microfabrication schemes for semiconductor active devices and MEMS. Techniques for both silicon and compound semiconductor processing. Topics include: wafer growth, oxidation, diffusion, ion implantation, lithography, etch and deposition. Includes hands-on, clean-room exposure for fabrication of simple representative microdevices. (Same as EE 5393. Credit cannot be earned for both ME 5873 and EE 5393.)

5893 Advanced Topics in Sensors and Actuators

(3-0) 3 hours credit. Prerequisite: ME 5843 or consent of instructor.

Explore advanced microfabrication approaches for a variety of sensors, such as magnetic, acoustic, mechanical, radiation, thermal, chemical and biological. Different actuation schemes are also covered (electrostatic, piezoelectric, thermal, magnetic and shape-memory-alloys). (Same as EE 5493. Credit cannot be earned for both ME 5893 and EE 5493 when the topic is the same.)

5973 Special Project

3 hours credit. Prerequisites: Permission in writing (form available) from the instructor and the Graduate Advisor of Record.

The directed research course is offered only for nonthesis option students and may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

5991 Graduate Seminar

(1-0) 1 hour credit. Prerequisites: Graduate standing and consent of instructor.

May be repeated for credit up to a limit of 2 hours.

6813 Biomaterials

(3-0) 3 hours credit. Prerequisite: ME 3243 or an equivalent.

Fundamentals in applications of biomaterial science and engineering principles and concepts to repairing, replacing, and protecting human tissues and organs. (Formerly ME 5813 and ME 6013. Same as BME 6903. Credit can be earned for only one of the following: ME 6813, ME 6013, ME 5813 or BME 6903.)

6833 Biomechanics

(3-0) 3 hours credit. Prerequisites: ME 3243, ME 3663, and ME 3813, or their equivalents.

Fundamentals in applications of engineering mechanics to modeling structures and functions of tissues, organs, joints, and human body. (Formerly ME 5833 and ME 6033. Same as BME 6803. Credit can be earned for only one of the following: ME 6833, ME 6033, ME 5833 or BME 6803.)

6893 Topics in Biomechanics

(3-0) 3 hours credit. Prerequisite: ME 6833 or BME 6803 or an equivalent.

The biomechanics of biological tissues and organs. Topics may include constitutive equations, stress, and adaptation of hard and soft tissues. (Formerly ME 6023. Same as BME 6893. Credit cannot be earned for both ME 6893 and ME 6023. Credit cannot be earned for both ME 6893 and BME 6893 when the topic is the same.)

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor, the student's advisor, and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Mechanical Engineering Graduate Program Committee to take the Comprehensive Examination.

Independent study for the purpose of taking the Comprehensive Examination. May be repeated for credit as many times as approved by the Mechanical Engineering Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized studies not normally available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, may be applied to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

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COLLEGE OF

LIBERAL AND

FINE ARTS



COLLEGE OF LIBERAL AND FINE ARTS

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COLLEGE OF LIBERAL AND FINE ARTS

DEPARTMENT OF ANTHROPOLOGY

Master of Arts Degree in Anthropology

The Master of Arts program in Anthropology emphasizes the anthropology of the Americas and is dedicated to training graduate students in both method and theory. Students, in conjunction with faculty, may design their programs with a focus on the subdisciplines of archaeology or cultural anthropology. Faculty expertise lies in the archaeology of the Maya and Andean regions; the archaeology of Texas, the American Southwest, and northern Mexico; the cultural anthropology of Texas and the Plains; ethnography and applied anthropology of Mexico and the United States; language, cognition, and human ecology in North American maritime settings; and medical anthropology of the Border region.

Program Admission Requirements. Applicants for admission to the M.A. program must satisfy all University-wide graduate admissions requirements. To apply for admission to the M.A. program in Anthropology, applicants must complete the Graduate School Application. Complete applications will include the application form, official academic transcripts, an essay (500–750 word statement of purpose), and two letters of recommendation. Graduate Record Examination (GRE) scores must also be submitted to the Graduate School. These scores will be considered only as one element in the evaluation of applicants. Applications will not be reviewed until complete.

Applicants can request degree-seeking or non-degree-seeking (special graduate student) status. Applicants for admission as non-degree-seeking students need not submit GRE scores but should have completed at least 12 semester credit hours in anthropology (with no more than 6 of the 12 in a field school) before application. Non-degree-seeking students may be limited in the courses they are permitted to take. Admission as a non-degree-seeking student does not ensure subsequent admission as a degree-seeking student.

Admission is competitive. Satisfying the minimum requirements does not guarantee admission. Applicants for admission as degree-seeking students will be evaluated on the basis of undergraduate academic performance, the application essay, letters of recommendation, and GRE test scores. A degree-seeking applicant admitted to the program may receive unconditional, conditional, or probationary admission status.

Applicants who are able to visit the UTSA campus are encouraged to meet with the department's Graduate Advisor of Record and members of the anthropology faculty.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 500 and 600 (paper version) or 173 and 250 (computerized version). See Chapter 2, Admission, of this catalog for details.

Degree Requirements. The minimum number of semester credit hours required for this degree is 33 (with thesis) or 36 (without thesis). In addition to the University's general requirements for graduate study and any coursework or other study required as a condition of admission, the Master of Arts degree in Anthropology requires the following:

A. 9 semester credit hours of required basic courses:

ANT	5023	History, Method, and Theory of Archaeology
ANT	5033	Paradigms of Americanist Anthropology
ANT	5073	Advanced Biological Anthropology

B. 3 semester credit hours from one of the following methods courses, depending on the student's area of interest:

ANT	6353	Field Research Methods in Cultural Anthropology
ANT	6623	Seminar in Analytical Methods in Archaeology

- C. 15 semester credit hours of elective courses chosen in consultation with the student's advisor and subject to the following conditions:
1. Students will normally take a minimum of 9 semester credit hours of electives in regular, organized graduate anthropology courses (this excludes fieldwork, independent studies, and internships).
 2. Students are expected to develop a primary regional expertise. Knowledge of this region will be evaluated as part of the comprehensive evaluation (see below). In addition, students must take at least one other course focusing on a second region. This course may be in a subdiscipline other than that of the student's main interest.
- D. Although there is no program-wide language proficiency requirement, certain programs of study require students to demonstrate proficiency in a second language or in statistics. Students should consult their advisors regarding this matter.
- E. A written comprehensive examination, tailored to the student's program and area of concentration, is required. The comprehensive examination will be taken no later than nine months after the completion of the required coursework. Satisfactory performance on the comprehensive examination is required for advancement to Option I or Option II.
- F. *Option I* (with thesis). 6 semester credit hours of ANT 6983 Master's Thesis.

or

Option II (without thesis). 9 semester credit hours of additional, organized coursework. Students seeking this option must petition the Anthropology Graduate Program Committee. Normally, permission is granted only on presentation of evidence that the student has previously done scholarly work equivalent to that required in a Master's thesis. Such evidence would be a scholarly contribution of monograph length, reflecting in-depth research on a topic. A major published article or monograph may potentially meet these requirements.

Doctor of Philosophy Degree in Anthropology

UTSA's Ph.D. program in Anthropology offers a four-field approach to basic and applied research in ecological anthropology. Ecological anthropology develops empirical understandings of how humans culturally construct and organize their environments, how power relations are embedded in these activities; and the impact physical and social environments have upon human and non-human primates.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Program Admission Requirements. Applicants for admission to the Ph.D. program in Anthropology must satisfy all University-wide graduate admissions requirements. Applicants must submit a complete Graduate School Application. Complete applications include the application form, summary sheet, official academic transcripts, an essay (750–900 word statement of purpose), and three letters of recommendation. Applicants must also submit Graduate Record Examination (GRE) scores with their application. These scores will be considered only as one element in the evaluation of applicants. Only completed applications will be reviewed.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 500 and 600 (paper version) or 173 and 250 (computerized version). See Chapter 2, Admission, of this catalog for details.

Applicants to the Ph.D. program must request degree-seeking status. Applicants admitted to the Ph.D. program may receive unconditional, conditional, or probationary admission status.

Admission is competitive. Satisfying the minimum requirements does not guarantee admission. In any given application cycle, Ph.D. applicants will be evaluated on the strength of their application materials and also against other applicants in the same pool.

Degree Requirements. This degree requires a minimum of 78 semester credit hours beyond the baccalaureate degree (exclusive of coursework or other study required to remove conditions of admission).

Program of Study for Students Admitted Without a Master's Degree

All students who are accepted into the Doctoral program without a Master's degree (or its coursework equivalent) must successfully complete the program of study below. Students transferring to the Doctoral Program from accredited graduate programs but lacking a Master's degree may receive approval to transfer some coursework to UTSA, pending review by the Graduate Program Committee. Each student's transcript will be evaluated by the Graduate Program Committee, and credit will be determined on a course-by-course basis to satisfy the requirements of the degree. For credit to be accepted from an outside institution, a student must have earned course grades of "B" ("B-" is not acceptable) or better.

A. 6 semester credit hours of Doctoral Core Courses:

ANT	6603	Ecological Anthropology
ANT	6703	Human Population Ecology

B. 15 semester credit hours of Foundational Courses:

ANT	5023	History, Method, and Theory of Archaeology
ANT	5033	Paradigms of Americanist Anthropology
ANT	5073	Advanced Biological Anthropology
ANT	6303	Seminar in Research Design and Proposal Writing
ANT	6353	Field Research Methods in Cultural Anthropology
		or
ANT	6623	Seminar in Analytical Methods in Archaeology
		or
		approved coursework in statistics

C. 21 semester credit hours of Designated Elective courses, distributed among three categories as follows:

1. 6 semester credit hours of Theory Electives selected from the following:

ANT	5283	Hunter and Gatherers
ANT	5483	Landscape and Settlement
ANT	6133	Seminar in Medical Anthropology
ANT	6203	Seminar in Recent Trends in Archaeological Method and Theory
ANT	6223	The Archaeology of Household and Residence
ANT	6613	Seminar in Economic Anthropology
ANT	6713	Seminar in Primate Behavioral Ecology
ANT	6913	Seminar in Evolution and Human Behavior

2. 9 semester credit hours of Applied Electives selected from the following:

ANT	5043	Seminar in Laboratory Methods in Anthropology
ANT	5556	Field Course in Archaeology
ANT	6503	Seminar in Cultural Resource Management
ANT	6633	Current Technological Applications in Archaeology
ANT	6803	Medical Ecology
ANT	6903	Anthropology of Gender
ANT	6923	Conservation of Primates and Other Threatened Species
ANT	6973	Special Problems

3. 3 semester credit hours of Area Electives selected from the following:

ANT	5413	Seminar in the Prehistory of Texas and Adjacent Areas
ANT	5453	Seminar in the Archaeology of the American Southwest and Adjacent Regions
ANT	6113	Seminar in the Anthropology of Mesoamerica
ANT	6213	Topics in the Anthropology of Native North America

4. 3 semester credit hours of coursework outside the student's major concentration

D. 9 semester credit hours of Free Elective courses chosen in consultation with the student's advisor.

E. 3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of 51 semester credit hours of coursework and qualifying examination).

F. Doctoral Research and Dissertation (minimum 24 semester credit hours):

ANT	7011-3	Directed Doctoral Research (12 hours minimum)
ANT	7021-3	Doctoral Dissertation (12 hours minimum)

Qualifying Examination. Students may take the qualifying examination upon successful completion of 30 hours of coursework; this coursework must include all required Doctoral Core and Foundation courses. At least two months prior to taking the qualifying examination, the student and the Supervising Professor will select a Dissertation Committee, which needs to be approved by the Dean of the College and the Dean of the Graduate School (see Chapter 6, Doctoral Degree Regulations, for further information on requirements of committee composition), and schedule dates for the qualifying examination. The examination consists of three written literature reviews in areas most relevant to the student's research and will cover issues of geographical/topical, methodological, and theoretical relevance. It is intended that the qualifying examination will help lay the groundwork for subsequent dissertation research.

Proficiency in Foreign Language, Statistics, or Computer Programming. Doctoral students are required to have proficiency in a foreign language, statistics, or computer programming as deemed necessary by the Graduate Program Committee. This requirement must be fulfilled prior to the oral defense of the dissertation proposal. Should coursework be necessary, students may apply their credit hours to the free electives requirement of the Doctoral degree.

Doctoral Dissertation Proposal. Following successful completion of required doctoral coursework and the qualifying exam (51 semester credit hours), students will produce a dissertation proposal that will be submitted to their Dissertation Committee for review. Students must orally defend the proposal in order to qualify for doctoral degree candidacy. Students will enroll in 3 credit hours of ANT 7003 (Dissertation Proposal), in order to conduct preliminary research and write a successful proposal.

Advancement to Candidacy. Doctoral students can apply for admission to candidacy once they have met all requirements for the Doctoral degree other than dissertation research and write-up. The requirements include successfully completing all coursework, forming a dissertation committee approved by the University, passing the qualifying examination, passing a foreign language examination or demonstrating statistical or computer competency, as applicable, and submitting and successfully defending the dissertation proposal.

Dissertation. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation that makes a significant contribution to the field. The student, in consultation with his or her Supervising Professor, determines the research topic. The student's Dissertation Committee will guide and critique the candidate's research. The Dissertation Committee must unanimously approve the completed dissertation. The dissertation shall then be defended publicly before the Dissertation Committee. Students should be continually registered in Directed Doctoral Research (ANT 7011-3) and Doctoral Dissertation (ANT 7021-3) each semester the dissertation is in progress.

Final Oral Examination. Students must orally defend their dissertation as the final degree requirement. The Supervising Professor must notify the Graduate School in writing at least two weeks prior to the final scheduled oral defense. Awarding of the degree is based on the approval of the Dissertation Committee and the acceptance of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements (see Chapter 6, Doctoral Degree Regulations, for further information).

Program of Study for Students Admitted With a Master's Degree

Students who are accepted into the Doctoral Program with Master's degrees in anthropology from accredited institutions may receive approval to transfer up to 30 hours of their Master's-level coursework. Outside coursework will be reviewed by Anthropology's Graduate Program Committee. Each student's transcript will be evaluated by the Graduate Program Committee, and credit will be determined on a course-by-course basis to satisfy the requirements of the degree. The Committee has the option of requiring or recommending additional courses if it is deemed that the student has not obtained a background equivalent to training at UTSA. For credit to be accepted from an outside institution, a student must have earned course grades of "B" ("B-" is not acceptable) or better.

To complete their Ph.D. program of study, students entering the program with an acceptable Master's degree and 30 hours of transfer credit must complete the following requirements:

A. A minimum of 21 hours of coursework chosen in consultation with the Graduate Program Committee from the following domains:

1. Doctoral Core Courses:

ANT	6603	Ecological Anthropology
ANT	6703	Human Population Ecology

2. Foundational Courses:

ANT	5023	History, Method, and Theory of Archaeology
ANT	5033	Paradigms of Americanist Anthropology
ANT	5073	Advanced Biological Anthropology
ANT	6303	Seminar in Research Design and Proposal Writing
ANT	6353	Field Research Methods in Cultural Anthropology
		or
ANT	6623	Seminar in Analytical Methods in Archaeology
		or
		approved coursework in statistics

3. Designated Elective courses, distributed among the following three categories:

Theory Electives

ANT	5283	Hunter and Gatherers
ANT	5483	Landscape and Settlement
ANT	6133	Seminar in Medical Anthropology
ANT	6203	Seminar in Recent Trends in Archaeological Method and Theory
ANT	6223	The Archaeology of Household and Residence
ANT	6613	Seminar in Economic Anthropology
ANT	6713	Seminar in Primate Behavioral Ecology
ANT	6913	Seminar in Evolution and Human Behavior

Applied Electives

ANT	5043	Seminar in Laboratory Methods in Anthropology
ANT	5556	Field Course in Archaeology
ANT	6503	Seminar in Cultural Resource Management
ANT	6633	Current Technological Applications in Archaeology
ANT	6803	Medical Ecology
ANT	6903	Anthropology of Gender
ANT	6923	Conservation of Primates and Other Threatened Species
ANT	6973	Special Problems

Area Electives

ANT	5413	Seminar in the Prehistory of Texas and Adjacent Areas
ANT	5453	Seminar in the Archaeology of the American Southwest and Adjacent Regions
ANT	6113	Seminar in the Anthropology of Mesoamerica
ANT	6213	Topics in the Anthropology of Native North America

B. 3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of 51 semester credit hours of coursework and qualifying examination).

C. Doctoral Research and Dissertation (minimum 24 semester credit hours):

ANT	7011-3	Directed Doctoral Research (12 hours minimum)
ANT	7021-3	Doctoral Dissertation (12 hours minimum)

Qualifying Examination. Students may take the qualifying examination upon successful completion of 30 hours of coursework; this coursework must include all required Doctoral Core and Foundation courses. At least two months prior to taking the qualifying examination, the student and the Supervising Professor will select a Dissertation Committee, which needs to be approved by the Dean of the College and the Dean of the Graduate School (see Chapter 6, Doctoral Degree Regulations, for further information on requirements of committee composition), and schedule dates for the qualifying examination. The examination consists of three written literature reviews in areas most relevant to the student's research and will cover issues of geographical/topical, methodological, and theoretical relevance. It is intended that the qualifying examination will help lay the groundwork for subsequent dissertation research.

Proficiency in Foreign Language, Statistics, or Computer Programming. Doctoral students are required to have proficiency in a foreign language, statistics, or computer programming as deemed necessary by the Graduate Program Committee. This requirement must be fulfilled prior to the oral defense of the dissertation proposal. Should coursework be necessary, students may apply their credit hours to the free electives requirement of the Doctoral degree.

Doctoral Dissertation Proposal. Following successful completion of required doctoral coursework and the qualifying exam (51 semester credit hours), students will produce a dissertation proposal that will be submitted to their Dissertation Committee for review. Students must orally defend the proposal in order to qualify for doctoral degree candidacy. Students will enroll in 3 credit hours of ANT 7003 (Dissertation Proposal), in order to conduct preliminary research and write a successful proposal.

Advancement to Candidacy. Doctoral students can apply for admission to candidacy once they have met all requirements for the Doctoral degree other than dissertation research and write-up. The requirements include successfully completing all coursework, forming a dissertation committee approved by the University, passing the qualifying examination, passing a foreign language examination or demonstrating statistical or computer competency, as applicable, and submitting and successfully defending the dissertation proposal.

Dissertation. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation that makes a significant contribution to the field. The student, in consultation with his or her Supervising Professor, determines the research topic. The student's Dissertation Committee will guide and critique the candidate's research. The Dissertation Committee must unanimously approve the completed dissertation. The dissertation shall then be defended publicly before the Dissertation Committee. Students should be continually registered in Directed Doctoral Research (ANT 7011-3) and Doctoral Dissertation (ANT 7021-3) each semester the dissertation is in progress.

Final Oral Examination. Students must orally defend their dissertation as the final degree requirement. The Supervising Professor must notify the Graduate School in writing at least two weeks prior to the final scheduled oral defense. Awarding of the degree is based on the approval of the Dissertation Committee and the acceptance of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements (see Chapter 6, Doctoral Degree Regulations, for further information).

**COURSE DESCRIPTIONS
ANTHROPOLOGY
(ANT)**

- 5023 History, Method, and Theory of Archaeology**
(3-0) 3 hours credit.
A survey of the history and development of archaeology, research techniques, and method and theory of prehistoric research. May be repeated for credit with different instructors.
- 5033 Paradigms of Americanist Anthropology**
(3-0) 3 hours credit.
This course surveys the main conceptual, methodological, and theoretical developments in cultural anthropology in the United States.
- 5043 Seminar in Laboratory Methods in Anthropology**
(3-0) 3 hours credit.
This seminar reviews the physical and technical aspects of analysis of anthropological materials. May be repeated for credit when topics vary.
- 5073 Advanced Biological Anthropology**
(3-0) 3 hours credit.
An intensive review of the history of biological anthropology and current developments in method and theory. Topics will be drawn from the four major areas of biological anthropology: genetics and evolutionary theory, human variation and adaptation, primatology, and paleoanthropology.
- 5283 Hunters and Gatherers**
(3-0) 3 hours credit.
A study of the major issues archaeologists address concerning the cultural ecology and cultural evolution of hunters and gatherers around the world.
- 5413 Seminar in the Prehistory of Texas and Adjacent Areas**
(3-0) 3 hours credit.
Intensive study of prehistoric and early historic aboriginal cultures of Texas and adjacent areas. Focus is on problems of interpretation, current archaeological research of the region, and the impact of federal legislation on Texas archaeology.
- 5453 Seminar on the Archaeology of the American Southwest and Adjacent Regions**
(3-0) 3 hours credit.
Review of the major prehistoric cultures of the American Southwest, including the Anasazi, Mogollon, and Hohokam cultural regions and adjacent areas. Emphasis is on current research.
- 5483 Landscape and Settlement**
(3-0) 3 hours credit.
This course explores the wide array of data and theories used to identify and explain the patterned distribution of human activity. The significance of settlement pattern data is underscored, and relationships between data and theory are critically evaluated.
- 5556 Field Course in Archaeology**
(2-12) 6 hours credit. Prerequisite: Consent of instructor.
The opportunity for advanced training in field procedures and their applications to problem-oriented field research. May be repeated for credit.

6113 Seminar in the Anthropology of Mesoamerica

(3-0) 3 hours credit.

Attention is centered on a limited number of significant problems in Mesoamerican anthropology to which materials from archaeology, ethnology, and ethnohistory contribute. Examples of such problems are demography and the rise of Mayan civilization, roots of Mesoamerican peasant culture, and distribution analysis of cultural and language variance. May be repeated for credit when topics vary.

6133 Seminar in Medical Anthropology

(3-0) 3 hours credit.

This course offers a study of selected topics in contemporary theories and their application in medical anthropology. Topics include cross-cultural and biocultural approaches to the study of sickness, healing, and healing systems; critical approaches to the study of biomedicine, globalization and international health; meaning-centered approaches to understanding the experience of suffering and pain; and ecological approaches to understanding the relationship between human health, cultural processes, and the environment.

6203 Seminar in Recent Trends in Archaeological Method and Theory

(3-0) 3 hours credit.

A survey of major issues in archaeological method and theory. Attention is focused on recent methodological and theoretical developments in archaeology. May be repeated for credit with different instructors.

6213 Topics in the Anthropology of Native North America

(3-0) 3 hours credit.

An organized course examining topics of current interest to anthropologists with a focus on North America. May be repeated for credit.

6223 The Archaeology of Household and Residence

(3-0) 3 hours credit.

This course examines the data, methods, and theories used to reconstruct the composition and activities of domestic groups. The relevance of household studies in archaeology is stressed through inspection of the economic, political, and ideological links between domestic groups and broader social formations.

6303 Seminar in Research Design and Proposal Writing

(3-0) 3 hours credit.

This course familiarizes students with the philosophical foundations of social science research, the structure and types of research designs, and pragmatic considerations of data acquisition and analysis. The relationship between theory and research design and methods is emphasized. The final project is a scholarly research proposal.

6353 Field Research Methods in Cultural Anthropology

(3-0) 3 hours credit.

The study and practice of field research methods of cultural anthropology emphasizing participant observation and use of informants.

6443,6 Supervised Field Research

3 or 6 hours credit. Prerequisite: Consent of instructor.

The course is designed to offer the opportunity for intensive training and requires the student to carry out independent research and analysis of field data. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). May be repeated for credit.

6503 Seminar in Cultural Resource Management

(3-0) 3 hours credit.

This seminar reviews the legislative basis, practical application, and current state of cultural resource management in Texas and the United States.

- 6603 Ecological Anthropology**
(3-0) 3 hours credit. Prerequisite: Admission to the Doctoral Program in Anthropology.
This course explores anthropology's engagements with the environment, emphasizing historical trends and recent developments across the discipline. Explicit attention is paid to empirical studies and to the theories and assumptions anthropologists have brought to their research.
- 6613 Seminar in Economic Anthropology**
(3-0) 3 hours credit.
Economic anthropology is the comparative study of the organization of production, distribution, and consumption, and the values and meanings associated with those activities. This course provides an overview of the history, scope, and development of economic anthropology, including formalist, substantivist, and Marxist approaches. Ethnographic cases are used to examine economies across different levels of complexity and to explore how anthropologists have described preindustrial and industrial economies. (Formerly ANT 5053. Credit cannot be earned for both ANT 6613 and ANT 5053.)
- 6623 Seminar in Analytical Methods in Archaeology**
(3-0) 3 hours credit.
Basic quantitative and qualitative approaches to the analysis and interpretation of archaeological field and laboratory data are reviewed. (Formerly ANT 5513. Credit cannot be earned for both ANT 6623 and ANT 5513.)
- 6633 Current Technological Applications in Archaeology**
(3-0) 3 hours credit.
Students will be exposed to the application of current computer-related technologies to archaeology, such as Global Positioning Systems, Total Stations, and/or Geographic Information Systems. (Formerly ANT 5546. Credit cannot be earned for both ANT 6633 and ANT 5546.)
- 6703 Human Population Ecology**
(3-0) 3 hours credit. Prerequisite: Admission to the Doctoral Program in Anthropology.
A synthesis of core constructs in population ecology as they apply to the anthropological study of human populations. The focus is on understanding biocultural variables and multiplicity of causality in human population ecology. Topics include human demography and reproductive ecology; behavioral ecology and life history theory; epidemiology and the environmental history of human health and disease; conflict and cooperation within and between human populations; and, sustainability and the human impact on the natural environment.
- 6713 Seminar in Primate Behavioral Ecology**
(3-0) 3 hours credit.
This course draws from current literature in primate behavioral ecology. Topics include kinship and dominance, feeding competition, mating strategies, and social organization. The contribution of primate studies to understanding human evolution is considered. May be repeated for credit when topics vary. (Formerly ANT 5733. Credit cannot be earned for both ANT 6713 and ANT 5733.)
- 6803 Medical Ecology**
(3-0) 3 hours credit.
This seminar draws on different anthropological approaches to understanding the relationship between human health and the environment. Topics include the political ecology of health; ecology and evolution of health and illness; health, development and global change; and praxis-oriented perspectives on environmental health.
- 6903 Anthropology of Gender**
(3-0) 3 hours credit.
This course offers a critical assessment of disciplinary approaches to understanding sexuality, gender roles, and social and biological reproduction. Additional consideration is given to how femininity and masculinity have been represented in anthropological research and texts.

6913 Seminar in Evolution and Human Behavior

(3-0) 3 hours credit.

This seminar focuses on how anthropologists and scholars in related fields approach the relationship between culture change and biological evolution. Topics include the evolution of the capacity for culture in hominids, human evolutionary ecology, and competing models of cultural evolution. (Formerly ANT 5723. Credit cannot be earned for both ANT 6913 and ANT 5723.)

6923 Conservation of Primates and Other Threatened Species

(3-0) 3 hours credit.

Ecological and anthropological examination of contemporary problems and issues regarding the conservation of threatened species, with an emphasis on non-human primates. Topics to be covered include successes and failures in the conservation arena; deforestation, fragmentation, and habitat loss; hunting and the pet trade; genetics of conservation; effects of species loss on ecological communities; and efficacy of community-conservation approaches focused on local human populations.

6931-3 Internship in Anthropology

1 to 3 hours credit.

A supervised experience, relevant to the student's program of study, within selected community organizations. Must be taken on a credit/no-credit basis. May be repeated for credit.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor, the Graduate Advisor of Record, and the Department Chair.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary.

6981-3 Master's Thesis

1 to 3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7003 Dissertation Proposal

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and dissertation director; must be a Doctoral student.

Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 3 hours will apply to the Doctoral degree. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).

7011-3 Directed Doctoral Research

1 to 3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate.

Doctoral research and preparation. May be repeated for credit, but not more than 12 hours will apply to the doctoral degree. Enrollment in either ANT 7011-3 or ANT 7021-3, depending on progress, is required each term in which the dissertation is in progress.

7021-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate.

Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree. Enrollment in either ANT 7021-3 or ANT 7011-3, depending on progress, is required each term in which the dissertation is in progress.

DEPARTMENT OF ART AND ART HISTORY

Master of Fine Arts Degree in Art

The Master of Fine Arts (M.F.A.) degree in Art is the terminal degree in the field of studio art. UTSA is an accredited institutional member of the National Association of Schools of Art and Design. The emphasis of the M.F.A. program is on conceptual development and its harmony with formal aesthetic and art historical considerations. The objective of the degree is to provide advanced study in the field of art in preparation for a career as a practicing artist, in higher education, or as a professional in other art enterprises. Students in pursuit of the M.F.A. in Art have the opportunity to study in a wide range of disciplines including: ceramics, drawing, painting, photography, printmaking, sculpture, and video/digital.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have a Bachelor of Fine Arts degree or a Bachelor of Arts degree with a major in art or the equivalent. As part of their undergraduate degree, students must have completed a minimum of 45 semester credit hours in studio art and 15 semester credit hours in art history.

Application. The Graduate application for the M.F.A. is available online at www.utsa.edu/graduate/. A complete application includes the application form, personal contact information, educational background, transcripts, a statement of intent concerning graduate school, an artist's statement about the applicant's work, and three letters of recommendation (forms printable from the online application). The Graduate Record Examination (GRE) is not required as part of the application for the M.F.A.

Portfolio. The portfolio is the most important part of the application for admission. Applicants should submit 20 images that best exemplify their most recent creative work. Do not send original works of art. Portfolios may be submitted as twenty 35mm slides with an attached sheet listing titles, dates, dimensions, and media of each work or as a CD PowerPoint presentation with the same information. Video should be submitted on DVD labeled with titles, dates, total running time. No more than fifteen minutes will be reviewed.

The portfolio must be submitted directly to: The Department of Art and Art History, One UTSA Circle, San Antonio, TX 78249.

Deadlines for receipt of portfolios are:

Application for the Fall Semester: February 1
Application for the Spring Semester: October 1

Note: Due to the format of studio laboratory art courses, auditing is not permitted.

Degree Requirements. A minimum of 60 semester credit hours is required for the Master of Fine Arts degree, exclusive of coursework or other study required to remove admission deficiencies. Full-time enrollment of 9 or more semester credit hours during regular semesters is expected of degree-seeking students. In addition to satisfying all University-wide requirements, M.F.A. students must pass a First Semester Review, a Candidacy Review, and a final M.F.A. Oral Examination. Courses in which a grade of "C" or lower is earned will not count toward the minimum 60 hours required for the M.F.A. degree.

Degree candidates must complete the following requirements:

A focused program of study in studio art including ART 6023 Graduate Studio Seminar	30 hours
Art electives outside the student's specialized area of study	12 hours
Free Elective	3 hours
Art history and criticism including AHC 5123 Seminar in Research Methods and Writing	12 hours
ART 6843 Master of Fine Arts Exhibition	3 hours

COURSE DESCRIPTIONS
ART
(ART)

- 5153 Painting**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 The exploration of painting's broad capacity for conceptual and formal inquiry. May be repeated for credit.
- 5253 Drawing**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 Drawing joins knowledge and imagination with the investigation of materials, ideas, and imagery. May be repeated for credit.
- 5353 Printmaking**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 Emphasis on intaglio, lithography, monotype, relief, and photo processes in black and white and color. Experimentation in processes and imagery is encouraged. May be repeated for credit.
- 5453 Photography**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 Emphasis on the medium as an art form, including black and white, color, and nonsilver processes. May be repeated for credit.
- 5553 Sculpture**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 Emphasis on the creative development of sculptural ideas in a variety of materials and technical methods and approaches. May be repeated for credit.
- 5753 Ceramics**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 Emphasis on the discipline as an expressive art form, using a variety of technical processes and materials and approaches to ceramics. May be repeated for credit.
- 5953 Video/Digital**
 (0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
 Investigation of concepts and forms through the integration of video and other digital media into fine arts practice using a variety of materials and methods. May be repeated for credit.
- 6013 Practicum in the Visual Arts**
 3 hours credit. Prerequisite: Consent of instructor.
 Students participate in projects on an individual basis. These may include community-oriented activities such as workshops for community centers, special art programs for public or private educational organizations, service projects for displays, murals and exhibitions for special environments, or supervised assistance in instructional activities. The instructor supervises and evaluates the student's activities. May be repeated once for credit.
- 6023 Graduate Studio Seminar**
 (0-6) 3 hours credit. Prerequisite: Graduate standing.
 An organized class concerned with the exploration of current formal and conceptual problems in art through discussions, critiques, and work executed for the class in the student's major field: painting, drawing, printmaking, sculpture, photography, or ceramics. May be repeated for credit.

6843 Master of Fine Arts Exhibition

3 hours credit. Prerequisite: Completion of studio course requirements in the major.

Concentrated studio activity in the major field of study emphasizing preparation of work for the concluding exhibition, in consultation with the Graduate Advisor of Record and upon approval of the Graduate Program Committee in the program. Enrollment in this course is required each term in which the exhibition is in progress.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students desiring specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master of Fine Arts degree.

6973 Special Problems

(0-6) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. May be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master of Fine Arts degree.

Master of Arts Degree in Art History

The Master of Arts degree in Art History offers the opportunity for advanced study in art history, with an emphasis on Spanish, pre-Columbian, Latin American Colonial to Modern, and contemporary Hispanic art in the United States; contemporary United States art and criticism; and the cultural and artistic traditions of San Antonio's immediate region. The degree is designed to prepare the student for a career as a teacher of art history at the junior-college level and other arts-related professions or to serve as a basis for entering doctoral studies elsewhere.

Program Admission Requirements. In addition to the University-wide graduate admission requirements, applicants are expected to have completed an undergraduate major (24 semester credit hours) in art history or the equivalent in related fields that combine substantial studies in the humanities and visual arts. Students with no studio background will be required to take one undergraduate studio art course.

Application Materials. Application to the program is submitted online through the Graduate School's Web site (www.utsa.edu/graduate). Students can obtain information, detailed instructions of what additional material they must submit (three letters of recommendation, Graduate Record Examination (GRE) scores, official transcripts, a writing sample, and statement of intent), as well as forms, from the following Web site: www.utsa.edu/graduate. Deadlines for all materials for each term can be found on the same Web site.

Degree Requirements. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 36. Students are required to pass a language examination demonstrating a reading knowledge of a foreign language; in most cases, this will be Spanish. The suitability of another language will be determined by the student's advisor. This test should be completed before the student earns 18 semester credit hours of graduate work in this program. Courses in which a grade of "C" or lower is earned will not count toward the minimum 36 semester credit hours required for the Master of Arts degree in Art History.

Degree candidates must complete the following requirements:

A. 3 semester credit hours required:

AHC 5123 Seminar in Research Methods and Writing (must be taken in student's first year)

B. 21 semester credit hours of art history electives approved by the student's advisor, selected from the following and distributed across the disciplines offered by the program:

AHC	5813	Topics in Art History
AHC	5823	Topics in Mesoamerican Pre-Columbian Art
AHC	5833	Topics in Spanish Art
AHC	5843	Topics in Latin American Colonial Art
AHC	5853	Topics in Contemporary Latin American Art
AHC	5863	Topics in Contemporary U.S. Art
AHC	6813	Practicum in Art History and Criticism
AHC	6833	Art Gallery and Museum Practices
AHC	6843	Project in Art History
AHC	6913	Seminar in Art History

C. 6 semester credit hours of free electives. These are courses outside the discipline of art history in the supporting fields of Spanish, history, anthropology, or studio art (as approved by the Art History Advisor).

D. 6 semester credit hours of AHC 6983 Master's Thesis.

In addition to the semester credit hour requirements set forth above, all candidates for the degree are required to pass the Comprehensive Examination, a slide and essay examination designed to test students' knowledge of the history of European art, art of the Americas, and areas of concentration. The Comprehensive Examination is normally taken during or immediately after the semester in which students complete their coursework and before completion of the thesis.

COURSE DESCRIPTIONS ART HISTORY AND CRITICISM (AHC)

5123 Seminar in Research Methods and Writing

(3-0) 3 hours credit. Prerequisite: Graduate standing.

A basic methodology course designed to offer the opportunity for the graduate student to gain an introduction to all facets of the discipline of art history and criticism, including research, documentation, and historical and critical writing.

5813 Topics in Art History

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

A course designed to deal with specialized areas in art history. May be repeated for credit when topics vary.

5823 Topics in Mesoamerican Pre-Columbian Art

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

A study of specific developments in the pre-Columbian art of Mesoamerica. May be repeated for credit when topics vary.

5833 Topics in Spanish Art

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

A study of specific aspects of Spanish art and architecture, from 711 to the nineteenth century. May be repeated for credit when topics vary.

5843 Topics in Latin American Colonial Art

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

A study of specific topics in South and Central American art and architecture from 1500 through the early nineteenth century. May be repeated for credit when topics vary.

5853 Topics in Contemporary Latin American Art

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

A study of issues in contemporary Latin American art. May be repeated for credit when topics vary.

5863 Topics in Contemporary U.S. Art

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

Specific directions in modern and contemporary art history, with emphasis on critical theory. May be repeated for credit when topics vary.

6813 Practicum in Art History and Criticism

3 hours credit. Prerequisites: Graduate standing, consent of instructor, and completion of or concurrent enrollment in AHC 5123.

A learning laboratory in which the principles and methodologies of art history, art criticism, and museology are applied in a practical manner outside the classroom in areas such as museum and gallery activities, historical preservation, research for private collections, and community-oriented educational or informational functions and publications. Projects are initiated by students, with close supervision and evaluation by the instructor. May be repeated for credit, but not more than 6 hours will apply to the Master of Arts degree in Art History.

6833 Art Gallery and Museum Practices

3 hours credit. Prerequisites: Graduate standing, consent of instructor, and completion of or concurrent enrollment in AHC 5123.

An introduction to the organization and operation of gallery and/or museum activities: cataloging, research, and preparation and installation of art exhibitions. May be repeated once for credit.

6843 Project in Art History

3 hours credit. Prerequisites: Permission of the Graduate Advisor and project director.

A professional project in art history. Projects include but are not limited to historic preservation, publications, and exhibition curation. May be repeated for credit, but not more than 6 hours will apply to the Master of Arts degree in Art History.

6913 Seminar in Art History

(3-0) 3 hours credit. Prerequisites: Graduate standing and completion of or concurrent enrollment in AHC 5123.

A research course dealing with a particular problem or aspect of art history. Topics include but are not limited to Mayan vase painting, the Hispanic retablo, Francisco Goya, images of women in Latin American colonial art, Frida Kahlo, Marcel Duchamp, and contemporary Latino/a painters. May be repeated for credit when topics vary.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master of Arts Degree in Art History.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Credit earned in AHC 6961 cannot be counted in the 36 semester credit hours required for the Master of Arts degree in Art History.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master of Arts degree in Art History. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

DEPARTMENT OF COMMUNICATION

Master of Arts Degree in Communication

The Master of Arts Degree in Communication offers students the opportunity to pursue advanced study in Communication. This program is grounded in the concept of Integrated Communication and encourages students' development of broad perspectives in applying research, discovery, critical thinking, and creative enterprise to addressing the practical needs of individuals and groups in a variety of settings. The faculty intend to develop students' knowledge and skills in communication that are requisite for success in leadership, scholarship, and/or creative endeavors in business, public sector, and nonprofit environments.

Admission Requirements. In addition to satisfying University-wide admission requirements, applicants must meet the following Communication requirements for unconditional admission:

1. Submission of scores from the Graduate Record Examination (GRE) general test.
2. Provide two letters of recommendation from academic sources with the option of an additional letter from either an academic or a professional source (no more than three letters should be submitted). Letters from academic sources are expected, but if the applicant has been out of school for a significant period of time, letters from professional sources who can attest to the applicant's academic potential may be considered.
3. Provide a statement of purpose, 500–750 words in length, describing the applicant's academic and career goals and how a Master's degree in Communication from UTSA will help to achieve them. Applicants should specify which areas of specialized study they plan to pursue and why.

The number of students admitted to this program may be limited.

Degree Requirements. Upon the recommendation and approval of the graduate advisor, students will pursue one of three degree options: a thesis option, a project option, or a non-thesis or project option. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 36. Any grade lower than "B" (3.0 on a 4.0 scale) in a graduate course will not count toward the 36 semester credit hours of coursework required in items A through D.

Candidates for the degree must complete the following requirements:

- A. 15 semester credit hours of core courses:

COM	5003	Introduction to Graduate Studies in Communication
COM	5013	Communication Theory
COM	5023	Quantitative Research Methods
COM	5033	Qualitative Research Methods
COM	5103	Theories and Applications of Communication

Note: COM 5003 Introduction to Graduate Studies in Communication must be taken in the student's first semester of graduate coursework.

- B. 9 semester credit hours (for the thesis or project option) or 15 semester credit hours (for the non-thesis or project option) of prescribed electives in Communication in consultation with the Graduate Advisor of Record.
- C. 6 semester credit hours of free electives in consultation with the Graduate Advisor of Record. These courses may be in Communication or outside the program.
- D. Students pursuing the thesis or project option must complete COM 6983 Master's Thesis (6 hours) or COM 6993 Master's Project (6 hours). Students must complete at least 21 hours of coursework and maintain a 3.25 grade point average before they may enroll in COM 6983 Master's Thesis or COM 6993 Master's Project.

As soon as a student completes 12 hours of graduate coursework in Communication, he or she must meet with the Graduate Advisor of Record to devise a program of study.

In addition to the semester credit hours set forth above, candidates for the degree are required to pass the Comprehensive Examination. Students in the thesis or project option will present a written prospectus for approval by their thesis or project committee, and orally defend the completed thesis or project before the committee as the Comprehensive Examination. Students in the non-thesis or project option must successfully pass a written and oral Comprehensive Examination tailored to the student's program and specialized coursework. The Comprehensive Examination is offered two times a year, each Fall and Spring semester, and may be offered during the summer term. The Comprehensive Examination will normally be taken in the semester in which the candidate is due to complete his or her graduate study. Enrollment in COM 6961 is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The Comprehensive Examination may be taken only twice.

COURSE DESCRIPTIONS COMMUNICATION (COM)

5003 Introduction to Graduate Studies in Communication

(3-0) 3 hours credit. Prerequisite: Admission to the Master of Arts Program in Communication or consent of instructor.

Tracks the development of research and practice in communication stressing integration of inquiry, theory, and practice as well as grounding in various areas of specialized study. Emphasis on the development of skills critical to success in graduate-level communication study.

5013 Communication Theory

(3-0) 3 hours credit. Prerequisite: Completion of or concurrent enrollment in COM 5003, or consent of instructor.

Critical review of the historical roots, major paradigms, and current status of communication theory. Special emphasis on the diversity of theoretical approaches and applications as well as the integral relationship of theory and research.

5023 Quantitative Research Methods

(3-0) 3 hours credit. Prerequisite: Completion of or concurrent enrollment in COM 5003, or consent of instructor.

Introduces social scientific approaches to communication inquiry. Focus is on design, measurement, and data analysis of quantitative research. Also covers principal statistics applied in communication and related computer programs. Students apply course concepts by evaluating and conducting research projects.

5033 Qualitative Research Methods

(3-0) 3 hours credit. Prerequisite: Completion of or concurrent enrollment in COM 5003, or consent of instructor.

Introduces humanistic approaches to communication inquiry. Focus is on design, coding, analysis, data interpretation, and reporting of qualitative research. Examines a variety of qualitative research methods as well as challenges facing researchers in diverse social settings. Students apply course concepts by evaluating and conducting research projects.

5103 Theories and Applications of Communication

(3-0) 3 hours credit. Prerequisites: Completion of or concurrent enrollment in both COM 5003 and COM 5013.

Integration of theory and application in one or more contextual areas of communication, such as interpersonal communication, organizational communication, new media, international communication or intercultural communication. May be repeated for credit when topics vary, but not more than 6 hours will apply to the Master's degree in Communication without the permission of the Graduate Program Committee.

- 5213 Relational Communication**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
This course applies theories of interpersonal processes and communication principles in relational contexts, such as marriages, families, friendship, and others. This course emphasizes the use of theoretical frameworks for research investigation in human relational systems. The course includes integration of theory with research and/or practice.
- 5223 Small Group Communication**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
An examination of communication processes in bona-fide groups such as interdisciplinary health care teams, community groups, and corporate teams. This course emphasizes the role and function of verbal and nonverbal communication in group processes of decision making, dialogue, and problem solving. The course includes integration of theory with research and/or practice.
- 5413 Seminar in Organizations**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
Examination of communication processes in complex organizations such as culture, socialization, leadership, decision-making, diversity management, technologies, and methods for adapting to change through strategic planning and continuous process improvement. This course emphasizes the role of organizational communication theory and research in applied organizational settings. The course includes integration of theory with research and/or practice.
- 5423 Organizational Implementation of Integrated Communication**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
Examination of communication and organizational development with external audiences such as managing integrated communication to enhance the dissemination, comprehension, acceptance, and application of information to achieve organizational goals. This course emphasizes the role of communication specialists as message managers for organizations. The course includes integration of theory with research and/or practice.
- 5613 New Media Design and Production I**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
Introduction to information design. Advanced study of new media development. Hands-on skill development in creating digital elements for use in multimedia and combining these elements into interactive presentations. The course includes integration of theory with research and/or practice.
- 5623 New Media Design and Production II**
(3-0) 3 hours credit. Prerequisite: COM 5613 or consent of instructor.
Advanced study of information design theories and practice. Emphasizes new media production techniques. The course includes integration of theory with research and/or practice.
- 5813 International Communication**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
Exploration of global media systems, transnational information flows, and their impacts. Issues surrounding globalization, media representation, development communication and communication policy are examined. The course includes integration of theory with research and/or practice.
- 5823 Intercultural Communication**
(3-0) 3 hours credit. Prerequisites: COM 5003, COM 5013, and COM 5023 or COM 5033.
Examination of communication dynamics in diverse societies and between different cultural communities. The interactions among communication, culture, and identity are explored within historical and contemporary perspectives. The course includes integration of theory with research and/or practice.
- 5973 Topics in Communication**
(3-0) 3 hours credit. Prerequisites: COM 5003 and COM 5013, or consent of instructor.
Intensive study of one or more specific issues in communication. May be repeated for credit when topics vary, but not more than 9 hours will apply to the Master's degree.

6941-3 Internship in Communication

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and Graduate Advisor of Record.

Supervised experience, relevant to the student's program of study, within selected organizations. Must be taken on a credit/no credit basis. Not more than 3 hours will apply to the Master's degree.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and Graduate Advisor of Record.

Independent reading, research, discussion, project development and/or writing under the direction of a faculty member. Intended for specialized work not normally available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree. May not be substituted for COM thesis or project courses.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Graduate Advisor of Record.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated once. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Credit earned in COM 6961 may not be counted in the 36 hours required for the Master's degree in Communication.

6983,6 Master's Thesis

3 or 6 hours credit. Prerequisites: Permission of the thesis advisor and the Graduate Advisor of Record.

Supervised thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6993,6 Master's Project

3 or 6 hours credit. Prerequisites: Permission of the project advisor and the Graduate Advisor of Record.

Supervised development and completion of a professional-quality project in the student's area. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the project. Enrollment is required each term in which the project is in progress.

DEPARTMENT OF ENGLISH, CLASSICS, AND PHILOSOPHY

Master of Arts Degree in English

The Master of Arts degree in English offers the student an opportunity to acquire a general knowledge of literatures written primarily in English, to understand the historical and cultural contexts in which that literature was produced, to develop skills in critical analysis, and to conduct literary, rhetorical, and linguistic research.

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, the applicant must have completed at least 18 semester credit hours of work (exclusive of freshman courses) in English with a grade point average of 3.3 (on a 4.0 scale) in all work taken in English at the upper-division and graduate levels. This work must include at least 12 semester credit hours of upper-division English literature courses, and the student must have a grade point average of 3.3 in these courses. Under normal circumstances, the applicant must submit scores from the Graduate Record Examination (GRE) General Test. If GRE scores are not available at the time of application, the scores must be reported prior to the applicant's second semester in the program. These scores, considered in comparison with scores from applicants of similar socioeconomic background, will be used as one element in the evaluation of the applicant. These requirements may be waived in unusual circumstances, upon the approval of the Graduate Program Committee.

Degree Requirements. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 36. Any grade lower than "B" in a graduate course will not count toward the 36 semester credit hours of coursework required in items A and B below.

Degree candidates must complete the following requirements:

A. 24 semester credit hours in the major, distributed as follows:

1. Core Courses. 6 semester credit hours required:

ENG	5013	Introduction to the Graduate Study of Literature (normally must be taken in the student's first semester)
ENG	5053	Topics in Literary Genres

2. Prescribed electives. 18 semester credit hours, distributed as follows:

- a. 6 semester credit hours of ENG literary study from before 1700, at least 3 of which must be ENG 5943 Topics in Major English Authors
- b. 6 semester credit hours of ENG literary study between 1700 and 1900
- c. 6 semester credit hours of ENG literary study after 1900, at least 3 of which must include the study of multiethnic literatures of the U.S.

At least 3 hours of the above prescribed electives must include the study of American literature.

B. 12 semester credit hours of electives in graduate English. In consultation with the Graduate Advisor of Record, the student will select a program of elective courses in one of several specialized areas of study, such as the following:

- Literature and/or Literary Theory
- Linguistics and/or Rhetoric and Composition
- Creative Writing
- Post-colonial and Cultural Studies
- Others as approved by the M.A. in English Graduate Program Committee

Students who have a grade point average of 3.3 or better, and with approval of the M.A. Graduate Advisor, may choose to include electives from outside of English.

Thesis option: Students who have completed 24 or more semester credit hours in an approved program of study with a grade point average of 3.5 or better, upon submission and approval of a thesis proposal to a Thesis Director and the Graduate Program Committee, may elect to include ENG 6983,6 Master's Thesis in their 12 elective hours. Students choosing to write a creative thesis must have completed, among their approved electives, 6 hours of ENG 6043 Creative Writing or the equivalent; at least 3 of these 6 hours must be in the genre of the thesis.

As soon as a student completes 12 semester credit hours of graduate coursework in English, he or she must meet with the Graduate Advisor to draw up a program of study.

In addition to the semester-credit-hour requirements set forth above, candidates for the degree are required to pass the Comprehensive Examination. The Comprehensive Examination, composed of both written and oral portions, is offered two times a year, each Fall and Spring semester, and may be offered during the summer term. The Comprehensive Examination may be taken only twice.

Graduate Certificate in Creative Writing

The Graduate Certificate in Creative Writing is a 12-credit-hour concentration available to degree-seeking students who have been admitted to any UTSA graduate program.

The Graduate Certificate in Creative Writing adds interdisciplinary breadth to a student's course of study while increasing the depth and coherence of a student's work in creative writing. Given the growing interest in creative writing in non-traditional disciplines of medicine, sociology, and psychology as well as in liberal arts, many students find this formal recognition of their work in Creative Writing to be a valuable credential in both academic and non-academic job markets. This certificate demands an active engagement in graduate-level creative writing classes. Students who are pursuing the Graduate Certificate also receive first consideration for graduate workshop registration.

Requirements for the Graduate Certificate include 12 semester credit hours of ENG 6043 Creative Writing repeated in any combination, but at least 3 hours must be taken in each genre (poetry and fiction). No course in which a grade lower than a "B" is earned may be used to complete a Graduate Certificate in Creative Writing.

Individuals interested in the Graduate Certificate in Creative Writing should contact the Graduate Office of the Department of English, Classics, and Philosophy.

Doctor of Philosophy Degree in English

The Doctor of Philosophy (Ph.D.) degree in English offers students opportunities for advanced study and research in cross-cultural, transnational approaches to English language and literary studies, with coursework required in U.S. Latina/o literature and the theory and practice of teaching composition. The Ph.D. in English is awarded to candidates who complete all required coursework, demonstrate in-depth, cross-cultural knowledge of literature, language or composition and rhetoric, and produce an original contribution to their field of specialization.

The regulations for this degree comply with the general University requirements (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, the minimum requirements for admission to the Doctoral program in English are as follows:

1. The student must have a Master's degree in English or a related discipline with a grade point average of 3.5 or better or a Bachelor's degree in English or a related discipline with a grade point average of 3.5 or better.
2. A minimum of at least 18 upper-division and/or graduate hours in English literary studies with a grade point average of 3.5 or better.

In addition, applicants must submit:

1. A statement of purpose (2–3 pages).
2. A writing sample (minimum 15-page research paper).
3. Three letters of recommendation attesting to the student's academic training, capability, and potential.
4. Graduate Record Examination (GRE) scores from both the General Test and the English Subject Test. These scores will be considered in comparison with scores from applicants of similar socioeconomic background.
5. Students who have received degrees from non-English speaking universities must submit Test of English as a Foreign Language (TOEFL) scores of no less than 550 (paper version), or 213 (electronic version).

Degree Requirements. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 39 graduate hours beyond the Master's degree.

Students who are accepted into the Doctoral program without a Master's degree must complete all requirements for the Master of Arts degree in English or its equivalent. Courses in which students receive any grade lower than "B" will not count toward the 39 semester credit hours of coursework required in items A through D.

Degree candidates for the Doctoral degree must complete the following requirements:

A. Core Curriculum (9 semester credit hours):

ENG	5183	Theory and Practice of Teaching Composition
ENG	6013	Bibliography and Research
ENG	6053	Latina/o Studies: Text and Context

B. Seminars (9 semester credit hours):

ENG	7053	Seminar: Latina/o Studies
ENG	7063	Seminar: Issues in Culture
ENG	7073	Seminar: Theory and Criticism

C. Electives:

1. Prescribed electives (3 semester credit hours):

ENG	6023	Rhetoric and Composition: Text and Context
		or
ENG	6033	Language and Linguistics

2. Free electives (minimum 12 semester credit hours, including at least 6 in ENG graduate courses). The student, in consultation with an academic advisor and the Doctoral Advisor of Record, will select at least 12 hours of freely elected courses. Students will select coursework from available graduate courses in ENG or, with approval of the Graduate Program Committee, related disciplines.

D. Doctoral research (minimum 6 semester credit hours):

ENG	7311-3	Doctoral Dissertation
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The entire program of study must be approved by the student's dissertation advisor, dissertation committee, and Graduate Program Committee, and must be submitted to the Dean of the Graduate School through the Dean of the College for final approval.

Language Requirement. In addition to fluency in English, students must demonstrate proficiency in Spanish or another language that is approved in advance by the Graduate Program Committee. Proficiency may be demonstrated in one of the following ways:

1. Successful completion of an upper-division undergraduate course or a graduate course with a grade of “B” or better. The course must be approved in advance by the Graduate Program Committee.
2. Passing the College Level Examination Program (CLEP) examination in the approved language with a score of 85% or higher.

Admission to Candidacy. A student will be admitted to candidacy after completing all University and program requirements, passing the Qualifying Examination, and completing a dissertation prospectus. The Qualifying Examination will be based on three areas of literary study, one of which must be cross-cultural in focus; all three must be relevant to the student’s anticipated dissertation and selected in consultation with the student’s examination committee. In consultation with the examination committee, the student will prepare reading lists in each area and compose position papers in each of the three areas. The examination committee must approve the reading lists and conduct an oral examination on the reading lists and the position papers. The Qualifying Examination will be completed when the examination committee approves the student’s dissertation prospectus (approximately 15–20 pages) and recommends admission to candidacy to the Dean of the Graduate School through the Graduate Program Committee and the Dean of the College.

Dissertation and Final Oral Examination (Defense of the Dissertation). Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation that makes a significant contribution to the fields of English literature, language, or rhetoric and composition. The student, in consultation with his or her dissertation advisor, determines the research topic. A dissertation committee, selected by the student and dissertation advisor and approved by the Dean of the College and the Dean of the Graduate School, will guide and critique the candidate’s research. The dissertation committee must unanimously approve the completed dissertation. The dissertation shall then be defended publicly before the dissertation committee.

COURSE DESCRIPTIONS

ENGLISH (ENG)

5013 Introduction to the Graduate Study of Literature

(3-0) 3 hours credit.

Introduction to the premises, concepts, and methods of literary study, including literary history, terminology, bibliography, and various critical and theoretical approaches to literature. Normally must be taken in the student’s first semester of graduate study.

5053 Topics in Literary Genres

(3-0) 3 hours credit.

Consideration of texts selected to illustrate the structural, conceptual, and contextual properties of a specific genre, e.g., poetry, fiction, or drama. May be repeated for credit when topics vary.

5133 Development of Rhetoric and Composition

(3-0) 3 hours credit.

Survey of the development of rhetorical theory, with emphasis on how present composition theory and practice reflect earlier traditions.

5161 Practicum in Rhetoric

(1-0) 1 hour credit. Prerequisite: Consent of instructor.

Applied study of the rhetorical and linguistic foundations of written English. May be repeated for credit, but not more than 2 hours may be applied to the Master’s or Doctoral degree in English.

- 5173 Theory and Practice of Teaching Literature**
 (3-0) 3 hours credit.
 Critical study of literary pedagogy and applications of theory and research to the teaching of literature.
- 5183 Theory and Practice of Teaching Composition**
 (3-0) 3 hours credit.
 Introduction to current scholarship in composition and applications to the teaching of writing.
- 5223 Medieval Literature**
 (3-0) 3 hours credit.
 Critical study of works from the Anglo-Saxon period through the fifteenth century, excluding Chaucer. Some readings are in modern translation, and some are in Middle English.
- 5313 Renaissance Literature**
 (3-0) 3 hours credit.
 Critical study of poetry, prose and drama of the sixteenth and seventeenth centuries, excluding Shakespeare and Milton.
- 5413 Restoration and Eighteenth-Century Literature**
 (3-0) 3 hours credit.
 Critical study of poetry, prose, and drama of the Restoration and the eighteenth century.
- 5513 Nineteenth-Century British Literature**
 (3-0) 3 hours credit.
 Critical study of poetry and prose of nineteenth-century British writers.
- 5613 Nineteenth-Century American Literature**
 (3-0) 3 hours credit.
 Critical study of poetry and prose of nineteenth-century American writers.
- 5633 Topics in the Study of Literature**
 (3-0) 3 hours credit.
 Exploration of the ways that important texts, theories, and cultural or intellectual movements have shaped the study of literature and literary forms. May be repeated for credit when topics vary.
- 5733 British and American Literature, 1900–1950**
 (3-0) 3 hours credit.
 Critical study of poetry, prose, and drama of British and American writers from 1900 to 1950.
- 5743 British and American Literature, 1950–The Present**
 (3-0) 3 hours credit.
 Critical study of poetry, prose, and drama of British and American writers from 1950 to the present.
- 5753 World Literatures in English**
 (3-0) 3 hours credit.
 Critical study of poetry, prose, and drama of world literatures in English, such as literature of the Indian subcontinent, Latin America, Africa, or the Caribbean.
- 5763 Latina/o Literature**
 (3-0) 3 hours credit.
 Critical study of poetry, prose, and drama of Latina/o writers.

- 5773 Women and Literature**
(3-0) 3 hours credit.
Critical study of poetry, prose, and drama written by women and/or representing female identity.
- 5783 African American Literature**
(3-0) 3 hours credit.
Critical study of poetry, prose, and drama of African American writers.
- 5933 Topics in American Literature**
(3-0) 3 hours credit.
Critical study of selected American authors, themes, or cultural, historical, or aesthetic issues. May be repeated for credit when topics vary.
- 5943 Topics in Major English Authors**
(3-0) 3 hours credit.
Critical study of the major works of one of the following authors: Chaucer, Shakespeare, Milton. May be repeated for credit when topics vary.
- 6013 Bibliography and Research**
(3-0) 3 hours credit.
Introduction to the tools and technology of professional literary research and also research in cross-cultural studies, including Latina/o Studies.
- 6023 Rhetoric and Composition: Text and Context**
(3-0) 3 hours credit.
Advanced study and research of topics and movements in rhetoric and composition. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Master's or Doctoral degree in English without the approval of the Graduate Program Committee.
- 6033 Language and Linguistics**
(3-0) 3 hours credit.
Advanced study and research of topics and movements in language and/or linguistics. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Master's or Doctoral degree in English without the approval of the Graduate Program Committee.
- 6043 Creative Writing**
(3-0) 3 hours credit. Prerequisites: Approval of instructor and Graduate Advisor of Record.
Intensive workshop in creative writing. May be repeated for credit when topics vary.
- 6053 Latina/o Studies: Text and Context**
(3-0) 3 hours credit.
Advanced study and research of Latina/o texts. May include some literature in translation. May be repeated once for credit when topics vary.
- 6063 Cross Cultural Issues: Text and Context**
(3-0) 3 hours credit.
Advanced study and research of primary literary texts in the context of key cultural and/or cross-cultural issues. May be repeated once for credit when topics vary.
- 6073 Theory and Criticism: Text and Context**
(3-0) 3 hours credit.
Advanced study and research of topics and movements in literary theory and criticism. May be repeated once for credit when topics vary.

6951,3 Independent Study

1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master of Arts degree in English.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Graduate Advisor of Record.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated once. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Credit earned in ENG 6961 cannot be counted in the 36 hours required for the Master's degree or for the 39 hours required for the Doctoral degree in English.

6983,6 Master's Thesis

3 or 6 hours credit. Prerequisites: Permission of the thesis advisor and the Graduate Advisor of Record.

Supervised thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required in each term in which the thesis is in progress.

7053 Seminar: Latina/o Studies

(3-0) 3 hours credit. Prerequisite: ENG 6013.

Advanced and intensive research of key issues in Latina/o Studies. May be repeated once for credit when topics vary.

7063 Seminar: Issues in Culture

(3-0) 3 hours credit. Prerequisite: ENG 6013.

Advanced and intensive research of key issues in cultural and/or cross-cultural studies. May be repeated once for credit when topics vary.

7073 Seminar: Theory and Criticism

(3-0) 3 hours credit. Prerequisite: ENG 6013.

Advanced and intensive research of key issues in theory and criticism. May be repeated for credit when topics vary.

7083 Seminar: New Texts/New Contexts

(3-0) 3 hours credit. Prerequisite: ENG 6013.

Advanced and intensive research of recent writings or movements influencing literary and cultural studies. May be repeated once for credit when topics vary.

7113 Supervised Teaching in English

3 hours credit. Prerequisites: Admission to the Doctoral program in English and approval of the Graduate Advisor of Record.

Development and implementation of an undergraduate course in English under the supervision of a member of the English graduate faculty. May be repeated for credit.

7211-3 Directed Readings

1 to 3 hours credit. Prerequisites: ENG 6013 and completion of at least 12 additional hours of 6000-level and/or 7000-level ENG coursework, and permission of the Graduate Program Committee.

Reading, research, discussion, and writing under the direction of a member of the graduate faculty. Enables students to prepare one of their fields of specialization when other appropriate classes are unavailable. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree.

7311-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisites: Admission to candidacy for the Doctoral degree, completion of 33 hours of coursework approved by the Graduate Advisor and the Graduate Program Committee, and fulfillment of the Language Requirement.

May be repeated for credit but not more than 18 hours may be applied to the Doctoral degree.

7961 Qualifying Examination

1 hour credit. Prerequisite: Approval of the Graduate Program Committee to take the Qualifying Examination.

Independent study course for the purpose of taking the Qualifying Examination. May be repeated for credit as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Qualifying Examination is taken if no other courses are being taken that term. The grade report for the course is either “CR” (satisfactory performance on the Qualifying Examination) or “NC” (unsatisfactory performance on the Qualifying Examination).

DEPARTMENT OF HISTORY

Master of Arts Degree in History

The Master of Arts degree in History offers students the opportunity to pursue the advanced study of history. The program is designed to develop historical skills and to expand students' understanding of the conceptualization and practice of history. Explicit attention is focused on historical comparisons and historical comparative frameworks.

Program Admission Requirements

In addition to satisfying the University-wide admission requirements, students should have:

1. 18 semester credit hours in history or courses with significant historical content (12 of these hours must be at the upper-division level); and
2. A grade point average of 3.1 or better (on a 4.0 scale) in the last 60 hours of undergraduate education.

Students who do not meet the above requirements, and who have 12 semester credit hours of courses with significant historical content, may be considered for admission if they meet one or more of the following conditions:

1. A minimum grade point average of 2.8 overall.
2. A grade point average of 3.0 in 15 hours of graduate or professional courses.

Students may submit one or more of the following in support of their application:

1. Letters of recommendation (use university form).
2. Graduate Record Examination (GRE) scores.
3. A 500-word essay outlining qualifications and goals.

Applicants for admission as non-degree-seeking students (special graduate students or non-degree-seeking graduate students) should have completed at least 12 semester credit hours in history or a related field before application. Non-degree-seeking students may be limited in the courses they are permitted to take. Admission as a non-degree-seeking student does not ensure subsequent admission as a degree-seeking student. Consult the catalog on regulations regarding "special graduate student" and "non-degree-seeking status."

Degree Requirements. The minimum number of semester credit hours required for this degree is 33. This is exclusive of coursework or other study required for admission.

Degree candidates must complete the following requirements:

A. 6 semester credit hours:

HIS	5023	Historical Methods
HIS	5113	Historical Approaches and Interpretations

Students should take these two courses during the first year of their programs.

B. 3 semester credit hours in Comparative History (HIS 6483 Topics in Comparative History or other courses identified as meeting the requirement).

C. 6 semester credit hours consisting of the sequence:

HIS	6813	Proseminar in History
HIS	6903	Research Seminar in History

This sequence will vary in subject. A student should take HIS 6813 Proseminar in History and then HIS 6903 Research Seminar in History in the same academic year. Note: HIS 5023 Historical Methods and HIS 5113 Historical Interpretations and Approaches are prerequisites for enrollment in HIS 6813.

D. 18 semester credit hours of elective courses, chosen in consultation with the student's advisor:

- At least 6 hours must be outside the student's focus area; focus areas are United States History and World History.
- Students electing to write a thesis will complete HIS 6983 Master's Thesis (6 hours) in accordance with University regulations as stated in Options for Master's Degrees in Chapter 4, Master's Degree Regulations. Students must pass the comprehensive examination before enrolling in HIS 6983.
- Up to 6 hours of graduate-level courses outside the program may be taken with prior approval of the Graduate Advisor of Record.
- Up to 6 hours of Independent Study hours may be taken with approval of instructor.

E. Students must pass the comprehensive examination before they can enroll in HIS 6983 Master's Thesis. Nonthesis students should take the examination in the last semester of their program.

Students are encouraged to pursue languages or other formal competencies as appropriate to their needs.

COURSE DESCRIPTIONS

HISTORY

(HIS)

5023 Historical Methods

(3-0) 3 hours credit.

This course introduces students to the historian's craft through an examination of basic research and analytical skills. These skills include: reading and analyzing primary and secondary works (literary and nonliterary), diverse methodologies, archival and library research (both traditional and electronic), and the design of a research proposal. (Students are expected to take this course at the outset of their graduate studies.)

5053 Topics in Medieval Europe

(3-0) 3 hours credit.

An examination of the major problems in the history of medieval Europe, from the second to the fourteenth century. The course focuses on changing interpretations in medieval history but also stresses the reading of primary texts.

5063 Topics in Early Modern European History

(3-0) 3 hours credit.

An examination of the major historiographical and historical problems in early modern European history, from the fourteenth century to the seventeenth century.

5093 Designing a History Course

(3-0) 3 hours credit.

A comprehensive approach to constructing history survey courses for the college level. Topics may include a survey of current curriculum debates; course and syllabus design; selection of textbook and other readings; evaluation and grading; leading discussions; nontraditional instructional methods, including the use of new technologies; and lecture preparation and presentation.

5113 Historical Approaches and Interpretations

(3-0) 3 hours credit.

This course promotes an understanding of how historians conceptualize the study of history by asking historical questions and using different historical approaches to develop answers. This will foster the ability to develop and critique an argument, to conduct bibliographic reviews, and to identify competing schools of thought. This course will also investigate how historical interpretations change over time. (Students are expected to take this course at the outset of their graduate studies.)

5123 The American Revolution, 1763–1789

(3-0) 3 hours credit.

A history of British America from the imperial crisis of 1763 to the ratification of the United States Constitution in 1789, with emphasis on the early beginnings of the American nation and social, economic, military, and cultural features of the revolutionary movement.

5153 The Civil War and Reconstruction, 1850–1877

(3-0) 3 hours credit.

An examination of the political, social, and economic factors in the 1850s that led to the American Civil War, as well as a study of the military, diplomatic, and political consequences of the war and efforts to create a new union.

5163 History of the U.S. South

(3-0) 3 hours credit.

This course examines the social, political, cultural, and economic developments that shaped life in the southern United States in the nineteenth and twentieth centuries. Topics may include race relations; southern politics; the economic transformation of the region; and religious identities and faiths.

5193 The United States Since the Great Depression

(3-0) 3 hours credit.

An analysis of recent American history with emphasis on the role of the national government, U.S. involvement in global affairs, and the changing status of women and people of color. Topics may include the drives for social justice by women and minority groups, the evolution of the American economy, the rise of the national security state, the emergence of the welfare state, and the cultural impact of electronic mass media.

5203 U.S. Political History

(3-0) 3 hours credit.

Examines the role of government and the political process in the United States. Topics may include the origins of the political system, the evolution of political parties, and the expansion of the public sector.

5263 History of the Spanish Borderlands

(3-0) 3 hours credit.

A comprehensive study of Spanish exploration and colonization in the borderlands adjacent to the international boundary between the southwestern United States and Mexico. Emphasis is on Hispanic institutions and cultural values that shaped the development of a frontier society on the eve of Mexican independence. Attention is given to bibliographic sources and specialized readings.

5303 Twentieth-Century Texas

(3-0) 3 hours credit.

An examination of Texas society, culture, and politics in modern times. Topics may include the period of reform in the 1890s, the boom in oil, the growth of cities, the politics of the Progressive Era, the developments of the Twenties, the Depression and New Deal, World War II, the era of Lyndon Baines Johnson, and the expansion of industry in the state and the Sun Belt.

5313 South Texas: Rural and Urban

(3-0) 3 hours credit.

An overview and analysis of the development of South Texas, from pre-Columbian cultures to the rise of urbanization. Emphasis on Spanish exploration and settlement of Nuevo Santander, contact with indigenous cultures, the impact of nineteenth-century warfare, and the rapid transformation of the region through urbanization.

5323 The U.S.–Mexico Border

(3-0) 3 hours credit.

This course will examine social, economic, and political conditions shaping the character of the United States-Mexico border region. Using a transnational approach, students will have an opportunity to explore the history of the border as a bicultural region, and to examine issues relevant to the development of the border area. Topics of interest may include urbanization, industrialization, gender, trade, migration, security, and ecological problems.

5423 Colonial Mexico

(3-0) 3 hours credit.

A detailed examination of the Spanish conquest and colonization of Mexico from 1521 to Independence. Special attention is paid to the transformation of Indian society under Spanish rule, the development of the colonial economy, and the formation of an interrelated colonial elite.

5433 Modern Mexico

(3-0) 3 hours credit.

Examines the history of Mexico following independence from Spain in 1821. Consideration is given to the disintegration of the colonial system, nineteenth-century reforms, the Porfiriato, the Mexican Revolution, and their effects on contemporary Mexico. Students may have the opportunity to work in Mexico.

5453 The French Revolution and the Greater Caribbean

(3-0) 3 hours credit.

This course explores the French Revolution and its impact on the French colonies in the western hemisphere. The course provides a comparative analysis of notions of citizenship and the variety of factors that shaped the practice of rights before, during, and after the revolutionary struggle in both France and the Greater Caribbean.

5653 Modern Chinese History

(3-0) 3 hours credit.

This course provides an overview of Chinese history since 1550, with particular attention to the major historiographical debates in recent scholarship. Topics may vary, and the latest ones include ethnic and cultural identities in modern China and themes in local and transnational history.

5693 Indian Subcontinent

(3-0) 3 hours credit.

This course provides students with an opportunity to learn about the cultures and histories of the Indian subcontinent. Particular attention will be paid to the major historiographical debates in recent scholarship. Topic will vary and may include India, Pakistan, Afghanistan, Nepal, Sri Lanka, and/or Bangladesh.

5733 Migration in Historical Context

(3-0) 3 hours credit.

What has caused people to migrate as individuals and as groups? To what extent has geographical mobility been a function of economic mobilization, political transformation, social upheaval, and/or technological revolution? How has the migratory process, in turn, affected the migrants themselves, both in their place of origin, and in the host society? This course is a graduate-level exploration of these and other related questions on migration and may be explicitly comparative. Specific theme, regional focus, and time period may vary and may draw from a variety of historical situations.

5753 Women and Gender in African History

(3-0) 3 hours credit.

This course will explore individual and collective agency in the history of African women since 1800. Topics may vary but the historical themes examined in this course may include African feminisms, social movements, domesticities, masculinities and religions.

6113 Law and Society in America

(3-0) 3 hours credit.

An examination of the role of law as both a reflection and initiator of change in American life, from colonial times to the present. Topics range from seventeenth-century slavery to the equal rights revolution of the twentieth century.

6133 The United States and the World

(3-0) 3 hours credit.

An examination of the relationship between the United States and foreign nations and peoples from the late eighteenth century through the Cold War era. Using selected episodes, the course will focus on: the domestic sources for American policies and activities; the ways in which foreign peoples prompted, perceived, and influenced those policies and actions; and the impact the United States has had overseas.

6153 History of Sexuality

(3-0) 3 hours credit.

What does it mean to write, research, analyze, and talk about the histories of sex and sexuality? This seminar explores historical and cultural interpretations of the history of sexuality. The course involves understanding how changes in society, the economy, the family, and politics have reshaped sexual values and behaviors, and the ways that individuals and groups have responded to these challenges. Topics may include the family, religion, race and sexuality, class, reproductive health, and transgender and queer studies. Geographical focus may vary with instructor. (This course may employ an explicitly comparative approach.)

6163 Women in the United States

(3-0) 3 hours credit.

Analyzes the experiences of women in the United States from the colonial period to the present. Topics may include economic roles, legal issues, religion, culture, feminist movements, and family life.

6173 Latina/os in the United States

(3-0) 3 hours credit.

Examines the Mexican American, Cuban American, and Puerto Rican American experience in the United States, treating the historical relationship between this nation and the countries of origin and the interaction between these groups and mainstream society.

6193 The City in History

(3-0) 3 hours credit.

This course explores the roles of the urban place in the formation of modern culture, society, and polity. It interprets the shifting functions of the "urban factor" in social and cultural change. (This course may employ an explicitly comparative approach.)

6323 Comparative Environmental History

(3-0) 3 hours credit.

This course explores the role of environmental factors in world history. It provides students the opportunity to consider the importance of often overlooked actors such as plants, animals, and diseases alongside more familiar human cultural and social institutions. We consider how the inhabitants of different continents and nations were shaped by nature, shaped their own very different environments, and made sense of these processes.

- 6413 Topics in U.S. History**
(3-0) 3 hours credit.
Examines topics of current interest to historians of the United States. May be repeated for credit when topics vary.
- 6423 Topics in Modern European History**
(3-0) 3 hours credit.
Examines topics of current interest to historians of Europe. May be repeated for credit when topics vary.
- 6433 Topics in Latin American History**
(3-0) 3 hours credit.
Examines topics of current interest to historians of Latin America. May be repeated for credit when topics vary.
- 6443 Comparative Nationalism in the Modern World**
(3-0) 3 hours credit.
This course offers a comparative investigation of nationalism around the globe from 1700 until the present. Interdisciplinary perspectives will be used to examine the growth of nations, the nation-state, ethnic identity, and community as well as related subjects such as race and racism, fascism, minorities, gender, immigration, and genocide.
- 6453 Comparative U.S. Home Fronts: Civil War to Cold War**
(3-0) 3 hours credit.
This course will examine the United States during wartime, with a focus on activities on the home-front. This course will examine the different ways U.S. conflicts from the Civil War to the Cold War have shaped the politics and culture of the United States. Issues considered in this course may include war's effect on race and gender relations, propaganda during wartime, war and notions of citizenship, and war and the growth of the national state.
- 6463 Topics in African History**
(3-0) 3 hours credit.
This seminar is a graduate-level introduction to African history. The course will emphasize the ways in which events and processes in the African past can be juxtaposed usefully with developments in other regions of the world. Topics and themes may include regional trading networks, the range of political/governmental structures, and cultural variation.
- 6473 Topics in Asian History**
(3-0) 3 hours credit.
Examines topics of current interest to historians of Asia. May be repeated for credit when topics vary.
- 6483 Topics in Comparative History**
(3-0) 3 hours credit.
This course provides an introduction to one or more of the major approaches, methods, or theories in comparative history today. It may consider, for example, comparison of events, social movements, social or political institutions, social groups, economic developments, regions or nations, among other topics. May be repeated for credit when topics vary.
- 6813 Proseminar in History**
(3-0) 3 hours credit. Prerequisites: HIS 5023 and HIS 5113.
A detailed investigation of a major historical subject, with particular attention to current research and major interpretations. Intended as preparation for HIS 6903. May be repeated for credit when topics vary.
- 6903 Research Seminar in History**
(3-0) 3 hours credit. Prerequisite: HIS 6813 in the specific subject of the seminar or consent of instructor.
An examination of research materials pertinent to topics in history explored in HIS 6813, of methodologies developed to interpret these materials, and of theoretical issues guiding inquiry. Preparation of a primary research paper required. May be repeated for credit when topics vary.

6913 Making History in the Digital Age

(3-0) 3 hours credit.

This course will explore some of the newer applications of information technology for presenting history to students and the public. Training will be offered in developing multimedia presentations for the classroom or public spaces, such as museums and the Web. Prior experience with computers is not required.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study to prepare for the Comprehensive Examination. Students will select fields of study and prepare for examination under faculty supervision. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6973 Special Problems

(3-0) 3 hours credit.

An organized course providing specialized study in a historical field not normally available as part of the regular course offerings. May be repeated for credit when topics vary.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6993 Internship in History

3 hours credit.

A supervised experience, relevant to the student's program of study, within selected community organizations, libraries, and archives. No more than 6 semester credit hours may apply to the Master's degree.

DEPARTMENT OF MODERN LANGUAGES AND LITERATURES

Master of Arts Degree in Spanish

The Master of Arts degree in Spanish offers the student the opportunity for an in-depth view of Hispanic studies in three specialized areas: literature, culture, and language, underscoring the unity of the Hispanic world rather than its national components. Elective courses in Linguistics (LNG) and Foreign Languages (FL) offer an opportunity to further the student's grasp of the Spanish language in its geographical, cultural, and social variations.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have 12 or more upper-division hours in Hispanic culture, literature, or linguistics and a mastery of oral and written skills in Spanish in an academic register. Upper-division grammar, oral communication, and language courses may not be included in this requirement. Students are required to have written and oral proficiencies assessed during their first semester of study.

A grade point average of 3.0 (on a 4.0 scale) is required in undergraduate coursework in Spanish. These requirements may be waived in unusual circumstances upon the approval of the Graduate Program Committee.

Admission determinations are based on the grade point average, undergraduate coursework, fluency in Spanish, the personal statement, and the letter(s) of recommendation.

Application Materials. In addition to filing the regular University application for admission, all applicants must submit to the Spanish Graduate Committee for evaluation a one- to two-page statement written in Spanish describing the objectives of proposed graduate study and at least one letter of recommendation from a prior teacher or professional colleague.

Degree Requirements. The number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 36. A maximum of one grade of "C" shall be applicable toward coursework for the Master of Arts degree.

Degree candidates must complete the following requirements:

- A. 3 semester credit hours of SPN 5373 Introduction to Graduate Spanish Studies. This course must be taken within the first 18 hours of graduate work.
- B. 18 semester credit hours distributed as follows:
 - 6 hours in culture (SPN)
 - 6 hours in Spanish language and linguistics (SPN and LNG)
 - 6 hours in literature (SPN)
- C. 15 semester credit hours of electives in Spanish (SPN), Linguistics (LNG), or other courses as approved by the Graduate Advisor of Record.
- D. Thesis Option
 - SPN 6983 Master's Thesis. The satisfactory completion of a thesis in accordance with University regulations as stated under Options for Master's Degrees in Chapter 5, Master's Degree Regulations. If this option is chosen, up to 6 semester credit hours of thesis credit may be used in place of the electives in Item C.
- E. The satisfactory completion of a comprehensive examination, to be taken toward the end of a student's 36-hour program. Students are advised to speak with the Graduate Advisor of Record when close to 27 hours.

COURSE DESCRIPTIONS
SPANISH
(SPN)

- 5023 Writing and Editing in Spanish**
 (3-0) 3 hours credit.
 Theory and practice of advanced Spanish stylistics. Development of writing skills and practice in editing Spanish texts. Can be repeated for credit up to 6 hours, and with approval of the Graduate Advisor of Record.
- 5123 Hispanic Film**
 (3-0) 3 hours credit.
 Hispanic societies, history, culture, and language of film as interpreted by representative directors. May be repeated for credit when topics vary.
- 5373 Introduction to Graduate Spanish Studies**
 (3-0) 3 hours credit.
 An introduction to graduate studies in Spanish. Emphasis on critical writing and research skills, including bibliography and electronic media. Incorporates critical and methodological approaches to Hispanic literature, culture, and linguistics. This course must be taken within the first 18 semester credit hours of graduate studies.
- 5413 History of Ideas in the Hispanic World**
 (3-0) 3 hours credit.
 Selected Spanish, Latin American and/or U.S. Latina/o issues representative of major currents of thought affecting the evolution of Hispanic cultural history. May be repeated for credit when topics vary.
- 5463 Spanish Civilization**
 (3-0) 3 hours credit.
 A study of the social, political, and cultural history of Spain from prehistory (the Caves of Altamira) to the present.
- 5473 Latin American Civilization**
 (3-0) 3 hours credit.
 A study of the social, political, and cultural history of the Latin American countries from pre-Columbian civilizations through the Conquest, Colonial period, and Independence to the present.
- 5483 Studies in Hispanic Culture**
 (3-0) 3 hours credit.
 Studies of different facets of Hispanic culture not normally available as part of regular course offerings. May be repeated for credit when topics vary.
- 5633 Spanish Medieval-Golden Age Literature**
 (3-0) 3 hours credit.
 Study of Medieval, Renaissance, and/or Golden Age Spanish texts in a variety of contexts that may include historical, cultural, or theoretical approaches. Topics may include poetry, narrative, drama, and Don Quijote. May be repeated for credit when topics vary.
- 5703 Modern Spanish Literature**
 (3-0) 3 hours credit.
 Selected Spanish literary works from 1700 to the present. May be repeated for credit when topics vary.
- 5763 Latin American Literature to Modernism**
 (3-0) 3 hours credit.
 In-depth study of selected literary works by Indian, Spanish, and Creole authors. May be repeated for credit when topics vary. Topics may include the Conquest, the Colonial period, and the nineteenth century.

- 5773 Latin American Literature from Modernism to the Present**
(3-0) 3 hours credit.
Studies in contemporary prose, poetry, and/or drama. May be repeated for credit when topics vary.
- 5803 Mexican American Literature**
(3-0) 3 hours credit.
The consideration of Mexican American literature in the context of the Hispanic tradition. Different genres, themes, and authors will be examined in terms of ethnic, social, and linguistic characteristics as well as artistic merit. May be repeated for credit when topics vary.
- 5813 Studies in Hispanic Literature**
(3-0) 3 hours credit.
Study in selected areas of Hispanic literature not normally available as part of regular course offerings. May be repeated for credit when topics vary.
- 5843 History of the Spanish Language**
(3-0) 3 hours credit.
Chronological development of the Spanish language, focusing on areas such as phonology, morphology, and lexicon.
- 5853 Spanish of the Southwest**
(3-0) 3 hours credit.
An in-depth study of the contact variety of Spanish spoken by Mexican Americans in the U.S. Southwest, including San Antonio. Complementary descriptive and sociolinguistic approaches are incorporated.
- 5863 Spanish Phonetics and Phonology**
(3-0) 3 hours credit.
The framework of articulatory phonetics and its application to the description of Spanish. Analysis of the sound system of Spanish in both traditional and contemporary phonological frameworks, with attention given to regional variation.
- 5883 Spanish Morphology and Syntax**
(3-0) 3 hours credit.
An opportunity for in-depth analysis of the Spanish language, focusing on the levels of word, phrase, and sentence.
- 5893 Spanish Dialects**
(3-0) 3 hours credit.
A study of regional and social variation in Peninsular, Latin American, and U.S. Spanish, including phonology, grammar, and lexicon of vernacular dialects. Perspectives of traditional dialectology and modern sociolinguistics.
- 5903 Topics in Hispanic Linguistics**
(3-0) 3 hours credit.
Study in selected areas of Hispanic linguistics not normally available as part of regular course offerings. May be repeated for credit when topics vary.
- 5943 Spanish Language and Culture**
(3-0) 3 hours credit.
Identification of those aspects of contemporary Spanish pertinent to the major functions or purposes of language use in a given part of the Spanish-speaking world. May be repeated for credit when topics vary, but not more than 6 hours will apply to the Master of Arts degree in Spanish. (Formerly SPN 5953.)
- 6011 Supervised Teaching in Spanish**
1 hour credit.
Development and implementation of an undergraduate course in Spanish under the supervision of a member of the graduate faculty. May be repeated for credit.

6083 Theory and Practice of Translation

(3-0) 3 hours credit.

Introduction to current research in translation and applications to the process between English and Spanish. May be repeated for credit when topics vary.

6813 Seminar in Hispanic Studies

(3-0) 3 hours credit. Prerequisite: 24 semester credit hours of graduate-level Spanish.

In-depth study and major research project in areas such as Hispanic culture, literature, and/or language. May be repeated once for credit as an elective.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master of Arts degree in Spanish.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Credit earned in SPN 6961 cannot be counted in the 36 semester credit hours required for the Master of Arts degree in Spanish.

6973,6 Special Problems

(3-0, 6-0) 3 or 6 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. May be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master of Arts degree in Spanish.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master of Arts degree in Spanish. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

COURSE DESCRIPTIONS FOREIGN LANGUAGES (FL)

5003 Foreign Language Studies

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Consideration of second language acquisition research and classroom applications. Topics may include theory and practice of language skills development, methods of language instruction, foreign language anxiety, and technology-assisted language learning. May be repeated for credit when topics vary.

5013 Foreign Language Testing

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Consideration of content and approaches for measuring achievement and proficiency in various sub-skills of language and culture.

5033 Foreign Languages and Intercultural Communication

(3-0) 3 hours credit.

Investigation of intercultural communication research in specific language communities and its application to effective interaction with speakers of a variety of foreign languages. Consideration of sociolinguistic norms, semantic variation, and nonverbal language relevant to selected foreign language communities in the United States and abroad compared with mainstream U.S. English norms.

5043 Principles of Translation

(3-0) 3 hours credit. Prerequisite: Previous coursework or experience in translation or consent of instructor.

A survey of approaches to translation, practice, and theory, with hands-on experience in a variety of genres (for example, literary prose, poetry, essay, narration) and vocabularies (e.g., legal, medical, business). May be repeated when languages vary, i.e., Spanish/English, French/English, or German/English.

5114 Individual Instruction in Elementary Language I

4 hours credit.

Opportunity to develop basic oral and written communication skills in the target language, along with enhanced comprehension skills in listening and reading.

5124 Individual Instruction in Elementary Language II

4 hours credit. Prerequisite: FL 5114 or the equivalent in the selected foreign language.

Opportunity to develop basic oral and written communication skills in the target language, along with enhanced comprehension skills in listening and reading.

5213 Individual Instruction in Intermediate Language I

3 hours credit. Prerequisite: FL 5124 or the equivalent in the selected foreign language.

Opportunity to develop intermediate-level oral and written communication skills in the target language, along with increased comprehension skills in listening and reading.

5223 Individual Instruction in Intermediate Language II

3 hours credit. Prerequisite: FL 5213 or the equivalent in the selected foreign language.

Opportunity to develop intermediate-level oral and written communication skills in the target language, along with increased comprehension skills in listening and reading.

5313 Individual Instruction in Advanced Language I

3 hours credit. Prerequisite: FL 5223 or the equivalent in the selected foreign language.

Opportunity to develop advanced-level oral and written communication skills in the target language, along with enhanced comprehension skills in listening and reading.

5323 Individual Instruction in Advanced Language II

3 hours credit. Prerequisite: FL 5313 or the equivalent in the selected foreign language.

Opportunity to develop advanced-level oral and written communication skills in the target language, along with enhanced comprehension skills in listening and reading.

**COURSE DESCRIPTIONS
FRENCH
(FRN)**

5813 Topics in French Linguistics

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A course focusing on a selected area of French linguistics, such as grammar, stylistics, phonetics, or applied linguistics. May be repeated for credit when topics vary.

5913 Topics in French Literature and Culture

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A course focusing on a selected period or aspect of French literature and culture, such as contemporary France, the nineteenth-century novel and society, or twentieth-century theater. May be repeated for credit when topics vary.

**COURSE DESCRIPTIONS
GERMAN
(GER)**

5813 Topics in German Linguistics

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A course focusing on a selected area of German linguistics, such as grammar, stylistics, phonetics, or applied linguistics. May be repeated for credit when topics vary.

5913 Topics in German Literature and Culture

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Selected topics relative to German literature and culture, including such areas as contemporary Germany and profiles of particular segments of German society. May be repeated for credit when topics vary.

**COURSE DESCRIPTIONS
LINGUISTICS
(LNG)**

5013 Sociolinguistics

(3-0) 3 hours credit. Prerequisite: LNG 3813, an equivalent, or consent of instructor.

Theory, research, and methods for the study of linguistic variation and language use in context. Quantitative and qualitative approaches are included.

5153 Topics in Contemporary Linguistics

(3-0) 3 hours credit. Prerequisite: LNG 3813, an equivalent, or consent of instructor.

Contemporary approaches to language analysis and description. May be repeated for credit when topics vary.

DEPARTMENT OF MUSIC

Master of Music Degree

The Master of Music degree program in the Department of Music is accredited by the National Association of Schools of Music.

The Master of Music degree offers the opportunity for advanced study for qualified students who wish to pursue a concentration in conducting, music performance, music education, or piano pedagogy and performance. The Music Performance Concentration offers specialized curricular tracks in instrumental and vocal performance. The Conducting Concentration offers specialized curricular tracks in instrumental and choral conducting. The Music Education Concentration offers specialized curricular tracks in instrumental music education, choral music education, or general music education. The Piano Pedagogy and Performance Concentration is a specialized curricular track in piano pedagogy from elementary to advanced levels of study.

Program Admission Requirements. In addition to satisfying the University-wide admission requirements, applicants are expected to hold the Bachelor of Music degree or Bachelor of Music Education degree with a major in their intended area of graduate concentration, or the equivalent; submit three recommendations from established professionals commenting on the appropriateness of graduate study in music for the applicant; and successfully pass one of the following:

Conducting: Audition in person or provide a recent videotape demonstrating the level of mastery in a rehearsal or performance situation.

Music Performance: Audition in person or provide a recent tape demonstrating the level of mastery in the proposed performance medium.

Music Education: Submit a VHS videotape recording of teaching skills, a curriculum vitae or portfolio, document two years of successful elementary or secondary level teaching, and complete written entrance exam.

Piano Pedagogy and Performance: Audition in person or provide a recent tape demonstrating the level of mastery in piano.

Students are required to take placement examinations in music theory and music history before taking graduate courses. The student's advisor will counsel the student in correcting deficiencies and selecting courses for the student's degree program.

Degree Requirements. Courses in which a grade of "C" or lower is earned are not applicable toward coursework for the Master of Music degree.

Conducting Concentration

Degree candidates for the Master of Music degree with a concentration in Conducting must complete a total of 31 semester credit hours:

A. 10 semester credit hours in the area of concentration:

MUS	5554	Music Performance–Performance Concentration (two semesters)
MUS	6941	Recital
MUS	6961	Comprehensive Examination

B. 15 semester credit hours of other studies in music to include 9 hours in the areas of theory and analysis (MUS 5103 Applied Systems of Analysis or MUS 6233 Twentieth-Century Analytical Techniques), history (MUS 5263 Topics in Music Theory), and research (MUS 5233 Introduction to Music Research). The remaining 6 hours must be satisfied by the completion of MUS 5223 Ensemble Repertoire and MUS 5523 Rehearsal Techniques.

C. 6 semester credit hours of electives (approved by advisor), of which no more than 2 hours may be in a music ensemble.

Music Performance Concentration

Candidates for the Master of Music degree with a concentration in Music Performance must complete a total of 31 semester credit hours:

A. 10 semester credit hours in the area of concentration:

MUS	5554	Music Performance–Performance Concentration (two semesters)
MUS	6941	Recital
MUS	6961	Comprehensive Examination

B. 15 semester credit hours of other studies in music to include 9 hours in the areas of theory and analysis (MUS 5103 Applied Systems of Analysis or MUS 6233 Twentieth-Century Analytical Techniques), history (MUS 5263 Topics in Music Theory), and research (MUS 5233 Introduction to Music Research). The remaining 6 hours must be satisfied by the completion of MUS 5433 Performance Repertoire and MUS 5533 Pedagogy of Musical Performance.

C. 6 semester credit hours of electives (approved by advisor), of which no more than 2 semester credit hours may be in a music ensemble.

Music Education Concentration

Candidates for the Master of Music degree with a concentration in Music Education must complete a total of 36 semester credit hours. Candidates may select a thesis or nonthesis option.

Music Education Thesis Option

A. 12 semester credit hours in the area of concentration:

MUS	5403	Psychological Foundations of Music Education
MUS	5413	Research in Music Education
MUS	6423	Seminar in Music Education
MUS	6913	Thesis in Music Education

B. 15 semester credit hours of other studies in music to include 9 hours in the areas of theory and analysis (MUS 5103 Applied Systems of Analysis or MUS 6233 Twentieth-Century Analytical Techniques), history (MUS 5263 Topics in Music Theory), and research (MUS 5233 Introduction to Music Research). The remaining hours must be satisfied by the completion of a minimum of 6 hours chosen from MUS 5423 Foundations of Music Education, MUS 5523 Rehearsal Techniques, or MUS 5542 Music Performance (may be repeated for credit).

C. 9 semester credit hours of electives of which no more than 2 semester credit hours may be in a music ensemble. Nonmusic electives are available with consent of the advisor.

Music Education Nonthesis Option

A. 12 semester credit hours in the area of concentration:

MUS	5403	Psychological Foundations of Music Education
MUS	5413	Research in Music Education
MUS	5423	Foundations of Music Education
MUS	6423	Seminar in Music Education

B. 12 semester credit hours of other studies in music to include 9 hours in the areas of theory and analysis (MUS 5103 Applied Systems of Analysis or MUS 6233 Twentieth-Century Analytical Techniques), history (MUS 5263 Topics in Music Theory), and research (MUS 5233 Introduction to Music Research and MUS 5523 Rehearsal Techniques).

- C. 12 semester credit hours of electives of which no more than 2 semester credit hours may be in a music ensemble. Nonmusic electives are available with consent of the advisor.

Piano Pedagogy and Performance Concentration

Candidates for the Master of Music degree with a concentration in Piano Pedagogy and Performance must complete a total of 36 semester credit hours:

- A. 22 semester credit hours in the area of concentration:

12 semester credit hours in pedagogy studies:

MUS	5421	Practicum in Advanced Teaching
MUS	5533	Pedagogy of Musical Performance (2 semesters)
MUS	5572	Class Piano Pedagogy
MUS	6903	Project in Music Pedagogy

10 semester credit hours in performance studies:

MUS	5433	Performance Repertoire
MUS	5542	Music Performance (3 semesters)
MUS	6941	Recital

- B. 9 semester credit hours in the areas of theory and analysis (MUS 5103 Applied Systems of Analysis or MUS 6233 Twentieth-Century Analytical Techniques), history (MUS 5263 Topics in Music Theory), and research (MUS 5233 Introduction to Music Research).
- C. 5 semester credit hours of electives (approved by advisor), of which no more than 2 semester credit hours may be in a music ensemble.

Special Degree Requirements. Students selecting the Music Performance Concentration are required to participate for two semesters in an ensemble appropriate to their program of study.

Students selecting the Music Performance Concentration or Conducting Concentration must successfully complete a recital document and oral comprehensive examination. Students selecting the Music Education Concentration must successfully complete written and oral comprehensive examinations. Students selecting the Piano Pedagogy and Performance Concentration must successfully complete an oral comprehensive examination.

Voice principles must take diagnostic examinations in French, German, Italian, and English lyric diction. If the student is not found proficient in any one of the languages, the appropriate course will be required.

COURSE DESCRIPTIONS

MUSIC (MUS)

5003 Graduate Music Theory Review

(3-0) 3 hours credit.

Designed to satisfy deficiencies indicated by the Graduate Music Theory Placement Examination. Harmonic analysis, part-writing, form, sight-singing and aural skills, as well as twentieth-century materials will be reviewed. A grade of "B" or higher is required before taking further graduate studies in music theory. Cannot be counted toward any Master of Music degree program.

5013 Graduate Music History Review

(3-0) 3 hours credit.

Designed to satisfy deficiencies indicated by the Graduate Music History Placement Examination. Surveys the styles, periods, composers, and historical developments of Western art music. A grade of "B" or higher is required before taking further graduate studies in music history. Cannot be counted toward any Master of Music degree program.

5103 Applied Systems of Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing in music.

A study of techniques designed to assist the conductor-performer-analyst in a better understanding of music through the application of different analytical systems.

5133 Topics in Music Theory

(3-0) 3 hours credit. Prerequisite: Graduate standing in music.

A study of selected areas of music theory. Topics may include theory pedagogy, performance and analysis, history of theory, theory and aesthetics of music, and rhythmic analysis. May be repeated for credit when topics vary. Topics may be taken concurrently.

5163 Composition

3 hours credit. Prerequisites: Graduate standing in Music and consent of instructor.

Private study for the development of techniques and tools for composition, with emphasis on the craft of writing chamber works for various media in contemporary styles. Seminar attendance may be required.

5223 Ensemble Repertoire

(3-0) 3 hours credit. Prerequisite: Graduate standing in music.

A study of repertoire for ensembles including a historical perspective. Topics are (1) Choral; (2) Instrumental. May be repeated for credit.

5233 Introduction to Music Research

(3-0) 3 hours credit. Prerequisite: Graduate standing in music.

A survey of references and sources consulted in graduate music courses; format for papers and thesis, including footnotes and bibliography. Research methods in music are explored.

5263 Topics in Music History

(3-0) 3 hours credit. Prerequisite: Graduate standing in music.

A study of works and styles appropriate to the topics listed below. Topics are (1) Middle Ages; (2) Renaissance; (3) Baroque Period; (4) Classic Period; (5) Romantic Period; (6) Twentieth Century; and (7) Music Practices and Styles. May be repeated for credit when topics vary. Topics may be taken concurrently.

5403 Psychological Foundations of Music Education

(3-0) 3 hours credit. Prerequisites: Graduate standing in music and MUS 5233, or consent of instructor.

A study of the psychological foundations of music education. An investigation of topics such as perception of and responses to music, the nature of musical attributes, music learning, and the measurement of musical behavior.

5413 Research in Music Education

(3-0) 3 hours credit. Prerequisites: Graduate standing in music and MUS 5233, or consent of instructor.

An introduction to historical, philosophical, descriptive, and experimental research in music education. Students will conduct a research study and prepare a final report.

5421 Practicum in Advanced Teaching

(1-0) 1 hour credit. Prerequisite: MUS 5533 or consent of instructor.

Observation and teaching of an advanced undergraduate student under the direct supervision of a studio professor.

5423 Foundations of Music Education

(3-0) 3 hours credit. Prerequisites: Graduate standing in music and MUS 5233, or consent of instructor. Overview of principles, methodologies and practices of music education.

5433 Performance Repertoire

(3-0) 3 hours credit. Prerequisite: Graduate standing in music. A study of the solo, chamber, and orchestral repertoire. May be repeated for credit when topics vary.

5511 Secondary Performance

1 hour credit. Prerequisite: Placement by audition. Private instruction for graduate students desiring secondary study in the following areas: baritone, bassoon, clarinet, classical guitar, conducting, contrabass, cornet, flute, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, violoncello, and voice. Seminar attendance and/or concurrent enrollment in an assigned University ensemble may be required. May be repeated for credit.

5523 Rehearsal Techniques

(3-0) 3 hours credit. Prerequisite: Graduate standing in music. A study of rehearsal techniques, including tone development, phrasing, rehearsal score study, style, and rehearsal organization. Topics are (1) Choral; (2) Instrumental. May be repeated for credit when topics vary. Topics may be taken concurrently.

5533 Pedagogy of Musical Performance

(3-0) 3 hours credit. Prerequisite: Graduate standing in music. Techniques and materials of teaching musical performance to students of all levels. A critical comparison of existing materials is included. Each student is required to demonstrate teaching techniques. May be repeated for credit when topics vary.

5542 Music Performance

2 hours credit. Prerequisites: Graduate standing in music and successful audition. Private instruction in baritone, bassoon, clarinet, classical guitar, conducting, contrabass, cornet, flute, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, violoncello, or voice. Seminar attendance may be required. May be repeated for credit.

5554 Music Performance–Performance Concentration

4 hours credit. Prerequisites: Graduate standing in music and successful audition. Private instruction for graduate students with concentration in performance or conducting. Instruction offered in baritone, bassoon, clarinet, classical guitar, conducting, contrabass, cornet, flute, harpsichord, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, violoncello, or voice. Seminar attendance may be required. May be repeated for credit.

5572 Class Piano Pedagogy

(2-0) 2 hours credit. Prerequisite: Graduate standing in music. A study of pedagogical techniques and materials used in teaching class piano. Students will have an opportunity to tutor individual students under the supervision of the instructor.

5583 Advanced Instrumental Techniques

(3-0) 3 hours credit. Prerequisite: Graduate standing in music. A study of advanced playing and teaching techniques, selection of materials, and maintenance care. Topics are (1) Winds and Percussion; (2) Strings. Designed primarily for instrumental music teachers.

5593 Elementary Music

(3-0) 3 hours credit. Prerequisite: Graduate standing in music. A study of the current methods and materials used in teaching elementary music. Classroom instruments are also studied.

- 5711 Graduate Ensemble**
(0-3) 1 hour credit.
The study of selected ensemble works through participation in rehearsal and performance. May be repeated for credit.
- 6233 Twentieth-Century Analytical Techniques**
(3-0) 3 hours credit. Prerequisite: Graduate standing in music.
Applied analysis of contemporary music using techniques designed to aid the performer and music educator in a fuller understanding of music composed since 1900.
- 6313 The Use of Microcomputers in Music Education**
(3-0) 3 hours credit. Prerequisite: Graduate standing in music.
A study of the role of microcomputers in music education. Students are given the opportunity to learn basic programming techniques with specific applications to music instruction. Currently available software and hardware applicable to music instruction are examined.
- 6353 Multimedia Production**
(3-0) 3 hours credit.
Provides instruction on the development of computer-aided presentations and interactive applications that integrate various media including music, narration, sound, text, and graphics. Students use current multimedia development and presentation packages to apply concepts of effective production management, audiovisual design, and educational psychology. Supplementary instruction includes scanning, digital audio/video manipulation, and graphics creation. Projects are individualized to reflect each student's chosen discipline.
- 6423 Seminar in Music Education**
(3-0) 3 hours credit. Prerequisites: Graduate standing in music and MUS 5233, or consent of instructor.
Studies in the philosophy, historical background, and current trends in music education. May be repeated for credit when topics vary.
- 6543 Diction for Singers**
(3-0) 3 hours credit. Prerequisite: Graduate standing in music.
A study of performance diction for singers. The pronunciation of the language as it applies to public performance. Topics include English, French, Italian, and German. May be repeated for credit when topics vary.
- 6903 Project in Music Pedagogy**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and program advisor.
Offers the opportunity to complete a professional project in music pedagogy relevant to the student's background, interests, and/or needs. The project should include, but not necessarily be limited to, appropriate written documentation. May be repeated for credit.
- 6913 Thesis in Music Education**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and project director.
Offers the opportunity to complete a thesis in music education relevant to the student's background, interests, and/or needs. The thesis should include, but not necessarily be limited to, appropriate written documentation. May be repeated for credit, but not more than 3 hours will apply to the Master of Music degree. Enrollment is required each term in which the thesis is in progress.
- 6941 Recital**
1 hour credit. Prerequisites: Permission of the Graduate Advisor of Record and music performance instructor.
Concurrent registration required in MUS 5542 or MUS 5554 for piano pedagogy and performance concentration.
A recital approximately one hour in length; required of all students in the performance, or conducting, or piano pedagogy and performance concentrations.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours will apply to the Master of Music degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Credit earned in MUS 6961 cannot be counted in the total hours required for the Music Education concentration or Piano Pedagogy and Performance concentration. MUS 6961 is required of all students in the Music Performance concentration or Conducting concentration and will be counted in the total hours required for those degrees.

6971-3 Special Problems

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

Offers the opportunity for specialized study not normally or not often available as part of the regular course offerings. May be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master of Music degree.

DEPARTMENT OF POLITICAL SCIENCE AND GEOGRAPHY

Master of Arts Degree in Political Science

The Master of Arts degree in Political Science offers students the opportunity to develop and expand their understanding of political theories, methodologies, and substantive political affairs. The program prepares students for possible careers in city, state and federal government, international governmental and non-governmental organizations, public opinion polling, campaign management, community college teaching and other related occupations. The program also provides excellent preparation for law school and doctoral studies. Students may specialize in American Government, International Politics, or Political Theory and Public Law, or design their own specialization.

Program Admission Requirements. Students wishing to apply to the Master of Arts Program in Political Science must submit the following materials to the graduate admissions office:

1. an application form (available online at www.utsa.edu/graduate/)
2. an application fee
3. official transcripts from all collegiate institutions attended including community colleges
4. a statement of purpose (roughly 500 words or two typed pages) indicating your interest and goals in studying political science
5. at least one letter of recommendation from someone familiar with your academic or professional qualifications.

Graduate Record Examination (GRE) and LSAT scores are optional, but are recommended for students who feel their undergraduate grade point average does not accurately reflect their academic potential. To qualify for unconditional admission, applicants must submit the above materials and satisfy all University requirements, have completed 18 semester credit hours in upper-division undergraduate or graduate-level courses in political science or related fields, and have a 3.0 grade point average (on a 4.0 scale) in the last 60 hours of undergraduate and graduate work. Applicants who do not meet the requirements for unconditional admission will be considered on a case-by-case basis and may be admitted conditionally. Students who wish to take courses in the program without earning credit toward a Master's degree may apply as non-degree-seeking students.

Degree Requirements. The minimum number of semester credit hours required for the degree is 36. Students without a basic foundation in statistics and/or social science research methods may be required to complete an undergraduate-level course in one of these areas before enrolling in POL 5013 Research Methods.

Degree candidates must complete the following requirements:

- A. 6 semester credit hours of methodological core courses:

POL	5003	Political Inquiry
POL	5013	Research Methods

Plus 6 semester credit hours of breadth core courses from the following:

POL	5043	International Politics
POL	5063	Political Philosophy
POL	5153	American Government and Politics

- B. 18 semester credit hours (for the Master's thesis) or 21 semester credit hours (for the Master's essay) of designated elective courses in consultation with the faculty advisor. Students may receive up to 6 semester credit hours for courses taken outside of political science after consultation with their advisor.

Students specializing in *American Government* must complete:

POL 5153 American Government and Politics

And at least 9 semester credit hours from the following:

POL 5023 Political Economy
POL 5033 Political Communications and Behavior
POL 5103 Topics in American Politics
POL 5113 Latino/a Politics
POL 5133 Ethnic and Gender Politics
POL 5143 Theory and the City
POL 5163 American Political Development
POL 5173 Policy Process
POL 5183 Congress
POL 5193 Presidency
POL 5403 Topics in Political Communications and Behavior
POL 5413 Political Psychology
POL 5423 Campaign Management and Consulting
POL 5433 Electoral Behavior
POL 5443 Polling and Survey Research Techniques
POL 5454 Political Advertising
POL 5503 Constitutional Law and Judicial Decision-Making

Students specializing in *International Politics* must complete:

POL 5043 International Politics

And at least 9 semester credit hours from the following:

PAD 5663 Development Administration
POL 5303 Topics in Comparative and International Politics
POL 5313 Comparative Political Parties
POL 5333 European Politics
POL 5363 Mexican Politics
POL 5373 Human Rights
POL 5703 American Foreign Policy
POL 5713 Comparative Political Systems
POL 5723 International Organizations
POL 5733 Political Actors and Systems in Latin America
POL 5743 Electoral Systems in the Americas
POL 5773 Comparative Foreign Policy
POL 5783 International Security
POL 5793 International Political Economy
POL 5813 Principles of Economic Governance
POL 5823 Political Economy of the Americas
POL 5833 Business and Labor in U.S. Politics
POL 5853 Economic Geography
POL 5873 Global Governance
POL 5903 Political Geography

Students specializing in *Political Theory and Public Law* must complete:

POL 5063 Political Philosophy

And at least 9 semester credit hours from the following:

POL 5143 Theory and the City
 POL 5203 Topics in Political Theory
 POL 5223 Issues in Contemporary Political Theory
 POL 5243 International Justice and Values Relativism
 POL 5253 Issues of Immigration
 POL 5263 Theories of Racism
 POL 5273 Contemporary Political Theory and Social Policy
 POL 5503 Constitutional Law and Judicial Decision-Making
 POL 5523 Litigation Politics
 POL 6103 Seminar in Theories of Politics and Law

C. 6 semester credit hours (Master's Thesis); 3 semester credit hours (Master's Essay):

POL 6983 Master's Thesis
 or
 POL 6993 Master's Essay

D. Students must complete the core course requirements within their first 18 hours of coursework. Students must complete at least 21 semester credit hours of coursework and maintain a 3.0 grade point average before they may enroll in POL 6983 Master's Thesis or POL 6993 Master's Essay.

COURSE DESCRIPTIONS POLITICAL SCIENCE (POL)

5003 Political Inquiry

(3-0) 3 hours credit.

An introduction to investigation and analysis in Political Science. A major objective is for students to learn how to frame a question, formulate a hypothesis, and review and apply the relevant literature. The course provides an introduction to research design and qualitative research methods, and may include questions in the philosophy of science and other methodological and theoretical questions central to political science.

5013 Research Methods

(3-0) 3 hours credit.

This course provides students with the opportunity to develop a basic working knowledge of the empirical, quantitative approaches/techniques social scientists use in understanding social/political phenomena. The conceptual focus will be on classic hypothesis testing. The class will culminate with multiple regression analysis and its extensions. Students will be given an opportunity to learn how to read the empirical, quantitative primary political science literature, and conduct a statistical analysis of a question in political science.

5023 Political Economy

(3-0) 3 hours credit.

Analysis of the interplay of politics and economics in the domestic and international arenas. Divergent theoretical perspectives and their basis in the work of classical and contemporary political economists and social theorists. Topics may include the politics and economics of international trade, technology policy, educational reform, industrial restructuring, privatization, environmental policy, and labor-market policy.

5033 Political Communications and Behavior

(3-0) 3 hours credit.

An examination of major theories and research dealing with human behavior and interaction in politics, drawing on the literature of political sociology, political communications, political anthropology, and political psychology. Professional applications such as public opinion polling, political journalism, public relations, campaign management, political advertising, and political consulting are considered.

5043 International Politics

(3-0) 3 hours credit.

This course analyzes theories of international relations and/or comparative politics, with an emphasis on major theoretical paradigms and methodological approaches. Topics may include security, economics, the environment, and human rights.

5063 Political Philosophy

(3-0) 3 hours credit.

A broad survey of central political issues and thinkers. Students will be introduced to the philosophies of thinkers such as Plato, Hobbes, Locke, Rousseau, and Marx.

5103 Topics in American Politics

(3-0) 3 hours credit.

An examination of an individual topic or set of issues in American politics. May be repeated for credit when topics vary.

5113 Latino/a Politics

(3-0) 3 hours credit.

This course examines the role of the Latino electorate in shaping state and national politics. Topics may include the political histories of various Latino national origin groups, public policy issues that concern Latinos, the successes and failures of Latino empowerment strategies, and the electoral impact of Latino votes.

5133 Ethnic and Gender Politics

(3-0) 3 hours credit.

How ethnic and gender differences influence political behavior, policymaking, and policy outcomes in the United States. Theories of ethnic relations and feminist and other theories of gender relations. Strategies for dealing with ethnic conflict and gender discrimination and harassment. (Formerly POL 5123. Credit cannot be earned for both POL 5133 and POL 5123.)

5143 Theory and the City

(3-0) 3 hours credit.

This course examines the city from a theoretical and historical perspective. The course allows for various strategies focusing on communities and/or policies. Authors may include, but are not limited to, Mumford, Jacobs, Engels, Katznelson, Harvey, and Castells.

5153 American Government and Politics

(3-0) 3 hours credit.

An examination of the major issues, problems, and processes of American government and administration.

5163 American Political Development

(3-0) 3 hours credit.

This course presents a macropolitical perspective on American politics. It introduces students to debates in political science about change and development in political authority relations since the founding of the Republic. Topics may include the nature of regimes and regime change; the relationship between ideology and political culture; developments in institutional authority and in the balance of power among institutions such as the three branches of government, federal and state authority, and the military; continental development; the emergence of the regulatory state; the United States as a world power; and the representative process and forms of popular organization.

- 5173 Policy Process**
(3-0) 3 hours credit.
This course examines theories of the policy-making and -executing process, and the actors, institutions, and politics that are involved in the process. (Credit cannot be earned for both POL 5173 and PAD 5323.)
- 5183 Congress**
(3-0) 3 hours credit.
The study of the U.S. Congress. Topics may include Congressional procedure and policymaking, representation, and elections. The course also considers the various approaches used in the scholarly study of Congress, including behavioral, rational choice, and historical methods.
- 5193 Presidency**
(3-0) 3 hours credit.
This course examines the origins and development of the presidency, the relationship of the institution of the presidency with major actors in the governmental process, and the modern practice of presidential leadership in the United States.
- 5203 Topics in Political Theory**
(3-0) 3 hours credit.
An examination of an individual topic, theorist, or set of issues in political theory. May be repeated for credit when topics vary.
- 5223 Issues in Contemporary Political Theory**
(3-0) 3 hours credit.
An introduction into some of the major issues and trends within political theory over the last century. Authors may include Gramsci, Adorno, Heidegger, Fanon, de Beauvoir, Habermas, and Derrida.
- 5243 International Justice and Values Relativism**
(3-0) 3 hours credit.
This course examines the question of whether it is possible to formulate a universally acceptable theory of justice or human rights in a world of diverse religious, cultural, moral and ideological beliefs. Authors may include Habermas, Rawls, Gewirth, Rorty, Finnis, and Nussbaum.
- 5253 Issues of Immigration**
(3-0) 3 hours credit.
An investigation into immigration policies of three democracies—Germany, Great Britain and the United States—pre- and post-September 11. The course will explore issues raised by immigration in a democracy, problems of justice, who deserves citizenship, concerns about work, and the role of human rights.
- 5263 Theories of Racism**
(3-0) 3 hours credit.
An examination of Marxist and post-Marxist analyses of racism and its development. Concepts of “race,” race-thinking and racism will be explored from the 1500s on. Two central premises of the course are that racism still exists and that race is largely a construct rather than a biological reality.
- 5273 Contemporary Political Theory and Social Policy**
(3-0) 3 hours credit.
This course explores contemporary political theories such as welfare liberalism, libertarianism, socialism, communitarianism, multiculturalism and feminism. Emphasis will be placed on understanding the theoretical principles underlying these different theories and the practical social policies and institutions that logically follow from them.
- 5303 Topics in Comparative and International Politics**
(3-0) 3 hours credit.
An examination of an individual topic or set of issues in comparative and/or international politics. May be repeated for credit when topics vary.

5313 Comparative Political Parties

(3-0) 3 hours credit.

An examination of the major theories and research regarding the role of political parties in contemporary democracies. The course will focus on how the role of political parties has changed in the post-WWII era at three levels: in the electorate, as organizations, in government.

5323 Urban Social, Economic, and Political Geography

(3-0) 3 hours credit.

An advanced social and economic geography of urban areas, emphasizing intra-urban inequality, the modeling of economic dynamics, and spatial mobility to and within the city. Topics may include social area analysis, residential segregation, migration, perception and personal space in the urban environment, urban transportation, the urban economic base and its dynamics, and consumer shopping behavior in cities. May be repeated for credit when topics vary.

5333 European Politics

(3-0) 3 hours credit.

An examination of the political systems and links between civil society and political institutions in several European nations in the post-WWII era. This course will focus on domestic politics, and will also introduce the European Union. Topics may include the role of citizens within the democratic process, the role of parties, and political participation, and attitudes of citizens in European countries.

5363 Mexican Politics

(3-0) 3 hours credit.

This course focuses on Mexico's political and economic development, including the interaction between the state and civil society and the current challenges of the state. The course includes a historical overview of the development of Mexican national politics, institutions and the economy, and the emergence of civil society. Specific topics may include guerrilla movements, drug dealing, and U.S.-Mexico relations.

5373 Human Rights

(3-0) 3 hours credit.

This course explores the meaning of human rights, analyzes cases of human rights violations in various parts of the world, and examines the roles that individuals, states, and international organizations play in committing and ending human rights abuses. Topics may include genocide, torture, the death penalty, honor killings, and the violation of children's and workers' rights.

5403 Topics in Political Communications and Behavior

(3-0) 3 hours credit.

An examination of an individual topic or set of issues in political communications and behavior. May be repeated for credit when topics vary.

5413 Political Psychology

(3-0) 3 hours credit.

The study of psychological theories of political phenomena at individual, small group, organizational, and nation-state levels. Topics may include political socialization, personality and political leadership, the social psychology of mass participation, rational choice and symbolic politics paradigms of political behavior, psychological models of international conflict, and models of political cognition.

5423 Campaign Management and Consulting

(3-0) 3 hours credit.

An examination of strategies and techniques employed in managing electoral and lobbying campaigns. Topics may include development of comprehensive campaign plans, techniques of fund-raising and budgeting, advertising and public relations, canvassing phone banks, sociodemographic targeting, use of polls, image management, and the use of mass media.

- 5433 Electoral Behavior**
(3-0) 3 hours credit.
An examination of political science theory and research on elections and voting behavior in the United States and other countries. Topics may include electoral cycles and realignment patterns; the impact of media coverage and campaign tactics on opinions, turnout, and electoral outcomes; and the sociodemographic and psychological variables influencing voting and nonvoting.
- 5443 Polling and Survey Research Techniques**
(3-0) 3 hours credit.
The sources, dynamics, and political effects of public opinion. Emphasis is on applied quantitative and qualitative techniques of data collection and analysis commonly used by political scientists, polling organizations, and political consultants in measuring citizen orientations. Topics may include survey methods, interviewing, focus groups, debate meters, sociodemographic targeting, content analysis, frame analysis, simulation, multidimensional scaling, and cluster analysis.
- 5454 Political Advertising**
(3-2) 4 hours credit.
A comprehensive and in-depth examination of the many aspects of political advertising. This course merges academic research with expertise from professional practitioners to give students an understanding of a variety of current topics. Topics may include image development, message creation, advertising production, advertising placement and buying, “under the radar” techniques, direct mail, and related issues such as negative advertising, and the attitudinal and behavioral consequences of particular advertising strategies. Three lecture and two laboratory hours per week. Laboratory hours will consist of hands-on projects related to the topics covered in the course.
- 5503 Constitutional Law and Judicial Decision-Making**
(3-0) 3 hours credit.
An advanced course in constitutional law and interpretation. Emphasis is on written judicial decisions, the political environment of judicial decision-making, and the impact of constitutional interpretations on society.
- 5523 Litigation Politics**
(3-0) 3 hours credit.
An examination of litigation as a means of social change, effectuation of justice, and political pressure and reform. Explores the litigation process from historical and political context, through its origins, court proceedings, and impact.
- 5623 Intergovernmental Relations in the United States**
(3-0) 3 hours credit.
The administrative and political effects of the division of authority among coordinate units of government. Federal-state, state-local, local-federal, state-state, local-local, and governmental-nongovernmental relations are examined.
- 5703 American Foreign Policy**
(3-0) 3 hours credit.
This course analyzes the domestic and international factors that affect American foreign policy, including explanations that focus on psychology, bureaucratic politics, lobbying organizations, public opinion, and national culture.
- 5713 Comparative Political Systems**
(3-0) 3 hours credit.
Comparative analysis of institutions, processes, and policy objectives in Western, Communist, and developing political systems.
- 5723 International Organizations**
(3-0) 3 hours credit.
An examination of international political and economic organizations, as well as major issues involving them. Topics may include alliance systems, regional development, common markets, peacekeeping, international conferences, United Nations, IMF, World Bank, and regional organizations.

5733 Political Actors and Systems in Latin America

(3-0) 3 hours credit.

An examination of politics in Latin America. The course centers the analysis around two axes: the interplay between civil society and the state and patterns of inter-American relations.

5743 Electoral Systems in the Americas

(3-0) 3 hours credit.

A comparative study of campaigns and elections in the Americas. The course assesses similarities and differences of electoral systems in the region with particular emphasis on North American politics (Canada, the United States, and Mexico).

5753 The Geography of Third World Development

(3-0) 3 hours credit.

Advanced analysis of economic growth and social change in developing nations and regions. Investigates issues such as defining of development; major theories of development and underdevelopment; global inequalities; population growth and migration; and the role of agriculture, industry, transportation, and government and trans-governmental planning in development. (Same as GRG 5753. Credit cannot be earned for both POL 5753 and GRG 5753.)

5773 Comparative Foreign Policy

(3-0) 3 hours credit.

This course will compare worldviews, institutional processes, policies, and outcomes in foreign policymaking. Cross-national and thematic comparisons will be used to examine the foreign policies of major actors in international security, international organization, economic competition, and humanitarian issues. Regional comparisons may focus on political and economic issues in Europe, the Middle East, Asia, Africa and/or Latin America.

5783 International Security

(3-0) 3 hours credit.

This course examines issues related to war. Topics may include causes of civil and international war, deterrence, nuclear and conventional weapons, terrorism, and conflict prevention and resolution.

5793 International Political Economy

(3-0) 3 hours credit.

This course analyzes the interaction of politics and economics in the international arena, with a focus on international trade, investment, monetary, and financial relations. Topics may include the role of international economic institutions (such as the World Bank, the International Monetary Fund, and the World Trade Organization), foreign debt, dependency and development, structural change in international economics, and critiques of economic globalization.

5803 Topics in Political Economy

(3-0) 3 hours credit.

An examination of an individual topic or set of issues in political economy. May be repeated for credit when topics vary.

5813 Principles of Economic Governance

(3-0) 3 hours credit.

Examination of the changing principles and practices of economic governance in Western democracies. The shift to market-oriented governance techniques. Theories of state-business relations. Case studies of specific national and regional governance regimes. Topics may include fiscal and monetary policy, the management of welfare systems, industrial development and antitrust, communications policy, trade policy, natural resource management, and regional development.

5823 Political Economy of the Americas

(3-0) 3 hours credit.

An examination of the changing relationship among the state, society, and the private sector in Latin America and its influence on hemispheric relations. Topics may include state ownership and privatization, industrial policy, trade union influence, foreign investment and foreign trade policy, and the impact of NAFTA, GATT, and other international agreements.

5833 Business and Labor in U.S. Politics

(3-0) 3 hours credit.

An examination of the influence of business and labor organizations on public policy formation, implementation, and elections. Policy areas may include industrial relations and labor law, regulatory practices, foreign trade, the environment, government subsidization, taxation, and finance.

5853 Economic Geography

(3-0) 3 hours credit.

An advanced examination of the location of economic activities, their causes, and consequences. Includes the principles and practices of manufacturing and agricultural location and their impact on political subdivisions and economies; trade areas for retail and service activities; the role of transportation; the economic impact of globalization on local areas; and community economic base and shift-share analysis applied to local economies, with implications for planning and public administration. (Same as GRG 5303. Credit cannot be earned for both POL 5853 and GRG 5303.)

5863 International Health Issues

(3-0) 3 hours credit.

This course investigates salient health issues in countries other than the United States. Focus is on the health problems of developing countries. (Credit cannot be earned for both POL 5863 and PAD 5863.)

5873 Global Governance

(3-0) 3 hours credit.

This course analyzes the ways in which various actors bring order to the international system. While traditional theories focus on the role of the state, this course gives greater attention to non-state actors, such as international laws, international organizations, multinational corporations, transnational networks, and norms.

5903 Political Geography

(3-0) 3 hours credit.

Investigates the role of the political state in society and the evolution of state organization from classical times to the present. Topics may include centrifugal and centripetal forces, geopolitics, territorial morphology, boundaries, core areas, and emerging supranationalism. (Same as GRG 5903. Credit cannot be earned for both POL 5903 and GRG 5903.)

5913 Design and Management of Geographic Information Systems

(3-0) 3 hours credit.

A graduate-level introduction to the use of industry-standard GIS software. Topics include GIS data structures, system design, and methods of data exploration and analysis. The course includes discussion of issues related to planning, implementing, and managing large-scale GIS projects for research projects or organizations. (Same as GRG 5913. Credit cannot be earned for both POL 5913 and GRG 5913.)

5923 Advanced Research Methods

(3-0) 3 hours credit.

An in-depth examination of regression analysis. Advanced topics may include recursive and nonrecursive causal modeling, factor analysis, and structural equation modeling. (Formerly POL 5213. Credit cannot be earned for both POL 5923 and POL 5213.)

5933 Topics in Research Methods

(3-0) 3 hours credit.

An examination of an individual topic or set of issues in research methods. May be repeated for credit when topics vary.

6103 Seminar in Theories of Politics and Law

(3-0) 3 hours credit. Prerequisite: 6 semester credit hours from the list of courses specializing in political theory and public law (see section B in Degree Requirements).

This course provides students with the opportunity to analyze and critique significant theories of politics and law. Emphasizing student development of critical, analytic, and synthetic abilities, this course explores major works of political philosophy and jurisprudence and culminates in theory construction by students.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not usually available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6963,6 Internship

3 or 6 hours credit.

Practical experience in a workplace setting in which classroom knowledge of political institutions, processes, and public policy can be deepened and applied. May be repeated for credit to a maximum of 6 hours.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not usually available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983,6 Master's Thesis

3 or 6 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6993 Master's Essay

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and master's essay director.

Master's essay research and preparation. Cannot be repeated for credit. Credit will be awarded upon completion of the essay. Enrollment is required in the first term in which the essay is in progress.

**COURSE DESCRIPTIONS
GEOGRAPHY
(GRG)**

5303 Economic Geography

(3-0) 3 hours credit.

An advanced examination of the location of economic activities, their causes and consequences. Includes the principles and practices of manufacturing and agricultural location and their impact on political subdivisions and economies, trade areas for retail and service activities, the role of transportation, the economic impact of globalization on local areas, and community economic base and shift-share analysis applied to local economies, with implications for planning and public administration. (Same as POL 5853. Credit cannot be earned for both GRG 5303 and POL 5853.)

5323 Urban Social, Economic, and Political Geography

(3-0) 3 hours credit.

An advanced social and economic geography of urban areas, emphasizing intra-urban inequality, the modeling of economic dynamics, and spatial mobility to and within the city. Topics may include social area analysis, residential segregation, migration, perception and personal space in the urban environment, urban transportation, the urban economic base and its dynamics, and consumer shopping behavior in cities. May be repeated for credit when topics vary.

5513 Geography and Culture

(3-0) 3 hours credit.

An exploration of the nature and distribution of cultural landscapes and human behavior within these landscapes. Taking a global focus, the course examines the spatial diffusion of culture, regional differences in religion, language, and ethnicity, environmental perception and behavior, intercultural communication, and environmental determinism and possibilism, among other topics.

5753 The Geography of Third World Development

(3-0) 3 hours credit.

Advanced analysis of economic growth and social change in developing nations and regions. Investigates issues such as defining of development, major theories of development and underdevelopment, global inequalities, population growth and migration, and the role of agriculture, industry, transportation, and government and trans-governmental planning in development. (Same as POL 5753. Credit cannot be earned for both GRG 5753 and POL 5753.)

5903 Political Geography

(3-0) 3 hours credit.

Investigates the role of the political state in society and the evolution of state organization from classical times to the present. Topics may include centrifugal and centripetal forces, geopolitics, territorial morphology, boundaries, core areas, and emerging supranationalism. (Same as POL 5903. Credit cannot be earned for both GRG 5903 and POL 5903.)

5913 Design and Management of Geographic Information Systems

(3-0) 3 hours credit.

A graduate-level introduction to the use of industry-standard GIS software. Topics include GIS data structures, system design, and methods of data exploration and analysis. The course includes discussion of issues related to planning, implementing, and managing large-scale GIS projects for research projects or organizations. (Same as POL 5913. Credit cannot be earned for both GRG 5913 and POL 5913.)

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not usually available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

DEPARTMENT OF PSYCHOLOGY

Master of Science Degree in Psychology

The Master of Science degree in Psychology is designed to address the needs of two groups of students: students who wish to pursue doctoral studies and need additional coursework and research experience in order to be competitive for admission to doctoral programs, and students who need graduate-level training in order to be competitive for jobs in behavioral science laboratories or industrial/organizational settings. The program is designed to give students extensive research experience and coursework in experimental methodology, statistics, and the content areas of experimental psychology (e.g., social, personality, cognitive, developmental, clinical).

Program Admission Requirements. Degree-seeking students normally are not admitted for the Spring or Summer Semesters due to course-sequence requirements in the program. Applicants for unconditional admission must meet University-wide admission requirements in addition to the following psychology admission requirements:

1. Scores on the verbal, quantitative, and analytical writing sections of the Graduate Record Examination (GRE) must be received before the application is considered complete and will be used as part of the selection criteria for admission to the program.
2. Completion of a minimum of 18 undergraduate semester credit hours in psychology (12 of which must be at the upper-division level). These hours must include at least one course in statistics and one course in experimental psychology. A single course that combines instruction in statistics and experimental methodology may be accepted, pending the approval of the Graduate Committee in Psychology.
3. A grade point average of at least 3.2 in the last 60 hours of undergraduate coursework and a grade point average of at least 3.2 in all psychology courses taken.
4. A grade of at least a "B" or higher in: PSY 2073 Statistics for Psychology (or its equivalent); and PSY 3403 Experimental Psychology (or its equivalent).
5. Completion of the Psychology Graduate Application, which includes written responses to questions about research experience and professional goals. The information provided on the Psychology Graduate Application will be evaluated and used as part of the selection criteria for admission to the program. The application is available online and can be obtained at the same Web site (<http://www.utsa.edu/graduate/>) as the University application. Applicants may also call the Department of Psychology to request an application.
6. Two letters of recommendation from behavioral scientists with whom the applicant has taken undergraduate or graduate courses. Recommendation forms are included with the Psychology Graduate Application.

All application materials must be submitted by the University's fall application deadline. The Psychology Graduate Application and the letters of recommendation can be sent directly to the Graduate Advisor of Record in the Department of Psychology. The University application form and application fee, official school transcripts, and GRE scores should be sent directly to the Graduate School.

Applicants who do not meet requirements for unconditional admission will be considered for admission on a conditional basis if there are indications of unrealized potential.

The highly individualized nature of the program dictates that a limited number of students be admitted each year. For this reason, early submission of application materials is strongly encouraged. Students who meet the minimum admission requirements are not necessarily guaranteed admission.

Degree Requirements. The minimum number of semester credit hours required for this degree, exclusive of coursework or other study required to remove admission deficiencies, is 36. Typically, students complete the program in two years (taking three courses a semester, excluding summers) or three years (taking two courses a semester, excluding summers).

Degree candidates must complete the following requirements:

A. 15 semester credit hours of core courses:

PSY	5113	Contemporary Research Paradigms in Psychology
PSY	5213	Design Considerations in Behavioral Research
PSY	5413	Inferential Statistics
PSY	6113	Perspectives in Measurement of Behavior
PSY	6213	Correlation and Regression Analyses

B. 9 semester credit hours chosen from the following:

PSY	5303	Research Seminar in Developmental Psychology
PSY	5313	Research Seminar in Psychopathology
PSY	5323	Research Seminar in Individual Differences and Personality Assessment
PSY	5333	Research Seminar in Social Psychological Research
PSY	5343	Research Seminar in Human Cognition
PSY	5353	Research Seminar in Industrial/Organizational Psychology
PSY	5363	Research Seminar in Psychology and Health
PSY	5373	Research Seminar in Program Evaluation
PSY	5383	Research Seminar in Biological Psychology
PSY	5393	Research Seminar in Cross Cultural Psychology

C. 6 semester credit hours of electives chosen from the following:

PSY	6513	Psychology Research Internship
PSY	6523	Psychology Research Apprenticeship
PSY	6951-3	Independent Study
PSY	6973	Special Problems

D. *Option 1* (with thesis): A Master's thesis and 6 hours of PSY 6983, Master's Thesis.

or

Option 2 (without thesis): 3 additional hours must be completed from the seminar option listed in Section B and PSY 6513 Psychology Research Internship or PSY 6523 Psychology Research Apprenticeship must be completed for an additional 3 hours of credit from the electives listed in Section C. Students seeking this option must notify the Psychology Graduate Program Committee of their intent at least one semester prior to their anticipated graduation date. Students should expect to take the comprehensive examination required for this option during the semester in which they plan to complete the degree. The comprehensive examination can be attempted twice but only once a semester.

Students admitted to the program should consult the Graduate Advisor of Record for specific program requirements.

The program does not require proficiency in a foreign language. A written thesis proposal, approved by the student's thesis committee, is required before the student may register for PSY 6983 Master's Thesis.

**COURSE DESCRIPTIONS
PSYCHOLOGY
(PSY)**

- 5113 Contemporary Research Paradigms in Psychology**
(3-0) 3 hours credit. Prerequisite: Consent of the instructor or admission to the psychology program.
An introduction to the research questions and the theoretical and methodological assumptions that characterize different subfields in psychology.
- 5213 Design Considerations in Behavioral Research**
(3-0) 3 hours credit. Prerequisite: Consent of the instructor or admission to the psychology program.
An examination of criteria and procedures for translating questions of theory and application into effective and relevant research plans.
- 5303 Research Seminar in Developmental Psychology**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the theories and empirical evidence that form the basis for understanding developmental change. Special emphasis is given to the issue of measurement of age-related change.
- 5313 Research Seminar in Psychopathology**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the theories, research methodology, and empirical evidence that form the basis for understanding and treating mental disorders.
- 5323 Research Seminar in Individual Differences and Personality Assessment**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the theories and empirical data regarding the psychological processes that underlie individual differences in personality.
- 5333 Research Seminar in Social Psychological Research**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the theories and empirical findings regarding the psychological processes that underlie human social behavior.
- 5343 Research Seminar in Human Cognition**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the ways that humans select, organize, store, retrieve, modify, and apply information as they cope in adapting to the world. The seminar focuses on selected topics of significance in the contemporary information-processing literature.
- 5353 Research Seminar in Industrial/Organizational Psychology**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the theories, research methodology, and empirical findings that form the basis for understanding work behavior. Additional focus on methods used to assess and evaluate behavior and jobs.
- 5363 Research Seminar in Psychology and Health**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the role of psychological factors in physical health. Topics may include the mind-body relationship, pain, stress, chronic illness, interpersonal relationships in health care, personality and illness, and death and dying.

- 5373 Research Seminar in Program Evaluation**
(3-0) 3 hours credit. Prerequisites: PSY 5213 and PSY 5413 or consent of instructor.
Application of psychological theory, methodology, and analyses to the systematic design and evaluation of social problems, programs, and policies. Topics may include needs assessment, goals analysis, ethical and design considerations, quasi-experimental designs, data collection challenges, relative merits of quantitative and qualitative measures, formative assessment, impact assessment, and decision making with fragmentary or flawed data.
- 5383 Research Seminar in Biological Psychology**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
A critical analysis of the theories, research methodology, and empirical findings that form the basis for understanding the biological principles that underlie human behavior.
- 5393 Research Seminar in Cross Cultural Psychology**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
The course provides a foundation for a “context sensitive” psychology influenced by the social, cultural, and environmental contexts in which psychological theory is generated and tested. Topics may include cultural influences on the self-concept, cultural influences within “universal” behaviors, cultural differences for participating in groups and societies, and the influence of culture on personal relationships.
- 5413 Inferential Statistics**
(3-0) 3 hours credit. Prerequisite: PSY 5213.
Application of selected parametric and nonparametric procedures to the analysis and interpretation of empirical data.
- 5603 Mind and Brain: Meta-analysis in Cognitive Neuroimaging**
(3-0) 3 hours credit. Prerequisite: Consent of instructor or admission to the psychology program.
The objective of this course is to familiarize students with human functional brain imaging methods, experimental designs, statistical analyses, and inferential strategies and content. Students are guided through a literature-based research project which culminates in a quantitative meta-analysis of a set of studies using similar tasks.
- 6113 Perspectives in Measurement of Behavior**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
An examination of criteria and procedures for the development of valid and reliable measures of behavior.
- 6213 Correlation and Regression Analyses**
(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.
Application of selected multivariate procedures to the analysis and interpretation of empirical data.
- 6513 Psychology Research Internship**
3 hours credit. Prerequisites: Consent of instructor and student’s Graduate Advisor.
Students assist in conducting supervised research in a local organization. May be repeated for credit to a maximum of 6 hours.
- 6523 Psychology Research Apprenticeship**
3 hours credit. Prerequisites: Consent of instructor and student’s Graduate Advisor.
Under faculty supervision, students will be responsible for developing experimental procedures, conducting experimental sessions, analyzing data, and preparing reports in an active research setting. The area of research will be determined by consensus of the student, the instructor, and the student’s Graduate Advisor. May be repeated for credit to a maximum of 6 hours.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6973 Special Problems

(3-0) 3 hours credit. Prerequisites: Consent of instructor and student's graduate advisor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. The course may be repeated for credit when the topics vary, but no more than 3 hours, regardless of discipline, may be applied to the Master's degree.

6983,6 Master's Thesis

3 or 6 hours credit. Prerequisite: Written thesis proposal must be approved by the Graduate Program Committee prior to enrollment.

Supervised thesis research and preparation. May be repeated for credit, but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

DEPARTMENT OF SOCIOLOGY

Master of Science Degree in Sociology

The Master of Science degree in Sociology is designed to prepare graduates with the skills necessary to enter the professional workforce as sociologists or to pursue further study at the doctoral level. Students have the opportunity to acquire a knowledge base in sociological methods, theory and in areas of growing community concern, including health, aging, civil-military relations, socioeconomic development, gender issues, and race and ethnic relations. They will have the necessary research skills to define social issues and problems, select data collection techniques, establish appropriate analysis methods, develop statistical reports, and undertake policy analyses for businesses, governmental agencies, and nonprofit organizations.

Program Admission Requirements. To qualify for unconditional admission, applicants must satisfy University-wide and College-wide graduate admission requirements, and be recommended for admission by the Graduate Program Committee. Applicants must have completed 18 semester credit hours of undergraduate courses, 12 of which must be at the upper-division level in sociology or related areas, including a course in research methods or statistics. Applicants who do not meet these requirements will be considered for conditional admission. Conditional applicants must submit indicators of preparation for graduate study, such as completion of additional undergraduate coursework to remove deficiencies, completion of 9 or more semester credit hours of graduate courses, and the achievement of a 3.0 grade point average (on a 4.0 scale). An applicant not eligible for either unconditional or conditional admission may be recommended for admission as a special graduate student. This does not guarantee subsequent admission as a degree-seeking graduate student; such students must reapply for degree-seeking status.

Degree Requirements. The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies, is 36.

Degree candidates must complete the following requirements:

A. 6 semester credit hours of core courses:

SOC	5003	Sociological Theory
SOC	5013	Advanced Conceptualization and Measurement
		or
SOC	5033	Qualitative Research Methods

B. 18 semester credit hours of prescribed electives from the following courses:

SOC	5023	Quantitative Research Methods
SOC	5043	Evaluation Research
SOC	5103	Complex Organizations
SOC	5113	Civil Military Relations
SOC	5123	Family Contexts and Social Change
SOC	5133	Sociology of Health and Health Care
SOC	5143	Demography and Community Trends
SOC	5153	Sociology of Tourism and Leisure
SOC	5203	Social Stratification
SOC	5213	Race and Ethnic Relations
SOC	5223	Mexican Americans: Community, Culture, and Class
SOC	5233	Gender and Society
SOC	5253	Border Studies
SOC	5263	Cultural Studies
SOC	5323	Sociology of Childhood
SOC	5333	Language and Society

SOC	5343	Education and Reproduction of Inequality
SOC	5353	Crime and Delinquency
SOC	6903	Topics in Advanced Sociology
SOC	6973	Special Problems

- C. 6 semester credit hours of additional electives in sociology or other approved discipline(s).
- D. 6 semester credit hours of Internship or Thesis.

Internship option. Students may participate in an internship (the nonthesis option) after completion of 18 semester credit hours. Internships offer work-oriented experiences in local organizational settings where the principles, theories, concepts, and methods of the discipline can be applied. A research paper under the supervision of assigned faculty is required.

Thesis option. Students may select the thesis option after they have completed 24 semester credit hours.

- E. Comprehensive examination. Degree candidates are required to pass both written and oral comprehensive examinations. Examinations are scheduled after a student has completed at least 30 semester credit hours in the program. Registration for SOC 6961 Comprehensive Examination is only required if the student is not registered for any other course in the semester he or she is taking the comprehensive examination.

COURSE DESCRIPTIONS SOCIOLOGY (SOC)

5003 Sociological Theory
(3-0) 3 hours credit.

The nature of sociological theory, the major varieties of theory, the theorists who developed them, and the social and historical contexts of theory development and construction. Issues concerning the relation of theory and research are also explored.

5013 Advanced Conceptualization and Measurement

(3-0) 3 hours credit. Prerequisite: 3 semester credit hours of undergraduate research methods.

Advanced quantitative research methods. Topics may include index construction and scaling, analysis of variance, multiple correlation, and regression, with use of applicable computer programs to analyze local, state, and/or national data sets.

5023 Quantitative Research Methods

(3-0) 3 hours credit. Prerequisite: SOC 5013.

Analyses are pursued using a variety of multivariate statistical techniques developed to meet specialized research problems. Topics may include log-linear analysis, factor analysis, path analysis, discriminant function analysis, logistic regression, and/or LISREL.

5033 Qualitative Research Methods

(3-0) 3 hours credit.

Qualitative strategies and techniques used in social science research, including field methods such as participant observation, in-depth interviews, and the collection of documents. Emphasis is on understanding the ways people interpret their experiences and construct and share their reality.

5043 Evaluation Research

(3-0) 3 hours credit.

Theory and practice of evaluation of public policy and social service programs. Evaluation theories, models, and key evaluation studies are reviewed. Practical and political issues involved in the design and implementation of evaluations are addressed. Evaluation of a social agency or program may be included.

- 5103 Complex Organizations**
(3-0) 3 hours credit.
Structure and dynamics of large organizations, with emphasis on outcomes related to varying organizational contexts. The influence of culture and society on organizational behavior is also examined.
- 5113 Civil Military Relations**
(3-0) 3 hours credit.
Theories of military organization and the impact of the military on societies and communities. Topics may include race and gender relations, military unions, coup d'états, war, and technology.
- 5123 Family Contexts and Social Change**
(3-0) 3 hours credit.
Family system organization and process within the broader context of community and society. Emphasis is on the changing historical roles of families, as well as cross-cultural, socioeconomic, race and ethnic, and gender variability in the family. The impact of education, the economy, and politics is also considered.
- 5133 Sociology of Health and Health Care**
(3-0) 3 hours credit.
The relation of social behavior to health status, epidemiology, and the social organization of medicine in the United States and cross-culturally. Emphasis is on the development of the health care industry and problems associated with the delivery of health care services.
- 5143 Demography and Community Trends**
(3-0) 3 hours credit.
Basic demographic perspectives and data; methods of analysis of population size, distribution, and composition; determinants and consequences of population trends. Applications of computer programs for demographic analysis may be included.
- 5153 Sociology of Tourism and Leisure**
(3-0) 3 hours credit.
Interdisciplinary survey of current theories and research on leisure activity. Leisure trends and their effects on tourism and economic development are examined.
- 5203 Social Stratification**
(3-0) 3 hours credit.
Theory and research pertaining to structures of social inequality—their causes, forms, and consequences. Emphasis is on the distribution of power, prestige, and economic privilege, and patterns of social mobility in the United States.
- 5213 Race and Ethnic Relations**
(3-0) 3 hours credit.
Dominant-subordinate relations between various racial and ethnic groups from cross-cultural theoretical perspectives. Models of assimilation, cultural pluralism, and colonialism are investigated, as are their implications for minority and majority group members.
- 5223 Mexican Americans: Community, Culture, and Class**
(3-0) 3 hours credit.
Sociological focus on the Mexican American population. Emphasis is on the theories used to interpret the experiences of this group, particularly those oriented to issues of stratification and social mobility.
- 5233 Gender and Society**
(3-0) 3 hours credit.
Interdisciplinary survey of theory and current research on gender and gender-related issues. Gender-based theories are examined and compared to explanations for other forms of social stratification. Implications for family dynamics, the labor force, and the economy are explored.

5253 Border Studies

(3-0) 3 hours credit.

An examination of borders in an era of globalization, with emphasis on the United States–Mexico border. Themes may include a theoretical criticism of American mainstream border studies and its more important representatives.

5263 Cultural Studies

(3-0) 3 hours credit.

A study of the significance of culture in society, including the relationship between culture, consciousness, the economy, identity, and history. The development of the field and crucial debates in the literature will be examined. The relationship of Cultural Studies with Critical Theory, feminist theory, multicultural theory, and media studies will be explored.

5323 Sociology of Childhood

(3-0) 3 hours credit.

Explores concepts, theories, and empirical research focusing on childhood and children. Topics may include social structure and its consequences for children's lives, and how circumstances, meanings, and representations of childhood differ across cultures.

5333 Language and Society

(3-0) 3 hours credit.

An examination of the work of important scholars in the study of language and social behaviors.

5343 Education and Reproduction of Inequality

(3-0) 3 hours credit.

Examines the relation between types of societies and systems of education, the connection between schooling and societal stratification, and how schooling contributes both to social mobility and to the reproduction of the prevailing social order.

5353 Crime and Delinquency

(3-0) 3 hours credit.

The role of crime and delinquency in society is analyzed. A consideration of the relationship among data, theory, and policy as integral components of crime and delinquency forms a central theme of this course. Independent empirical work is required.

6903 Topics in Advanced Sociology

(3-0) 3 hours credit.

A seminar offering the opportunity for specialized study not usually available as part of the regular course offerings. Topics may include social gerontology, deviance, social psychology, religion, mass communications, and research applications. May be repeated for credit when topics vary.

6943 Prerequisite Directed Study

3 hours credit.

Restricted to students who have been conditionally admitted. Directed study under the supervision of a faculty member designated by the Graduate Advisor of Record to supplement deficiencies in a student's background for graduate work. May require the student to audit undergraduate courses. Requires written work under the faculty member's supervision. May be repeated.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Sociology Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not usually available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Sociology Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Sociology Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6963,6 Internship

3 or 6 hours credit. Prerequisites: Consent of instructor and 18 semester credit hours of graduate work.

Work-oriented experience within a local organizational setting where the principles, theories, concepts, and methods of the discipline can be applied. A research paper under the supervision of assigned faculty is required.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not usually available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983,6 Master's Thesis

3 or 6 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director, and 24 semester credit hours of graduate work.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

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COLLEGE OF

PUBLIC POLICY



COLLEGE OF PUBLIC POLICY

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COLLEGE OF PUBLIC POLICY

DEPARTMENT OF CRIMINAL JUSTICE

Master of Science in Justice Policy

The Master of Science in Justice Policy (M.S. in Justice Policy) is designed to provide students with competency in policy planning and evaluation, and skills for managing justice agencies in complex and dynamic environments. The program assists students to develop and apply research expertise to the study and resolution of contemporary justice policy problems.

Program Admission Requirements. To qualify for unconditional admission, applicants must satisfy University-wide graduate admission requirements and submit all transcripts. Applicants admitted unconditionally as a degree-seeking student must possess a baccalaureate degree from an accredited university or equivalent training at a foreign institution; a grade point average of 3.0 or better in the last 60 semester credit hours of undergraduate work as well as all previous graduate work; 18 hours in criminal justice, criminology, or a closely-related discipline, or professional experience in the justice system; coursework in criminology theory, organization theory and research methods; good standing at the last institution attended; and the recommendation of the Justice Policy Graduate Admissions Committee. Students who do not meet these criteria may be admitted conditionally or on probation as degree-seeking depending on the nature of the deficiency. Admission as a special student may be considered by the Admissions Committee upon request of the applicant.

Degree Requirements. The minimum number of semester credit hours required for the degree, exclusive of coursework (CRJ 5033) or other study to remove deficiencies, is 36.

Degree candidates must complete the following requirements:

A. 21 semester credit hours of core courses:

CRJ	5073	Research Methods
CRJ	5083	Quantitative Analysis
CRJ	5123	Justice Policy Formation and Implementation
CRJ	5133	Management of Justice Organizations
CRJ	6363	Paradigms of Justice Policy
CRJ	6373	Crime Theory and Justice Policy
CRJ	6503	Applied Policy Research

Students are expected to complete core courses (with the exception of CRJ 6503 Applied Policy Research) within their first 21 hours of coursework. Normally, students should enroll in CRJ 5073 Research Methods and/or CRJ 5123 Justice Policy Formation and Implementation in their first two semesters, unless these courses are not offered. **CRJ 6503 should only be taken in the student's final semester.** Students may take CRJ 5033 Independent Foundation Studies up to three times to develop foundation knowledge in three key areas. Credit hours in CRJ 5033 may not be used toward the degree.

B. 15 semester credit hours of prescribed electives from the following. Up to 6 hours of elective credits may be taken outside of the discipline in related UTSA graduate programs with approval of the Graduate Advisor of Record (GAR).

CRJ	5053	History of Justice Policy Development
CRJ	5323	Program Evaluation: What Works, What Doesn't
CRJ	6003	Decision Analysis in Criminal Justice Settings
CRJ	6103	Seminar on Topics in Theory of Crime and Justice
CRJ	6113	Advanced Research Applications
CRJ	6123	Seminar on Topics in Research Methods
CRJ	6203	Seminar on Topics in Corrections Policy
CRJ	6223	Ethics and the Practice of Social Control

CRJ	6303	Seminar on Topics in Policing and Crime Control
CRJ	6403	Seminar on Topics in Law, Society and Justice Policy
CRJ	6951,3	Independent Study
CRJ	6961	Comprehensive Examination

- C. Thesis Option includes 6 semester hours of Master's Thesis. Students may enroll in CRJ 6991,3,6 Master's Thesis after 24 semester credit hours. To enroll in one semester hour of Master's Thesis, a student must already have completed six semester hours in that course. The Thesis Option requires compliance with UTSA Thesis Requirements and a thesis defense. See Section IV of the Policies and Procedures for the Master of Science in Justice Policy Program for additional information. Students electing the Thesis Option will request to have CRJ 6503 Applied Policy Research and 3 credit hours of prescribed electives waived, for a total of 36 program credit hours.
- D. Comprehensive examination. Degree candidates are required to pass an oral comprehensive examination. The examination is administered in the form of a presentation of the exit paper, written by the student in the required CRJ 6503 Applied Policy Research course, to a faculty committee. Candidates for the Master's degree will complete the comprehensive examination requirement in a successful proposal defense. Students must register for one semester credit hour of Comprehensive Examination for the semester in which the examination is to be taken, if they are not enrolled in other courses.

COURSE DESCRIPTIONS JUSTICE POLICY (CRJ)

5033 Independent Foundation Studies

3 hours credit. This course may not be used as credit toward the degree.

Guided independent learning and research to develop foundation knowledge of the structure and function of the United States criminal justice system, criminological theory, or research methods/statistics. This course may be repeated up to three times to encompass the three substantive areas. Group discussion sessions may be scheduled when multiple students enroll.

5053 History of Justice Policy Development

(3-0) 3 hours credit.

The history and development of crime control policy in America. Studies sources of policy initiatives (e.g., economics, law, social conditions, political environment); criminal justice policy process, dynamics of policy formation, and implementation and evaluation. Case studies and simulations in externalities. (Formerly CRJ 5023. Credit cannot be earned for both CRJ 5053 and CRJ 5023.)

5073 Research Methods

(3-0) 3 hours credit. Prerequisite: CRJ 3013 or equivalent.

Introduction to methodologies used in justice research. Topics include research design, sampling theory, data collection, measurement, and analysis.

5083 Quantitative Analysis

(3-0) 3 hours credit. Prerequisite: CRJ 5073 or equivalent.

Advanced practice with research design, quantitative techniques, and statistical software used in policy research. Familiarizes students with conventions for statistical report writing and data presentation.

5123 Justice Policy Formation and Implementation

(3-0) 3 hours credit.

Detailed study of policy formation and implementation process, stakeholder networks, agenda setting, policy crafting, constituency building, consideration of alternatives, political decision making and resolution, short-term and long-term implementation issues, and role of evaluation and evaluators.

5133 Management of Justice Organizations

(3-0) 3 hours credit.

The study of management theory, organizational dynamics, leadership and administration research related to public and private justice organizations, case studies and simulations of common administrative problems, operational policies, and implementation and evaluation.

5323 Program Evaluation: What Works, What Doesn't

(3-0) 3 hours credit. Prerequisite: CRJ 5083 or equivalent.

Introduction to methods for assessing whether policy relevant justice programs work as envisioned. Different evaluation methods will be explored including process, output, outcome, and cost-benefit analysis; evaluation considerations in development of policy; and common problems associated with evaluation research.

6003 Decision Analysis in Criminal Justice Settings

(3-0) 3 hours credit.

Surveys decision-analysis concepts and tools for application to policy problems in criminal justice involving risk, uncertainty, and conflicting objectives. Considers both qualitative and quantitative decision-making models. Introduction to decision-analysis software.

6103 Seminar on Topics in Theory of Crime and Justice

(3-0) 3 hours credit.

Consideration of selected topics related to the theory of crime and justice. Explores particular theories or perspectives of crime and its implications for justice policy. Topics may focus on traditional or emerging theories of crime and justice. May be repeated for credit when topics vary.

6113 Advanced Research Applications

(3-0) 3 hours credit. Prerequisite: CRJ 5083 or equivalent.

Survey of multivariate statistical techniques. Advanced practice conducting quantitative analyses using criminal history, offender tracking, and other justice policy information systems. Introduction to problems of data manipulation and interpretation using common agency databases.

6123 Seminar on Topics in Research Methods

(3-0) 3 hours credit. Prerequisite: CRJ 5083 or equivalent.

Study of qualitative or quantitative methods not addressed as part of the regular course offerings. Topics may include systems analysis in criminal justice, interrupted time-series analysis, and qualitative methods in criminal justice research. May be repeated for credit when topics vary.

6203 Seminar on Topics in Corrections Policy

(3-0) 3 hours credit.

Consideration of selected topics in the field of corrections. Topics may include offender classification, case management, pretrial supervision, management of confinement facilities, juvenile justice, special needs populations, comparative corrections, offender re-entry, restorative justice, and criminal sanctions on individuals or corporations. May be repeated for credit when topics vary.

6223 Ethics and the Practice of Social Control

(3-0) 3 hours credit.

Survey of the major schools of ethics theory; sources of the ethical and philosophical foundations for justice, social control, and criminal justice functions; common ethical quandaries confronting formal agencies of social control; the role of law, facts, and values in ethical use of formal social control. Externalities related to operational, administrative, and political decision making.

6303 Seminar on Topics in Policing and Crime Control

(3-0) 3 hours credit.

Consideration of selected topics related to police and private sector crime control practices. Topics may include the roles, responsibilities and limitations of public and private enforcement; surveillance, use of force, minority relations, extralegal practices, labor relations, security operations, terrorism, and national security. May be repeated for credit when topics vary.

6363 Paradigms of Justice Policy

(3-0) 3 hours credit. Prerequisite: CRJ 5123 or equivalent.

Examination of the major paradigms of justice policy from early deistic and philosophical perspectives to modern and postmodern perspectives of social justice, and exploration of policy implications of these perspectives.

6373 Crime Theory and Justice Policy

(3-0) 3 hours credit.

Examination of theoretical perspectives on crime and their impact on justice policy. Includes progression of criminology as an interdisciplinary field, theory construction and evaluation, and approaches to preventing and controlling crime in the United States.

6403 Seminar on Topics in Law, Society and Justice Policy

(3-0) 3 hours credit.

Consideration of selected topics related to law and society issues. Topics may include decision making by groups or individuals, criminal law and courts, international law, sentencing reforms, and history of law. May be repeated for credit when topics vary.

6503 Applied Policy Research

(3-0) 3 hours credit.

Organized applied policy research under faculty direction. Independent research conducted within justice agencies on policy or program evaluation. Involves out-of-class data collection and analysis. Reports are produced for participating agencies. Final presentation satisfies comprehensive examination requirement.

6951,3 Independent Study

1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not usually available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of completing the Comprehensive Examination requirement. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6991,3,6 Master's Thesis

1, 3, or 6 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and Faculty Thesis Advisor.

Thesis research and preparation. May be repeated for credit but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

DEPARTMENT OF DEMOGRAPHY AND ORGANIZATION STUDIES

Doctor of Philosophy Degree in Applied Demography

Students accepted for admission into the Ph.D. program in Applied Demography have the opportunity to engage in advanced study and research in the field of Applied Demography as it applies to questions in such areas as public policy, life sciences, medicine, business, and the social sciences. Depending on their area of focus, students may work with faculty from a variety of areas of study offered at UTSA. Students may also choose to take related courses at or work with contributing faculty members from The University of Texas Health Science Center at San Antonio and the San Antonio regional campus of The University of Texas School of Public Health.

There are two areas of concentration offered to students who enter the program. The Applied Demography and Health track prepares students to address the expanding education and research problems that are at the intersection of demography and health care. Students in this track not only pursue careers in university-based medical centers, health science centers, and social science departments but also in health care areas in the private sector such as marketing and planning. The Applied Demography and Policy track prepares students to work in the area of applied social demography. Students are trained to examine the effects of demographic factors on policy—both private and public. Students in this track may pursue academic careers as well as careers in national and corporate settings, such as marketing, advertising and policy. Special emphasis is placed on research and policy in large local, state, and federal agencies.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide requirements for admission to graduate programs, all prospective students must have a bachelor's degree and a Master of Science or Master of Arts degree from an accredited university in demography/sociology, geography, economics, biology, political science, statistics, mathematics, business, or a similar field. Students who have not earned a qualifying master's degree may be required to complete the equivalent courses in the appropriate discipline area before admission to the Ph.D. program in Applied Demography.

In addition, applicants must submit:

1. official transcripts of all undergraduate and graduate coursework completed
2. Graduate Record Examination (GRE) scores from a GRE-administered examination completed no more than five years prior to the Ph.D. student's date of application. All applicants are required to submit scores from the GRE math, verbal, and analytical portions of the examination and scores for a related specialty area
3. three letters of recommendation from academic or professional sources familiar with the applicant's background
4. a letter of application describing the applicant's academic and work backgrounds and goals and objectives related to the applicant's Ph.D. program.

International students from non-English speaking countries must also submit a score of at least 550 on the Test of English as a Foreign Language (TOEFL paper version) as required by the University. These test scores may not be more than two years old at the date of application to the Ph.D. program.

A complete application includes the application form, official transcripts, GRE scores, three letters of recommendation, a letter of application stating academic and work experience, interests and goals, and if required, a TOEFL score. Admission is competitive and satisfying these requirements does not guarantee admission.

Degree Requirements. The Applied Demography Ph.D. requires students to complete a minimum of 48 hours of organized coursework and a minimum of 12 hours of dissertation credits for a total of at least 60 hours beyond the master's degree. The doctoral program has a base of core courses that will result in all students having a firm grounding in demography and related areas of statistics with students then choosing from one of two tracks for their specialization. The tracks in Applied Demography are Applied Demography and Health and Applied Demography and Policy. All students will be required to complete the core courses listed below and a set of courses in their chosen track.

Program of Study**A. Core Research and Statistics Courses (21 semester credit hours):**

1. 12 semester credit hours of the following required courses or their equivalents:

Statistical Computing

DEM	7203	Software Applications for Demographic Analysis or
STA	5133	Data Analysis with Statistical Software
DEM	7213	Advanced Software Applications for Demographic Analysis

Research Methods

DEM	7243	General Research Methods for Demographers I or
GBA	7013	Research Methods I
DEM	7253	General Research Methods for Demographers II or
GBA	7023	Research Methods II

2. 9 semester credit hours selected from the following:

Mathematical Statistics

DEM	7223	Advanced Methods for Life Table Analysis or
STA	5903	Survival Analysis
STA	5853	Analysis of Categorical Data

Applied Statistical Methodology

DEM	7233	Applied Forecasting Methods in Demography or
STA	7083	Time Series Analysis
STA	5313	Theory of Sample Surveys with Applications
STA	7013	Advanced Applied Business Statistical Methods
STA	7023	Applied Linear Statistical Models
STA	7033	Multivariate Statistical Analysis

B. Core Demography Courses (15 semester credit hours):

1. 12 semester credit hours selected from the following:

DEM	7013	Basic Demographic Methods of Analysis
DEM	7023	Advanced Methods of Applied Demographic Analysis
SOC	5143	Demography and Community Trends or
PHS	3998*	Demography and Public Health
EES	5033	Geographical Information Systems or
POL	5913	Design and Management of Geographic Information Systems

2. 3 semester credit hours selected from the following:

DEM	7033	Fertility and Mortality
DEM	7043	Migration
DEM	7053	International Migration

C. Courses in Alternative Demographic Tracks (a minimum of 12 semester credit hours are required in the track selected):

Applied Demography and Health Track

A minimum of 12 semester credit hours are required from the following courses:

DEM	7063	Applied Demography in Policy Settings
DEM	7403	Health Care Organizations, Professions, and the Government
PH	1120*	Introduction to Program Evaluation or
PH	3740*	Community-Based Health Assessment

and at least one of the following courses:

DEM	7073	Disparities in Health and Health Care
FAPR	4100**	Medical Economics
PH	1110*	Social and Behavioral Aspects of Community Health
PH	2610*	Introduction to Epidemiology
SOC	5133	Sociology of Health and Health Care

Applied Demography and Policy Track

A minimum of 12 semester credit hours are required from the following courses:

DEM	7063	Applied Demography in Policy Settings
DEM	7413	Public Policy and Corporate Change
SOC	5103	Complex Organizations
SOC	5043	Evaluation Research or
PH	1120*	Introduction to Program Evaluation

and at least one of the following courses:

MKT	5003	Introduction to Marketing
POL	5853	Economic Geography
PAD	5323	Public Policy Formulation and Implementation or
PH	3915*	Methods for the Economic Evaluation of Health Programs

D. Doctoral Dissertation (minimum 12 semester credit hours):

DEM	7911-6	Doctoral Dissertation
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Note: * denotes courses that are to be completed at The University of Texas School of Public Health San Antonio Regional Campus. Course descriptions may be found in The University of Texas School of Public Health course catalog at <http://www.sph.uth.tmc.edu/uploadedfiles/catalog.pdf> or on the Web site for the UTSA Ph.D. program in Applied Demography at <http://utsa.edu/copp/>.

Note: ** denotes courses that are to be completed at The University of Texas Health Science Center at San Antonio. Course descriptions may be found in The University of Texas Health Science Center at San Antonio course catalog at <http://studentservices.uthscsa.edu/publications/Catalog.html> or on the Web site for the UTSA Ph.D. program in Applied Demography at <http://utsa.edu/copp/>.

The entire program of study must be approved by the student's dissertation advisor and graduate committee, and must be submitted to the Dean of the Graduate School through the Dean of the College of Public Policy for final approval.

Admission to Candidacy. Advancement to candidacy requires that a student complete University and Applied Demography requirements. The student must choose a graduate committee and designate one faculty member as chair of that committee. This faculty member must be a member of the graduate faculty of UTSA. A degree plan must be submitted by each student to his or her specific graduate committee and must be approved by the committee before the end of the second semester of enrollment. The student may seek candidacy by taking and passing written and oral qualifying examinations. The written examination is administered by the graduate faculty of each track. The oral qualifying examination will assess issues not adequately addressed in the student's written examination. The student will also submit and undergo an oral examination in defense of the student's dissertation proposal. Written qualifying examinations are scheduled twice a year, whereas oral examinations may be scheduled at any time. However, oral examinations are administered at the discretion of the student's committee and must meet the time line and requirements of the university. All students must schedule a defense of their dissertation at which all members of their committee are present to examine the student and issue a pass/fail evaluation of the student's work. The Chair of the student's committee is responsible for approval of the final corrections of the student's dissertation.

Dissertation. Candidates must demonstrate the ability to conduct independent research by completing and defending an original dissertation. The research topic is determined by the student in consultation with his or her supervising professor. A dissertation committee, selected by the student in consultation with his or her supervising professor, guides and critiques the candidate's research. The completed dissertation must be formally presented and defended to, and approved by, the student's Dissertation Committee. Awarding of the degree is based on the approval of the Dissertation Committee. The UTSA Dean of the Graduate School certifies the completion of all University-wide requirements.

COURSE DESCRIPTIONS DEMOGRAPHY (DEM)

7013 Basic Demographic Methods of Analysis

(3-0) 3 hours credit. Prerequisite: SOC 5143 or consent of instructor.

Examines basic materials and methods used in demography, including methods for measuring levels and rates of population change, fertility, mortality, migration (both domestic and international), distribution, and composition. Emphasis on cohort and period patterns of change, methods of standardization, and life table methods.

7023 Advanced Methods of Applied Demographic Analysis

(3-0) 3 hours credit. Prerequisites: DEM 7013 and SOC 5143, or consent of instructor.

Examines use of advanced demographic and statistical methods of analysis of population and sample data, including simulating, adjusting, and smoothing; advanced survival analysis, methods of rate decomposition and standardization, population estimation, population projections and evaluations of each. Considers applications of demographic techniques in marketing, management and impact analyses in business and government.

7033 Fertility and Mortality

(3-0) 3 hours credit. Prerequisite: SOC 5143 or consent of instructor.

Provides an overview of fertility and mortality in both national and international contexts. Examines theoretical perspectives used to explain patterns in fertility and mortality, and historical, current and projected patterns in these processes in both the United States and in developed and developing countries around the world. Explores advanced sources of data, measures and methods of analyses used to analyze the levels and changes in these processes used in applied setting.

- 7043 Migration**
(3-0) 3 hours credit. Prerequisite: SOC 5143 or consent of instructor.
Examines patterns, trends and consequences of migration and immigration in the United States and other parts of the world. Explores historical and current theoretical perspectives on migration, analysis of historical, current and projected patterns of migration in the United States and other parts of the world, and examines effects of migration on other demographic, economic, social, and political factors in the United States and elsewhere.
- 7053 International Migration**
(3-0) 3 hours credit. Prerequisite: SOC 5143 or consent of instructor.
Examines the determinants and consequences of international migration from theoretical and empirical perspectives. Explores impacts on the migrants themselves and the countries of origin and destination. Specific issues include global competition for skilled labor, the concept of 'replacement migration', and the role of the state in creating and regulating international population movements. Examines public policy implications of the volume and composition of migration for origin and destination countries.
- 7063 Applied Demography in Policy Settings**
(3-0) 3 hours credit. Prerequisites: DEM 7013 and SOC 5143, or consent of instructor.
Examines the roles, duties and implications of being an applied demographer in private- and public-sector policy settings, including required professional skills and knowledge. Provides practical case-study based experience in applying demographic knowledge and methods to such areas of applied analysis as marketing research, site location analysis, impact analyses, advertising analyses, program evaluation, short-term and long-term planning, and similar areas of policy development. Emphasis on interactive and team-based case-study analyses resulting in written reports, and findings presented to governmental or private-sector decision makers. Provides internship opportunities for students intending to work in applied policy settings.
- 7073 Disparities in Health and Health Care**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Overview of current and historical trends and differentials of health, health care access, and health care delivery systems among different racial/ethnic, socioeconomic, and residence area groups in the United States and elsewhere. Examines differentials in the types and rates of incidence and occurrence of alternative forms of disease and disorders, and access to physicians, hospitals and forms of treatment across demographic and socioeconomic groups. Data and methods for assessing such disparities are reviewed and alternative policy options for decreasing such disparities are discussed.
- 7203 Software Applications for Demographic Analysis**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Demographic analysis of statistical data sets using SAS or other appropriate software. Manipulation and analysis of very large (e.g., census bureau) data sets. Emphasis is on both introductory SAS Data Step programming and SAS Procedures (i.e., PROCs) for population estimates and longer-term projections, shorter-term forecasting, and general estimation.
- 7213 Advanced Software Applications for Demographic Analysis**
(3-0) 3 hours credit. Prerequisite: DEM 7203 or consent of instructor.
Advanced demographic analysis of large statistical data sets using the SAS system. Emphasizes programming for such techniques as small-area estimation, sampling methods, automated data-cleaning techniques of inconsistent data sets, and a detailed treatment of the SAS Macro Language and Matrix Language.
- 7223 Advanced Methods for Life Table Analysis**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
This course covers demographic life tables and event history analysis for events such as unemployment spans, birth intervals, years of healthy life lived, and other codependent demographic events. Further, this course will provide a survey of demographic analytical methods for empirically explaining variation in timing of demographic events. This course will use SAS and/or STATA software.

7233 Applied Forecasting Methods in Demography

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Explanation of methods used for demographic projections and statistical forecasts of empirical data series for the purpose of planning, policy, analysis, and program evaluation. Methods will be used that solve the many historical problems that arise during forecasting, including the modeling of episodic interventions.

7243 General Research Methods for Demographers I

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Examines key aspects of research methodology and provides an understanding and overview of practical and theoretical methods used to include sampling, interviewing, questionnaire and survey construction, and methods of analysis. The course will examine alternative research perspectives used in writing major publishable articles, and a dissertation in demography.

7253 General Research Methods for Demographers II

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Examines use of advanced methods in research analysis, such as path analysis, event history analysis, hazard and risk modeling, and hierarchical linear modeling; involves writing a draft of the student's dissertation proposal and the evaluation of the concepts, research design, and methods of data collection and modes of analysis for completing the dissertation. Topics to be covered include a general overview of large demographic surveys, modes of data collection, questionnaire design, reliability and validity, sampling, and analysis incorporating survey designs for various large-scale demographic surveys. Special attention will be given to data collected by the U.S. Bureau of the Census. Statistical software applications will be used as they relate to demographic survey instruments.

7403 Health Care Organizations, Professions, and the Government

(3-0) 3 hours credit. Prerequisite: SOC 5103 or consent of instructor.

Examination of analyses and published research on health care organizations, professions, and federal regulation. Focus on the interrelationships between and among health care organizations (hospitals and HMOs), professions (doctors and nurses), and government policy (laws and changes in state support for health care) and how these interrelationships affect health care.

7413 Public Policy and Corporate Change

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Theory and analysis of corporation response to business policy change, business policymakers' responses to corporate legal and illegal actions, and public policy alternatives in addressing such change.

7803 Directed Research

(3-0) 3 hours credit. Prerequisite: Consent of instructor and a minimum of 40 semester credit hours in the Applied Demography doctoral program.

Directed individual reading, discussion, writing, and/or studies of selected topics in the field of Demography. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours will apply to the doctoral degree.

7901-3 Special Topics

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. May be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Doctoral degree in Applied Demography.

7911-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisite: Admission to Candidacy for the Doctoral degree in Applied Demography.

May be repeated for credit, but no more than 12 hours may be applied to the Doctoral degree.

DEPARTMENT OF PUBLIC ADMINISTRATION

Master of Public Administration Degree

The Master of Public Administration (MPA) program is fully accredited by the National Association of Schools of Public Affairs and Administration (NASPAA). Its mission is to prepare students for careers and leadership roles in public and nonprofit organizations and to nurture their commitment to ethical public service in a diverse society.

Program Admission Requirements. Applicants must satisfy University-wide graduate admission requirements, submit a letter of intent, and complete an undergraduate course in both research methods or statistics (3 hours) and U.S. government or politics (3 hours). The 500 word letter of intent should state the applicant's reasons for pursuing the MPA, how their educational and/or career experience has prepared them for the MPA program, and how the degree will help the applicant achieve her or his goals. Two letters of recommendation are required from persons familiar with the applicant's academic and/or work abilities. Applicants may be admitted as unconditional, conditional, or special graduate students. Admission as a special graduate student does not guarantee subsequent admission as a degree-seeking student; such students must reapply for degree-seeking status.

Degree Requirements. The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies, is 39. In addition to these basic degree requirements, students without previous work experience that supports attainment of careers and leadership roles in public and non-profit organizations must complete an additional 6 semester credit hours of PAD 6963,6 Internship.

Degree candidates must complete the following requirements:

A. 24 semester credit hours of core courses:

PAD	5003	Introduction to Public Administration
PAD	5023	Quantitative Methods for Public Administration
PAD	5033	Theories of Public Organizations
PAD	5233	Scope and Methods of Inquiry
PAD	5323	Public Policy Formulation and Implementation
PAD	5343	Human Resource Management in the Public Sector
PAD	5363	Public Sector Financial Management
PAD	5393	Economics for Public Administrators

Normally, students enroll in PAD 5003 Introduction to Public Administration during their initial semester.

- B. 12 semester credit hours of electives, chosen in consultation with a faculty advisor to meet degree candidates' professional needs.
- C. Comprehensive examination. Degree candidates are required to pass an oral comprehensive examination. The examination is administered in the form of a presentation to a faculty committee of the exit paper written by the student in the required PAD 6923 Applied Research course.

COURSE DESCRIPTIONS PUBLIC ADMINISTRATION (PAD)

5003 Introduction to Public Administration

(3-0) 3 hours credit.

Provides an overview of the theoretical foundations, substance, and boundaries of modern public administration. Examines the traditional management functions in the legal domain performed by public administrators as well as current issues and problems in the field.

5013 Communication Skills for Public Management

(3-0) 3 hours credit.

Designed to improve a student's ability to use oral, written, graphic, or other presentation techniques as a means of expressing and conceptualizing ideas. Focuses on written and oral communications skills in public administration. Topics may include instruction in grant writing and the development and management of conferences, seminars, and workshops.

5023 Quantitative Methods for Public Administration

(3-0) 3 hours credit. Prerequisite: Undergraduate statistics or methodology course.

Examines data analysis techniques with emphasis on the social and policy sciences. Topics include descriptive statistics, probability, inference, and multivariate regression analysis. Proficiency in the use of statistical software is developed.

5033 Theories of Public Organizations

(3-0) 3 hours credit.

This course allows students to examine major theories of organization and assess how these theories fit with and impact public-sector bureaucracy. Emphasis is on organizational dynamics, behavior in bureaucracies, sources of organizational change, and the integration of theory and practice.

5223 Urban Management

(3-0) 3 hours credit.

An examination of the major economic, social, and political processes involved in managing urban government in the United States. Topics may include contemporary issues in urban areas, urban finance, and intergovernmental dimensions of urban management.

5233 Scope and Methods of Inquiry

(3-0) 3 hours credit.

A comprehensive exploration into the nature and modes of analytic inquiry for administrative and decision-making settings. Course material relevant for social sciences, managerial sciences, policy sciences, and other disciplines. Foci include the formulation of research designs, the conduct of literature reviews, measurement of variables, operationalization, use of theories and models, scientific investigations, and systematic inquiries.

5243 Management Information Systems

(3-0) 3 hours credit.

This course explores managerial means of accessing, organizing, and using information and data in public organizations. Attention is given to use of the Internet and database and information systems management.

5253 Electronic Government

(3-0) 3 hours credit.

This course examines managerial and policy issues associated with electronic government (or, "e-government") in public administration. The emphasis will be on the adoption of information technology to enhance access to and delivery of government information and services to citizens, business partners, employees, other agencies, and governmental entities. Topics discussed may include e-government business models, infrastructure, security and privacy, the digital divide, and e-procurement.

5303 Ethics in Government Administration

(3-0) 3 hours credit.

An inquiry into the philosophical and legal foundations of government administration, and the propriety, application, and enforcement of ethical standards for conducting government. Topics may include the dilemmas associated with public administration in democracies, multicultural environments, and societies marked by socioeconomic and ideological stratification.

- 5313 Public Policy Analysis**
(3-0) 3 hours credit.
This course examines the core component of policy making—the examination, comparison, and choice of policy alternatives. The values, assumptions, and tools associated with welfare economics, as well as alternative approaches to analysis will be studied in detail. Key issues such as informational capacity, public input, rhetorical tools of argument, and ethical obligations of the policy analyst may also be covered.
- 5323 Public Policy Formulation and Implementation**
(3-0) 3 hours credit.
A broad overview of the creation and execution of public policy at all levels and venues of government. Through theoretical approaches and case studies, this course examines key issues such as the impact of politics on policy formulation; the role of public opinion and interest groups; the dynamics of small-group decision making; rulemaking; and variables influencing successful implementation.
- 5333 Program Evaluation**
(3-0) 3 hours credit.
The process, politics, and methodology of analyzing and evaluating public programs. Addresses uses and limitations of methods such as cost-benefit analysis, time-series analysis, and case studies. Students are required to produce a report evaluating a program.
- 5343 Human Resource Management in the Public Sector**
(3-0) 3 hours credit.
An examination of the theory and practice of human resource management in public organizations, including the economic, political, and social factors shaping human resource policies in the public sector. The course is designed to provide students with an understanding of the techniques for managing personnel in the public sector.
- 5363 Public Sector Financial Management**
(3-0) 3 hours credit.
Addresses policies, procedures, and skills relevant to financial management in public sector organizations. Emphasis is on the practice of budgeting, financial reporting, revenue generation, capital budgeting, and debt management.
- 5393 Economics for Public Administrators**
(3-0) 3 hours credit.
Develops the tools of economic theory and demonstrates their use for public policy analysis and evaluation. Topics addressed may include discrimination, tax incidence, housing, income maintenance, job training, and environmental issues.
- 5443 Diversity Policies and Management**
(3-0) 3 hours credit.
Examines current policies and management practices associated with cultural, ethnic, and gender differences in the workplace. Includes analysis of the theoretical and historical bases for affirmative action policies, the impact of such policies, and their interaction with civil service systems and collective bargaining structures.
- 5463 Intergovernmental Relations**
(3-0) 3 hours credit.
Examines the origins and dimensions of American federalism and intergovernmental administration, including the impact of the federal system on contemporary public policy. Topics may include fiscal federalism, bi-national relations, and the character of federal relations involving the borderlands.
- 5473 Land Use Policy**
(3-0) 3 hours credit.
An overview of the formulation and implementation of land-use policies in the United States, with an emphasis on South Texas. Topics may include the history of land-use policies, the clash of interests and values, the difficulties of land use in growing areas, and the role of legal controversies.

5483 Environmental Policy

(3-0) 3 hours credit.

This course explores the public policy dimensions of environmental quality, hazards, and regulation. Problems and policies dealing with air, water, solid waste, energy use, natural resources, sustainability, and global environmental governance are discussed.

5503 Introduction to Urban Planning

(3-0) 3 hours credit.

The course explores the development and evolution of city planning and introduces the major concepts and procedures used by planners with emphasis on developing the urban general plan. Issues such as neighborhood revitalization, community planning, and the reflective practitioner may also be examined.

5513 Urban and Regional Economic Development

(3-0) 3 hours credit.

Scope and status of urban-regional economic development. Analyses of factors contributing to the economic growth or decline of U.S. cities or regions. Roles of government in urban and regional economic development and public/private cooperation. Case studies of specific urban areas.

5563 Urban Planning Methods

(3-0) 3 hours credit. Prerequisite: PAD 5503 or consent of instructor.

This course focuses on the analytical tools and research methods available to the city planner in addressing social, economic, and environmental problems. Urban data collection, analysis, and demographics are addressed.

5573 Public Policy and Policymaking in San Antonio

(3-0) 3 hours credit.

Examines the historical development and context of public policy in the San Antonio area. Considers the political, social, and economic forces shaping the local policymaking process in city, county, and special purpose governments. Topics may include fiscal policy, public investment policies, urban development policy, environmental policy, urban revitalization, economic development, and transportation.

5623 Comparative Public Administration

(3-0) 3 hours credit.

Analysis of a variety of contemporary administrative systems in Western, former Communist, and developing nations. Special attention to historical development, organization, function, and recruitment in selected bureaucracies. Examines relationships between bureaucracies and other components of the political system.

5663 Development Administration

(3-0) 3 hours credit.

Explores the basic relationship between administration and development in underdeveloped, newly developing, and developed societies. The role of development administration and nongovernmental organizations, as well as regional and international political economic organizations, are also analyzed.

5813 Health Issues and Policies

(3-0) 3 hours credit.

This course explores selected policy areas and related contemporary topics. May be repeated once for credit when topics vary.

5913 Nonprofit Organizations

(3-0) 3 hours credit.

This course focuses on the role, characteristics, and management of nonprofit organizations. Topics may include advocacy, governance, accountability, philanthropy, voluntarism, and financial resources. In different semesters, focus may be on organizations dealing with health and human services, community development, housing, education, energy, and the environment.

5923 Nonprofit Leadership and Management

(3-0) 3 hours credit.

This course focuses on leadership and managerial responsibilities and techniques in nonprofit organizations. Topics may include the roles and functions of boards of directors; the communication of a vision and effectively moving toward it; coordinating committees of governmental and business leaders; organizing, coordinating, and facilitating meetings; the cultivation and use of volunteers; and the management of change and conflict.

5933 Fiscal Resource Development and Management in Nonprofit Organizations

(3-0) 3 hours credit.

Designed to promote understanding of and practical knowledge and skills in philanthropy, fundraising, grants, contracting, resource development planning, and financial management appropriate to nonprofit organizations.

5943 Strategic Planning and Management for Public and Nonprofit Organizations

(3-0) 3 hours credit.

This course offers students an introduction to the context and processes of strategic planning and management in public and nonprofit organizations. Emphasis will be placed on topics such as developing an external organizational focus; identifying political, social, and economic trends; and developing and managing a strategic plan.

5953 Grant Development and Proposal Writing

(3-0) 3 hours credit.

This course will provide an overview of the various stages of the grant-seeking and grant-making processes. Topics that may be covered include types of grants and funders; the development of an idea; the creation of community partnerships; identification of possible funding sources; the design and evaluation of a proposed program; proposal writing; and the grant review process.

6213 Social Justice

(3-0) 3 hours credit.

Examination of social justice theories and various constructions of justice for understanding social issues and tracing the consequences of public policies. Review of competing facts and values that surround the contemporary debate over justice policy and practice. Topics may include dimensions and contexts of social justice, structures of domination, human agency, resistance to domination, development of alternative organizations, development of moral reasoning and values, distributive justice, and social action approaches to the study of social justice issues.

6233 Law and Policy

(3-0) 3 hours credit.

An overview of the inter-relationship of law, courts, and public policy. The course will stress a dual focus on the legal tools of policy makers, and courts as venues for policy formulation. Specific topics to be covered include philosophies of the role of law in society, types of law, and the various intersections of law and policy.

6243 Administrative Law

(3-0) 3 hours credit.

This course covers the procedural requirements that administrative agencies must adhere to and the body of law that defines those requirements. Topics may include rule-making, administrative hearings, and freedom of information, as well as broader questions of agency empowerment and the place of judicial review.

6253 Civil Rights Policies

(3-0) 3 hours credit.

This course will examine the state of current civil rights policies governing education, employment, housing, voting, and other social spheres, as well as with the history, from the post-Civil War period to the present, that got us to this point. In addition to this substance-based approach, the course will also utilize a process-based orientation, encompassing issues such as institutional influence on formulation (how different types of institutions, such as legislatures versus courts, produce different sorts of civil rights policies), the impact of public opinion, and the complexities of implementation. Public debates and controversies over necessary reforms or the continuing utility of various civil rights policies will also be discussed.

6303 Disaster Response and Preparedness

(3-0) 3 hours credit.

This course examines the functions involved with disasters including immediate response, long-term recovery, disaster preparedness, and mitigation strategies. The differences between human-caused disasters, technology accidents, and natural disasters are explored. The ways in which individuals, communities, and organizations (government, nonprofit, and for-profit) react when disasters occur are examined. The extent to which societal reaction to catastrophic events frames response, how perception of risk influences decision making, and the capacity of communities impacted by disaster to bring resources to support disaster relief efforts will be examined.

6543 Urban Service Systems

(3-0) 3 hours credit.

Study of urban service systems such as infrastructure, public safety, housing, and transportation systems. Economy, equity, and effectiveness are also addressed. Political and social dimensions may also be examined.

6923 Applied Research

(3-0) 3 hours credit.

Provides the opportunity to apply substantive expertise and research methods to managerial or policy issues in the public sector. May be repeated once for credit with a different emphasis.

6951,3 Independent Study

1 or 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not usually available as part of the regular course offerings. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee Chair to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6963,6 Internship

3 or 6 hours credit. Prerequisites: Consent of instructor and 18 semester credit hours of graduate work.

Work-oriented experience in a public service related setting where the principles, theories, concepts, and methods of the discipline can be applied. A research paper under the supervision of assigned faculty is required.

6973 Special Topics

(3-0) 3 hours credit.

An organized course offering the opportunity for specialized study not usually available as part of the regular course offerings. Special Topics courses may be repeated for credit when topics vary, but no more than 6 hours, regardless of discipline, will apply to the Master's degree.

DEPARTMENT OF SOCIAL WORK

Mission Statement

Educating to act with integrity—as socially responsible, culturally competent social work professionals—in service with diverse populations through community collaboration within an interprofessional and global context.

Master of Social Work

The Master of Social Work (MSW) degree prepares students for advanced social work practice. Graduates work in professional positions serving diverse individuals, families, groups, organizations, and communities. Students graduating from the program will demonstrate a commitment to social responsibility, cultural competence, and community collaboration within an interprofessional and global context.

Program Admission Requirements. Applicants must satisfy University-wide graduate admission requirements. All applicants who apply for unconditional admission must possess a baccalaureate degree from a regionally accredited college or university in the United States or have proof of equivalent training at a foreign institution, must have a grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours of coursework for the baccalaureate degree as well as in all graduate-level work previously completed, must be in good standing at the last institution attended, and based on review of documents including applicant narrative and reference forms, must be recommended for admission by the Department of Social Work Graduate Program Committee.

Admission requirements for all students include:

- a completed graduate application form submitted to the UTSA Graduate School, including official transcripts from all colleges and universities attended;
- a narrative statement to study in the UTSA MSW program not to exceed 1250 words (approximately 5 pages);
- three completed department recommendation forms from individuals familiar with applicant preparation for graduate social work education;
- department forms documenting prior professional and volunteer experiences and academic preparation in the liberal arts;
- for international students, results of the Test of English as a Foreign Language (TOEFL; not more than five years old and a score of not less than 550, paper version), or results of the International English Language Testing System (IELTS; not more than five years old and a score of not less than 4.5).

Students with a Bachelor of Social Work (BSW) degree may qualify for advanced standing if they graduated from a baccalaureate social work program accredited by the Council on Social Work Education (CSWE). The minimum number of semester credit hours required for the advanced standing degree is 36, exclusive of BSW coursework with a grade of “C” or below.

For advanced standing admission, the applicant must meet program admission requirements, and in addition:

- hold a BSW degree from a CSWE-accredited BSW program;
- have a grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours of coursework for the BSW, as well as in any graduate-level work previously completed;
- provide two additional reference letters from:
the BSW field director/coordinator/liaison or BSW program director, and
the agency-based field supervisor where the applicant completed his/her BSW field internship;
- provide a copy of the BSW field evaluation form which indicates number of clock hours completed, final grade, description of practicum setting (includes community and clientele served), and accomplishments as a practicum student;
- be in good standing at the last institution attended; and
- be recommended for admission by the Department of Social Work Graduate Program Committee.

A modified MSW degree option is also available for transfer students who successfully complete a minimum of 18 graduate semester credit hours at the foundation level in a CSWE-accredited master of social work program. The minimum number of semester credit hours required for the modified MSW degree option is 36, exclusive of MSW coursework with a grade of “C” or below. For modified MSW program admission, the applicant must meet program admission requirements, and in addition:

- have a grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours of undergraduate coursework as well as any graduate-level MSW coursework previously completed;
- provide a reference letter from the MSW program director/chair attesting to good standing status in the MSW program;
- when transferring field practicum courses, the applicant must also provide two additional reference letters from the MSW field director/coordinator/liaison or MSW program director, and the agency-based field supervisor where the applicant completed his/her MSW field internship, and provide a copy of the MSW field evaluation form which indicates number of clock hours completed, final grade, description of practicum setting (includes community and clientele served), and accomplishments as a practicum student; and
- be recommended for admission by the Department of Social Work Graduate Program Committee.

Applicants for non-BSW, advanced standing, or modified MSW program may also be admitted as unconditional, conditional, probationary, special graduate, or non-degree-seeking students. Admission as a special graduate or non-degree-seeking student does not guarantee subsequent admission as a degree-seeking student; such students must reapply for degree-seeking status.

Degree Requirements. The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies, is 36 for the BSW (advanced standing) student, 36 for the modified MSW degree option for transfer students from CSWE-accredited graduate social work programs, and 60 for the non-BSW student.

Please refer to department Web site for further information: <http://www.utsa.edu/copp/SW/socialwork.html>.

A. 24 semester credit hours of foundation courses. Non-BSW students must complete the following courses:

SWK	5013	Human Behavior and Social Environment: Dynamics of Individuals and Families
SWK	5023	Human Behavior and Social Environment: Dynamics of Organizations & Communities
SWK	5103	Social Problems and Social Welfare Policy Analysis
SWK	5203	Social Work Research
SWK	5303	Social Work Methods I
SWK	5313	Social Work Methods II
SWK	5403	Field Practicum I and Integrative Seminar
SWK	5413	Field Practicum II and Integrative Seminar

B. 9 semester credit hours of courses particular to program mission and goals. All students must complete the following courses:

SWK	5233	Global Context of Social Work
SWK	5513	Culturally Competent Practice with Diverse Populations
SWK	5633	Interprofessional Collaboration

C. 21 semester credit hours in Advanced Culturally Competent Practice. All students must complete the following courses:

SWK	5243	Advanced Social Work Research: Theoretically Driven Practice and Program Evaluation
SWK	5423	Field Practicum III and Integrative Seminar
SWK	5433	Field Practicum IV and Integrative Seminar
SWK	5443	Advanced Social Work Methods: Individual and Family Practice
SWK	5463	Advanced Social Work Methods: Group Practice
SWK	5473	Advanced Social Work Methods: Policy Practice and Advocacy
SWK	5493	Advanced Social Work Methods: Community Organization and Social Development

D. 3 semester credit hours from the following selectives. All Students must choose one of the following courses:

SWK	5453	Social Work Administration and Supervision
SWK	5483	Multidimensional Assessment

E. 3 semester credit hours of electives. All students must choose one of the following courses:

3 semester credit hours of free elective graduate coursework chosen in consultation with the GAR

or

SWK 6953 Independent Study

or

SWK 6973 Special Topics in Culturally Competent Practice

Comprehensive Examination. Students who successfully complete SWK 5243 Advanced Social Work Research: Theoretically Driven Practice and Program Evaluation with a grade of “B” or better satisfy the comprehensive examination requirement for master’s degree graduates. Students who receive a grade of “C” may still satisfy this requirement by successfully passing a comprehensive examination.

COURSE DESCRIPTIONS SOCIAL WORK (SWK)

5013 Human Behavior and Social Environment: Dynamics of Individuals and Families

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

In this foundation course, ecological systems and biopsychosocial developmental frameworks are used to examine the influence that context has in shaping individual and family dynamics across the life span with an emphasis on cultural diversity and social justice issues.

5023 Human Behavior and Social Environment: Dynamics of Organizations and Communities

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This foundation course applies the social systems/ecological perspective to the study of the dynamics of human behavior in diverse groups, organizations, and communities. The focus on the interconnectedness of variables and on the multiple causation of events prepares students to perceive holistically and contextually small groups, organizations, and communities.

5103 Social Problems and Social Welfare Policy Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This foundation policy course examines the historical perspective on the development of social problems and the social welfare institutions, policies, and programs created in response to those programs with emphasis on policy development and analysis within a local-global perspective.

5203 Social Work Research

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This foundation research course is designed to develop understanding of the process of research and of the use of the scientific method in social work practice. This course focuses on quantitative and qualitative research methods useful in evaluating culturally competent social work interventions with diverse populations.

5233 Global Context of Social Work

(3-0) 3 hours credit. Prerequisite: Graduate standing in social work, or consent of instructor or graduate advisor.

This course, particular to the mission of the UTSA Department of Social Work, examines the historical contexts of contemporary international social issues and the mutually reinforcing relationship between the local and the global. This course will critically explore the economic, political, social, behavioral, environmental, and cultural dimensions of globalization.

5243 Advanced Social Work Research: Theoretically Driven Practice and Program Evaluation

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work, completion of all foundation courses, and concurrent enrollment in SWK 5423.

This advanced research course integrates theory, practice, and research skills. Students demonstrate program competency mastery through completion of an independent capstone course paper. This course examines both program and practice interventions and facilitates students' integration of research methods in the assessment, planning, intervention, and evaluation of practice and program effectiveness.

5303 Social Work Methods I

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and concurrent enrollment in SWK 5403.

This foundation course is an introduction to social work methodology from a culturally competent and strengths perspective focus. Students are introduced to social work practice methods with individuals, families, and small groups through a generalist perspective of social work practice.

5313 Social Work Methods II

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work, completion of SWK 5303 and SWK 5403, and concurrent enrollment in SWK 5413.

This foundation course builds on SWK 5303, Social Work Methods I, by deepening student's knowledge of a generalist practice perspective and introduces macro practice approaches with diverse groups, organizations, and communities.

5403 Field Practicum I and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work and concurrent enrollment in SWK 5303.

This foundation field practicum course is designed to serve as the integration of classroom theory and real world practice. It is a practice course based on supervised assignments designed to facilitate the student's ability to develop and demonstrate independent learning competencies of a generalist social work perspective which includes skill in working with individuals, families, and small groups. The student will complete a minimum of 225 clock hours at an assigned field practicum site. An integrative seminar that emphasizes integration of theory and practice will be held weekly. The grade report for this course is either "CR" (credit) or "NC" (no credit).

5413 Field Practicum II and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work, completion of SWK 5303 and SWK 5403, and concurrent enrollment in SWK 5313.

This foundation course is a continuation of SWK 5403, Field Practicum I and Integrative Seminar, with a focus on demonstrating independent learning competencies in generalist social work perspective and skill development with groups, organizations, and communities. The student will complete a minimum of 225 clock hours at an assigned practicum site. An integrative seminar that emphasizes integration of theory and practice will be held weekly. The grade report for this course is either "CR" (credit) or "NC" (no credit).

5423 Field Practicum III and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work, completion of all core coursework with the exception of SWK 5243, which is taken concurrently.

Building on foundation or BSW field experiences, this advanced field practicum course provides a supervised practicum within a human service agency. The internship addresses the continued independent learning and application of theory to practice at an advanced level as related to the demonstration of culturally competent practice. The internship requires a minimum of 225 clock hours for 3 semester credit hours. A student may combine this course with SWK 5433, Field Practicum IV and Integrative Seminar, in one semester for a "block" placement, which requires a minimum of 450 clock hours for a total of 6 semester credit hours. An integrative seminar that emphasizes integration of theory and practice will be held weekly. The grade report for this course is either "CR" (credit) or "NC" (no credit).

5433 Field Practicum IV and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work, completion of all core coursework with the exception of SWK 5243, which may be taken concurrently.

Building on foundation or BSW field experiences, this advanced field practicum course provides a supervised practicum within a human service agency. The internship addresses the continued independent learning and application of theory to practice at an advanced level as related to the demonstration of culturally competent practice. The internship requires

a minimum of 225 clock hours for 3 semester credit hours. A student may combine this course with SWK 5423, Field Practicum III and Integrative Seminar, in one semester for a “block” placement, which requires a minimum of 450 clock hours for a total of 6 semester credit hours. An integrative seminar that emphasizes integration of theory and practice will be held on a regular basis. The grade report for this course is either “CR” (credit) or “NC” (no credit).

5443 Advanced Social Work Methods: Individual and Family Practice

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced practice methods course applies evidence and theory-based individual and family intervention skills and techniques with an emphasis on cultural competence within the local/global context. Ecological systems, interpersonal process, and social constructionism provide an overarching framework for integrating values, knowledge, skills, and techniques from the various practice approaches.

5453 Social Work Administration and Supervision

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced selective course critiques major theories of management and emphasizes the knowledge and skills needed for effective practice in human service management such as management functions, planning and goal setting, decision making, leadership, personnel management, conflict resolution, budgeting and fiscal management, and the management of a diverse workforce.

5463 Advanced Social Work Methods: Group Practice

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced methods course focuses on developing group leaders with both theoretical and experiential understandings of group purpose, development, dynamics, group theories, methods and skills, and other group approaches. Emphasis is given to developing an integrative perspective of group theory and in applying skills differentially to diverse populations across the lifespan.

5473 Advanced Social Work Methods: Policy Practice and Advocacy

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses, or consent of instructor or graduate advisor.

This advanced methods course in community organization and social development is aimed at students who seek to refine their skills in community-building and collective action. It draws and builds on foundation knowledge and skills from introductory level practice, policy, and human behavior and the social environment courses in the curriculum.

5483 Multidimensional Assessment

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses, or consent of instructor or graduate advisor.

This advanced selective course on the multidimensional assessment of the functioning of children, adolescents, and adults gives emphasis to students learning to critically evaluate and adapt assessment approaches and methods that are congruent with the cultural experiences of clients. The multidimensional framework incorporates biological, genetic, physical, developmental, social, cultural, environmental factors, and social justice issues in the assessment process.

5493 Advanced Social Work Methods: Community Organization and Social Development

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced methods course focuses on the community and the struggles of its people to build upon its strengths, reduce its distresses, and move toward fulfillment of self-determined goals. It seeks to deepen and expand the student’s knowledge, skills and understanding of community-based organizing and local social and economic development and how they can be combined through community building strategies shaped by participative organizing and advocacy.

5513 Culturally Competent Practice with Diverse Populations

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This course, particular to the mission of the UTSA Department of Social Work, explores social diversity and social justice and their relationship to social work practice with diverse and oppressed populations. The course examines the history, demographics, and cultures of various disenfranchised groups served by social workers. The course moves beyond a focus on cultural appreciation and self-awareness to focus on knowledge acquisition and culturally competent skill development.

5633 Interprofessional Collaboration

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This course, particular to the mission of the UTSA Department of Social Work, focuses on the social responsibility of culturally competent social workers to collaborate across disciplines within an interprofessional context in order to better serve families and communities. Central to interprofessional practice principles is the valuing of individual, family, and community expertise. Students will incorporate values, knowledge and skills to participate in the development of holistic service integration approaches and the creation of systems of care service networks.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing, successful completion of 6 semester credit hours of social work graduate courses, and permission in writing (form available) from the program advisor, graduate advisor, or instructor.

Independent course of study in a special topic of interest in the areas of research, field practicum, or other social work related topic under the direction of a faculty member. For students needing specialized work not usually available as part of the regular social work course offerings. May be repeated for credit, but no more than 6 hours will apply to the Master's degree.

6973 Special Topics in Culturally Competent Practice

(3-0) 3 hours credit. Prerequisites: Graduate standing, successful completion of 6 semester credit hours of social work graduate courses, and permission in writing from the instructor, program advisor, or graduate advisor.

This is an organized course offering the opportunity for specialized study in culturally competent practice not usually available as part of the regular course offerings. Special Topics courses may be repeated for credit when topics vary, but no more than 6 semester credit hours, regardless of discipline, will apply to the Master's degree.

COLLEGE OF
SCIENCES

COLLEGE OF SCIENCES

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COLLEGE OF SCIENCES

DEPARTMENT OF BIOLOGY

Master of Science Degree in Biology

The graduate program offers opportunities for advanced study and research leading to the Master of Science degree in Biology. A thesis option is offered to students who want an opportunity to develop expertise in research techniques and data analysis; a nonthesis option is offered for those who want the opportunity to earn the Master of Science degree primarily through organized coursework. The thesis option is recommended for students who plan a career in research or contemplate pursuing a doctorate in one of the life sciences. The nonthesis option might be suitable for students interested in secondary school teaching in the life sciences.

Graduate faculty research interests include biochemistry, cellular biology, developmental biology, ecology, genetics, microbiology, neurobiology, physiology, and plant sciences. The multidisciplinary nature of the program also allows students the opportunity to broaden their educational background at the graduate level. Individual programs are organized around each student's interests in consultation with the student's graduate advisor.

Qualified students are encouraged to apply for teaching assistantships and fellowships.

Program Admission Requirements. To be considered for degree-seeking status, applicants must submit along with the application, two letters of recommendation, a Statement of Future Plans, and scores from the Graduate Record Examination (GRE). In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have completed an undergraduate major in one of the biological sciences, with coursework comparable to that required for the Bachelor of Science degree in Biology at UTSA. Students whose undergraduate preparation is deficient in certain areas but who meet the minimum University standards for admission may be conditionally admitted and required to complete specific undergraduate or graduate courses as conditions of admission. In such cases, students should anticipate that additional time will be required to complete the degree. A grade point average of 3.0 or better (on a 4.0 scale) is required for admission, but exceptions may be made depending on the overall application. Students who are denied admission to the M.S. program must reapply if interested in acceptance as a special graduate student or a non-degree-seeking student. The nature of the program dictates that the number of students admitted each year may be limited; for this reason, early submission of application materials is strongly encouraged.

Degree Requirements. Degree candidates are required to complete a minimum of 36 semester credit hours approved by the student's Graduate Advisor of Record. These hours are subject to the following conditions:

- A minimum of 18 semester credit hours of graduate credit in organized classes must be earned within the department. This may include up to 6 semester credit hours of approved upper-division undergraduate coursework and a maximum of 3 semester credit hours in a graduate seminar (BIO 7051 Seminar in Life Sciences).
- An additional 18 semester credit hours of graduate credit as approved by the Graduate Advisor of Record. This may include a maximum of 6 semester credit hours, in total, of BIO 5973 Directed Research or BIO 6953 Independent Study. For students electing the nonthesis option, a minimum of 3 semester credit hours of BIO 7041 Biology Colloquium must be included. Students electing the thesis option must complete 6 semester credit hours of BIO 6983 Master's Thesis as part of this total.

Comprehensive Examination. As specified by University regulations, candidates must pass a comprehensive examination administered by their graduate committee. This examination is normally given in the semester prior to the semester during which degree requirements are to be completed. Certain rules must be adhered to concerning the composition of the Master's Thesis Committee and the Master's Comprehensive Examination Committee. Only tenured or tenure-track faculty members can chair these committees, and no more than one member of either committee can be a nontenured or nontenure-track faculty member, or be from another institution. Students electing the thesis option must successfully defend their thesis research before their graduate committee prior to the submission of the thesis to the Dean of the Graduate School for approval.

Master of Science Degree in Biotechnology

The Master of Science degree in Biotechnology offers opportunities for rigorous, advanced study and research in biotechnology, in order to prepare students for employment and research in the rapidly advancing and expanding field. A broad, common base of knowledge for biotechnology is provided in the Master's degree by a comprehensive core curriculum that includes key areas in biochemistry, cell and molecular biology, immunology, and bioinformatics. Additional coursework is selected from a list of required lectures and laboratory courses and from approved electives. The opportunity to develop additional technical expertise is also available through an internship in biotechnology-based companies within the city of San Antonio.

Program Admission Requirements. To be considered for degree-seeking status, applicants must submit along with the application, two letters of recommendation, a Statement of Future Plans for a career in Biotechnology, and scores from the Graduate Record Examination (GRE). In addition to satisfying the University-wide graduate requirements, applicants are expected to have completed an undergraduate major in the sciences with coursework comparable to the core required for the Bachelor of Science degree in Biology at UTSA. In particular, in-coming students are required to have taken and received at least a grade of "B" in upper-division undergraduate lecture and laboratory courses in microbiology and biochemistry, and to have taken undergraduate courses in molecular biology and statistics. In addition, undergraduate courses in immunology, with laboratory components, are recommended. Students whose undergraduate preparation is deficient in one of these areas of requirements but who meet the remaining standards for admission may be conditionally admitted and required to complete specific undergraduate course(s) in their first semester as conditions of admission. In such cases, students should anticipate that additional time will be required to complete the degree. A grade point average of 3.0 or better (on a 4.0 scale) is required for admission, but exceptions may be made depending on the overall application. Students who are denied admission to the M.S. program must reapply if interested in acceptance as a special graduate student or a non-degree-seeking student. The nature of the program dictates that the number of students admitted each year may be limited; for this reason, early submission of application materials is strongly encouraged.

Degree Requirements. Degree-seeking students are required to complete a minimum of 36 semester credit hours that must ultimately be approved by the student's Graduate Advisor and Comprehensive Examination Committee, as well as the Graduate Advisor of Record. Students are expected to meet with their assigned Graduate Advisor early in the first semester of study to prepare a course-degree-plan and organize a Committee as early as possible. Students must work closely with their Advisor and Committee to gain maximum benefit from this program.

Program of Study

A. Biotechnology lectures – core curriculum (14 semester credit hours):

BIO	5113	Principles of Biochemistry
BIO	5123	Principles of Molecular Biology
BIO	5133	Principles of Cell Biology
BIO	5623	Bioinformatics for Biotechnology
BIO	5762	Fundamentals of Immunology for Biotechnology

B. 3 semester credit hours in experimental data management are required from the following lectures:

BIO	5783	Introduction to Good Manufacturing Practices and Good Laboratory Practices
BIO	7413	Research Ethics and Responsible Conduct in Research

C. 3 semester credit hours of organized laboratory experience are required from the following:

BIO	5143	Advanced Molecular Biology Laboratory
BIO	7542-3	Bioprocessing and Protein Purification Laboratory
BIO	7571-3	Experimental Techniques in Biology

D. Biotechnology electives.

Students must complete 16 semester credit hours of biotechnology electives from the following list of specialized areas of study. Students are expected to select at least 9 credit hours from one specialized area of study. The remaining 7 credit hours should be chosen from the Electives. Depending on the student's specialized area of study, not all elective courses may be appropriate. Students should confer with their advisor in selecting appropriate electives. Electives not listed below that students wish to use toward their degree plan must be approved by the Graduate Advisor and Committee, in addition to the Graduate Advisor of Record, **before** enrollment in such a course.

Microbial Biotechnology:

BIO	5063	Environmental Microbiology
BIO	5373	Microbial Genetics and Recombinant DNA
BIO	5773	Applied Fungal Molecular Biology
BIO	6253	Biodegradation of Organics in Soil and Groundwater
BIO	6543	Vaccine Development
BIO	6553	Fermentation Science
BIO	6563	Food Science and Biotechnology
BIO	6873	Microbial Physiology and Energetics

Biodefense:

BIO	5543	Pharmacology and Toxicology
BIO	5733	Advanced Medical Mycology
BIO	5743	Biochemical Virology
BIO	6773	Host-Parasite Interactions

Drug Development and Discovery:

BIO	5403	Advanced Comparative Animal Physiology
BIO	5443	Neurochemistry
BIO	5453	Neuroendocrinology
BIO	5543	Pharmacology and Toxicology
BIO	5583	Molecular Neuropharmacology
BIO	6513	Drug Development

Molecular Biotechnology:

BIO	5523	Enzymes
BIO	5593	Proteomics
BIO	5653	Biology of Disease
BIO	5833	Membrane Structure and Function
BIO	6123	Plant Molecular Biology
BIO	6243	Gene Regulation
BIO	6523	Cell and Tissue Engineering

Electives:

BIO	5723	Topics in Biodefense
BIO	5783	Introduction to Good Manufacturing Practices and Good Laboratory Practices
BIO	6513	Drug Development
BIO	6533	Topics in Biotechnology
BIO	6543	Vaccine Development
BIO	6803	Advanced Immunology and Immunochemistry
BIO	7041	Biology Colloquium
BIO	7051	Seminar in Life Sciences

BIO	7571-3	Experimental Techniques in Biology
MOT	5163	Management of Technology
MOT	5173	Technology Transfer: The Theory and Practice of Knowledge Utilization

Biotechnology Internship. The internship will require prior arrangement with biotechnology-based companies within the city of San Antonio and approval of the Graduate Advisor of Record. Students should consult with their Graduate Advisor and Committee to determine where the 3 semester credit hours will be utilized toward the degree; these 3 credits can be used to satisfy the required 3 credit hours of laboratory experience in Part C of the Program of Study.

BIO	7563	Practicum in Biotechnology
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Comprehensive Examination. As specified by University regulations, degree candidates must pass a comprehensive examination administered by their Comprehensive Examination Committee. This examination is normally given in the semester prior to the semester during which degree requirements are to be completed. Only tenured or tenure-track faculty members, i.e., the Graduate Advisor, can chair the Committee, and no more than one member of the Committee may be non-tenure track faculty or from another institution.

Doctor of Philosophy Degree in Biology

The Department of Biology offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Biology. The Biology Ph.D. program has two concentrations: Neurobiology or Cell and Molecular Biology. The Ph.D. in Biology is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their specialized area of study.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. Applicants must have a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.3 in upper-division and graduate work for the Cell and Molecular concentration and a 3.0 for the Neurobiology concentration, preferably in biology. Applicants must submit along with the application, three letters of recommendation, a Statement of Future Plans, and scores from the Graduate Record Examination (GRE). Applicants whose native language is not English must score at least 600 on the Test of English as a Foreign Language (TOEFL). Admission requires appointment to a teaching assistantship, research assistantship, or research fellowship. The Doctoral Studies Committees for each concentration, comprised of members selected from the graduate faculty in each program, are responsible for reviewing applications for admission.

Degree Requirements. The degree requires a minimum of 91 semester credit hours beyond the baccalaureate degree for the concentration in Neurobiology, and a minimum of 84 semester credit hours beyond the baccalaureate degree for the concentration in Cell and Molecular Biology. The curriculum consists of core courses, elective courses, seminars, required teaching, research, and completion of the dissertation following advancement to candidacy. Any grade lower than “B” in a graduate course or in remedial coursework at the undergraduate level will not count toward the minimum number of required hours. Students matriculating with a Master’s degree may use up to 30 semester credit hours toward the degree provided the courses are comparable to core and elective courses and are approved by the appropriate Doctoral Studies Committee.

Program of Study for the Concentration in Neurobiology

A. Core curriculum (18 semester credit hours required):

BIO	5423	Neuroanatomy
BIO	5433	Neurophysiology
BIO	5443	Neurochemistry
BIO	7113	Supervised Teaching in Biology
BIO	7413	Research Ethics and Responsible Conduct in Research
BIO	7571-3	Experimental Techniques in Biology – Research Rotation (3 semester credit hours required)

B. Colloquia and seminars (16 semester credit hours minimum):

- BIO 7041 Biology Colloquium* (9 semester credit hours minimum)
 BIO 7051 Seminar in Life Sciences*

*Enrollment in both BIO 7041 and BIO 7051 is required each semester.

C. Doctoral research (44 semester credit hours minimum):

- BIO 7211-6 Doctoral Research (before admission to candidacy)
 BIO 7311-3,5,8 Doctoral Dissertation (for Ph.D. candidates)

D. Electives (13 semester credit hours minimum):

These can be selected from any 5000–7000 level courses offered in Biology or from any 5000–7000 level courses offered in other departments with the approval of the Neurobiology Doctoral Studies Committee.

The entire program of study must be approved by the student's dissertation advisor, dissertation committee, and the Neurobiology Doctoral Studies Committee, and must be submitted to the Dean of the Graduate School for final approval.

Program of Study for the Concentration in Cell and Molecular Biology

A. Core curriculum (21 semester credit hours required):

- BIO 5113 Principles of Biochemistry
 BIO 5123 Principles of Molecular Biology
 BIO 5133 Principles of Cell Biology
 BIO 7113 Supervised Teaching in Biology
 BIO 7143 Principles of Biological Scientific Writing
 BIO 7413 Research Ethics and Responsible Conduct in Research
 BIO 7571/7572 Experimental Techniques in Biology – Research Rotation (3 semester credit hours minimum)

B. Colloquia (9 semester credit hours minimum – a minimum of 1 credit hour each semester throughout tenure in the program):

- BIO 7041 Biology Colloquium (8 semester credit hours minimum)
 BIO 7101 Cell and Molecular Biology Introductory Colloquium (required the first semester of year 2)

C. Doctoral research (45 semester credit hours minimum):

- BIO 7212/7213 Doctoral Research (10 semester credit hours minimum)
 BIO 7315/7318 Doctoral Dissertation (35 semester credit hours minimum)

D. Electives (9 semester credit hours minimum):

These can be selected from any 5000–7000 level courses offered in Biology or from any 5000–7000 level courses offered in other departments with the approval of the Cell and Molecular Biology Doctoral Studies Committee.

The entire program of study must be approved by the student's dissertation advisor, dissertation committee, the Cell and Molecular Biology Doctoral Studies Committee, and must be submitted to the Dean of the Graduate School for final approval.

Advancement to Candidacy. Advancement to candidacy requires a student to complete University and program requirements and to pass written and oral qualifying examinations following completion of course requirements. The examination is administered by the Doctoral Studies Committee of each concentration and is conducted as outlined in the Handbook of Academic Policies and Procedures for each concentration. No more than two attempts to pass qualifying examinations are

allowed. Results of the written and oral examinations must be reported to the appropriate Doctoral Studies Committee and the Dean of the Graduate School. Admission into the Doctoral program does not guarantee advancement to candidacy.

Dissertation. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation. The research topic is determined by the student in consultation with their supervising professor and a dissertation committee. The dissertation committee is selected by the student and supervising professor and approved by the Dean of the College and the Dean of the Graduate School guides and critiques the candidate's research. The Committee is composed of four faculty and one outside member. The Dissertation Committee must approve the completed dissertation.

Final Oral Examination. Following an open presentation of the dissertation findings, the Dissertation Committee conducts a closed oral examination dealing primarily with the relation of the dissertation to the general field of specialty. Results of the oral examination must be reported to the Dean of the Graduate School. Awarding of the degree is based on the approval of the Dissertation Committee, approved by the Dean of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements.

COURSE DESCRIPTIONS

BIOLOGY

(BIO)

5013 Survey of Environmental Sciences

(3-0) 3 hours credit. Prerequisite: Graduate standing.

An integrative examination of living and nonliving environmental systems. A detailed study of interrelationships among plants, animals, and the environment, addressing the chemical, physical, and biological properties of living systems, and the principles that drive their evolution. (Same as EES 5013. Credit cannot be earned for both BIO 5013 and EES 5013.)

5063 Environmental Microbiology

(3-0) 3 hours credit. Prerequisite: BIO 3713 or consent of instructor.

To provide a basic understanding of environmental microbiology primarily from two aspects: microbial interactions with chemical pollutants in the environment and the fate of microbial pathogens in the environment. Topics covered include microbial environments, detection of bacteria and their activities in the environment, microbial biogeochemistry, bioremediation, and water quality. (Same as EES 5063. Credit cannot be earned for both BIO 5063 and EES 5063.)

5073 Environmental Microbiology Laboratory

(2-3) 3 hours credit. Prerequisite: BIO 3722 or consent of instructor.

To provide an understanding of environmental microbiology laboratory techniques using both traditional and molecular research skills. Basic techniques for isolation and characterization of environmental soil and water microflora including methods for enumeration and measurement of physiological activity. (Same as EES 5073. Credit cannot be earned for both BIO 5073 and EES 5073.)

5113 Principles of Biochemistry

(3-0) 3 hours credit. Prerequisites: BIO 2313 and BIO 3513, or their equivalents.

Biochemical properties of DNA, RNA, carbohydrates, lipids, and proteins; enzyme activity; catabolism; oxidative and photosynthetic metabolism; biosynthesis of macromolecular precursors; regulation and signaling mechanisms. (Credit cannot be earned for both BIO 5113 and BIO 7513 if taken prior to 2004.)

5123 Principles of Molecular Biology

(3-0) 3 hours credit. Prerequisite: BIO 3513 or an equivalent.

Molecular structure and function of genes and nucleic acids, and the processes of DNA replication, mutation and repair, as well as transcription and translation of genetic material. Genome projects, functional genomics and the genetic control of development will also be covered. (Replaces BIO 5353 and BIO 7643. Credit cannot be earned for both BIO 5123 and BIO 5353 or BIO 7643.)

- 5133 Principles of Cell Biology**
(3-0) 3 hours credit. Prerequisites: BIO 3513 and BIO 3813, or their equivalents.
Basic structure, organization and differentiation of cells. Cell cycle, signaling, growth and movement of cells, as well as cellular immunology and cellular aspects of infectious disease will also be covered.
- 5143 Advanced Molecular Biology Laboratory**
(0-6) 3 hours credit. Prerequisite: BIO 3913 or an equivalent.
An introduction to advanced techniques of molecular biology including analysis of genomic DNA, genomic cloning and DNA sequencing, analysis of gene expression, cDNA cloning, the polymerase chain reaction, and computational analysis of molecular data.
- 5243 Advanced Plant Ecology**
(3-0) 3 hours credit. Prerequisites: BIO 3283 and BIO 3292, or consent of instructor.
A study of the major biomes of the world, including North America and Texas, and the factors that influence the development of these biomes. Special consideration is given to species interactions that lead to high- and-low density species. (Same as EES 5243. Credit cannot be earned for both BIO 5243 and EES 5243.)
- 5263 Microbial Ecology**
(3-0) 3 hours credit. Prerequisite: BIO 3713 or consent of instructor.
Interrelationships between microorganisms and their environment, including natural habitats of microorganisms, normal human flora, and pathogens. Special consideration is given to application of genetically engineering microorganisms for environmental problems. (Same as EES 5263. Credit cannot be earned for both BIO 5263 and EES 5263.)
- 5333 Advanced Population Genetics**
(3-0) 3 hours credit. Prerequisites: BIO 2313 and BIO 2322, or their equivalents. Biostatistics highly recommended.
An experimental approach to the interaction of genotype and environment in populations, with emphasis on mutagenesis, selection, polymorphism, and adaptive mechanisms.
- 5373 Microbial Genetics and Recombinant DNA**
(3-0) 3 hours credit. Prerequisites: BIO 2313, BIO 3513, and BIO 3713, or consent of instructor.
This course covers recombinant DNA and various technologies that it has spawned. It also covers those aspects of microbial genetics that directly relate to recombinant DNA. (Formerly BIO 5363. Credit cannot be earned for both BIO 5363 and BIO 5373.)
- 5403 Advanced Comparative Animal Physiology**
(3-0) 3 hours credit. Prerequisite: BIO 4353 or an equivalent.
Physiology of the organs and organ systems of animals.
- 5423 Neuroanatomy**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
The anatomy of the vertebrate nervous system.
- 5433 Neurophysiology**
(3-0) 3 hours credit. Prerequisite: BIO 3433 or an equivalent.
The fundamentals of neurophysiology are presented from the cellular to the systems level.
- 5443 Neurochemistry**
(3-0) 3 hours credit. Prerequisites: BIO 3433, BIO 3513, and BIO 3522.
An examination of basic biochemical phenomena involved in normal neural processes and some pathological changes associated with neurobiological diseases and disorders.
- 5453 Neuroendocrinology**
(3-0) 3 hours credit. Prerequisites: BIO 3433 and BIO 3813.
Anatomical and molecular neurobiology of the endocrine hypothalamus and associated organs. Morphological, cell biological, and feedback mechanisms of endocrine regulation are emphasized.

5463 Reproductive Biology

(3-0) 3 hours credit. Prerequisite: Graduate standing in Biology.

Mammalian reproduction including mechanisms involved in sexual differentiation, fertilization, and fetal development. Endocrine regulation and environmental influences with a focus on human reproduction.

5473 Developmental Neurobiology

(3-0) 3 hours credit. Prerequisite: BIO 3433 or consent of instructor.

A study of the development of the nervous system, with an emphasis on neurogenesis, neuronal migration, growth factors axonal guidance, and the role of neuronal activity in synapse stabilization.

5483 Computational Neuroscience

(3-0) 3 hours credit. Prerequisite: BIO 3433 or an equivalent.

A non-mathematical approach to the computational functions of the brain, including sensory coding, neural control of movement, and the computational properties of neurons and neuronal networks.

5493 Cognitive Neuroscience

(3-0) 3 hours credit. Prerequisites: BIO 4813 (or PSY 3103 and PSY 4183) and BIO 3433, or consent of instructor.

A study of the biological foundations of mental phenomena, including perception, attention, learning, memory, language, motor control, and executive function, as well as functional specialization, development and plasticity, through various methodologies.

5503 Sensory Physiology

(3-0) 3 hours credit. Prerequisite: BIO 3433 or consent of instructor.

Principles of sensory physiology, including sensory transduction and central processing of sensory information in vertebrate and invertebrate species.

5523 Enzymes

(3-0) 3 hours credit. Prerequisite: BIO 3513 or an equivalent.

A study of enzyme structure and mechanism, inhibitors, cofactor, kinetics, and regulation.

5533 Human Electrophysiology

(3-0) 3 hours credit. Prerequisites: BIO 4813 (or PSY 3103 and PSY 4183) and BIO 3433, or consent of instructor.

A detailed study of the electrophysiology basis of human behavior, with an emphasis on event-related brain potentials associated with cognitive function, perception and action.

5543 Pharmacology and Toxicology

(3-0) 3 hours credit. Prerequisite: Graduate standing in Biology.

Mechanisms of action of major classes of therapeutic drugs. Clinical uses, drug comparisons, beneficial and adverse effects involved in clinical therapeutics.

5583 Molecular Neuropharmacology

(3-0) 3 hours credit. Prerequisite: Graduate standing in Biology.

A study of drugs that affect nervous tissue, specifically those affecting the brain and autonomic nervous system.

5593 Proteomics

(3-0) 3 hours credit. Prerequisite: BIO 3513 or an equivalent.

Protein sequences, domains, folding, proteomics, glycoproteins, protein-DNA interactions, RNA conformations. (Formerly BIO 5563. Credit cannot be earned for both BIO 5593 and BIO 5563.)

5623 Bioinformatics for Biotechnology

(3-0) 3 hours credit. Prerequisite: BIO 2313 or STA 1993, or an equivalent.

Nucleic acid and protein sequence analysis, phylogenetic analysis, protein structure analysis, microarray technology – experimental design and analysis, proteomics and internet resources and tools related to all these topics. (Credit cannot be earned for both BIO 5623 and BIO 5643.)

- 5633 Cytodifferentiation**
(3-0) 3 hours credit. Prerequisite: Graduate standing in Biology.
Detailed study of selected areas of developmental biology relating to cellular differentiation, including nuclear-cytoplasmic interactions, induction, and reversibility of differentiation.
- 5643 Bioinformatics and Computational Biology**
(3-0) 3 hours credit. Prerequisite: BIO 2313 or STA 1993, or an equivalent; enrollment in Biology Ph.D. program, or permission of the Biology Department or instructor.
Computational analysis of sequences, protein structures, and gene expression network on a large scale. Comparative genomics, functional genomics, and proteomics will also be covered.
- 5653 Biology of Disease**
(3-0) 3 hours credit. Prerequisites: BIO 3513 and BIO 3813, or BIO 5133.
A study of molecular and cellular events associated with disease processes. Diseases to be discussed include Alzheimer's, LDL-atherosclerosis, cancer, Duchenne muscular dystrophy, and diseases associated with defects in lysosome and mitochondrial function.
- 5723 Topics in Biodefense**
(3-0) 3 hours credit. Prerequisites: BIO 2313, BIO 3513, and BIO 3713, and instructor's consent.
This course encompasses the biology of agents important in biodefense and emerging infectious diseases. The course uses the Centers for Disease Control and Prevention Select Agent Categories as the curriculum template, with special emphasis on Category A agents.
- 5733 Advanced Medical Mycology**
(3-0) 3 hours credit. Prerequisites: BIO 3522 and BIO 3722.
This course is a comprehensive study of the etiological agents and host factors that lead to fungal disease in humans.
- 5743 Biochemical Virology**
(3-0) 3 hours credit. Prerequisite: Graduate standing in Biology.
A detailed study of the diversity of viruses and biochemical mechanisms for their replication.
- 5762 Fundamentals of Immunology for Biotechnology**
(2-0) 2 hours credit.
An integrated examination of the principles of immunology pertained to the Biotechnology Industry. An emphasis on current immunological techniques, including: recombinant antibody, flow cytometry and elispot technology. Issues related to vaccine production and therapeutics will also be considered.
- 5773 Applied Fungal Molecular Biology**
(3-0) 3 hours credit. Prerequisites: BIO 3522 and BIO 3722.
Examines basic principles of fungal physiology and genetics and explores how these are exploited in both biomedical research and industrial settings. Particular emphases include the production of modified proteins and the identification of novel protein interactions.
- 5783 Introduction to Good Manufacturing Practices and Good Laboratory Practices**
(3-0) 3 hours credit.
Review of FDA and U.S. Pharmacopia regulations. Practical considerations for the implementation of GMP/GLP systems; data management and reporting, as well as problem solving and interpretive skills, will be emphasized.
- 5833 Membrane Structure and Function**
(3-0) 3 hours credit. Prerequisite: BIO 3513 or an equivalent.
A study of the composition, organization, transport functions, and permeability of natural and model membranes.

5971-3 Directed Research

1 to 3 hours credit. Prerequisites: Admission to either the Biology or Biotechnology Master's program or admission as a special graduate or non-degree-seeking student, and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, in combination with BIO 6953 (Independent Study), will apply to the Master's degree.

6113 Advanced Plant Physiology

(3-0) 3 hours credit. Prerequisite: BIO 4603 or consent of instructor.

Principles of plant physiology, biochemistry, and an in-depth study of topics selected from the following: plant hormones, nitrogen fixation, plant respiration, photosynthesis, together with current research work. (Same as EES 6113. Credit cannot be earned for both BIO 6113 and EES 6113.)

6123 Plant Molecular Biology

(3-0) 3 hours credit. Prerequisite: BIO 5123 or an equivalent.

An overview of plant molecular biology, emphasizing the theoretical and practical aspects of protoplast isolation, introduction of foreign DNA into plant tissues and cells, and the regeneration of transformants. Specific uses of plant genetic engineering to improve agronomic yield and the nutritional quality of crop plants, and to produce novel natural products such as pharmaceutical compounds, will also be covered.

6133 Methods in Field Biology

(3-0) 3 hours credit. Prerequisite: BIO 3283 or an equivalent.

Examination of techniques to collect, identify, and preserve plants and animals. Field methods used in the analysis of populations and communities are considered. (Same as EES 6133. Credit cannot be earned for both BIO 6133 and EES 6133.)

6213 Advanced Ecology

(3-0) 3 hours credit. Prerequisite: BIO 3283 or an equivalent.

Interaction of organisms with their environment, allelopathy, competition, distribution, succession, and factors that control growth and dispersal. Special consideration is given to the concepts of climax, succession, and land management. (Same as EES 6213. Credit cannot be earned for both BIO 6213 and EES 6213.)

6243 Gene Regulation

(3-0) 3 hours credit. Prerequisite: BIO 5123 or consent of instructor.

A study of the mechanisms that regulate gene expression with an emphasis on those regulating transcription in mammals and certain model systems including bacteria, bacteriophage, and yeast.

6253 Biodegradation of Organics in Soil and Groundwater

(3-0) 3 hours credit. Prerequisite: BIO 3713 or consent of instructor.

Description of modern pollution problems and potential remediation techniques focusing on the chemistry, biochemistry, and molecular biology of biodegradation of hazardous and toxic compounds. (Same as EES 6253. Credit cannot be earned for both BIO 6253 and EES 6253.)

6313 Molecular Biology and Biophysics of Ion Channels

(3-0) 3 hours credit. Prerequisites: BIO 5433 and BIO 5443, or consent of instructor.

A study of the molecular composition and biophysical properties of ion channels. The course emphasizes three families of ion channels: voltage-gated, ligand-gated and metabotropically-stimulated channels. Their structure and function will be related to how ion channels mediate cellular actions in excitable cells.

6373 Invertebrate Physiology

(3-0) 3 hours credit. Prerequisite: BIO 3413.

An investigation of the mechanisms of respiration, movement, ion and water regulation, and hormonal integration in the invertebrates.

- 6483 Animal Behavior**
(3-0) 3 hours credit. Prerequisite: BIO 3413 or consent of instructor.
An examination of neural, endocrine, genetic, and environmental determinants of behavior.
- 6513 Drug Development**
(3-0) 3 hours credit. Prerequisites: BIO 5113, BIO 5123 and BIO 5133.
This course will provide students with an overview of the early drug discovery process, including target identification, validation, assay development and high throughput screening up to pre-clinical trials.
- 6523 Cell and Tissue Engineering**
(3-0) 3 hours credit. Prerequisites: BIO 5113, BIO 5123 and BIO 5133.
An interdisciplinary course complementing the natural sciences with material sciences to solve critical medical problems involving tissue defects and organ failures. The approaches range from the management of a single cell to exploitation of complex mixtures of cells to repair and produce complete, living tissue to heal currently still incurable chronic, degenerative diseases or to prevent acute organ failure.
- 6533 Topics in Biotechnology**
(3-0) 3 hours credit. Prerequisites: BIO 5113, BIO 5123 and BIO 5133.
An organized course offering the opportunity for specialized study in an area of biotechnology not normally available as a regular course. Topics in Biotechnology may be repeated for credit when topics vary, but not more than 6 hours may be applied to the Master's degree.
- 6543 Vaccine Development**
(3-0) 3 hours credit. Prerequisites: BIO 5762 and consent of instructor.
This course will provide students with an overview of issues about the roles of vaccines in the control of infectious diseases, vaccine development, clinical trials and implementation of vaccine programs.
- 6553 Fermentation Science**
(3-0) 3 hours credit. Prerequisites: BIO 3713 and BIO 3722, or their equivalents.
The principles and theory underlying industrial fermentations, such as vessel design and construction, media design, up-scaling fermentations, process control, and product isolation.
- 6563 Food Science and Biotechnology**
(3-0) 3 hours credit. Prerequisites: BIO 3713 and BIO 3722, or their equivalents.
An overview of food science covering nutrition, dietary recommendations, food chemistry, food preservation and safety, and an in-depth look at the uses of biotechnology in the food industry.
- 6663 Experimental Parasitology**
(3-0) 3 hours credit. Prerequisite: A course in parasitology or consent of instructor.
A study of animal parasites, with special emphasis on the physiology of host-parasite interactions.
- 6773 Host-Parasite Interactions**
(3-0) 3 hours credit. Prerequisites: BIO 3713 and BIO 4743, or consent of instructor.
A study of molecular interactions between animals and microorganisms, with emphasis on the nature of infectious disease processes and on the adaptations that allow microbial pathogens to avoid host defenses.
- 6803 Advanced Immunology and Immunochemistry**
(3-0) 3 hours credit. Prerequisite: BIO 4743 or consent of instructor.
The study of current concepts of humoral and cell-mediated immunity, with emphasis on molecular mechanisms.
- 6873 Microbial Physiology and Energetics**
(3-0) 3 hours credit. Prerequisite: BIO 3713 or consent of instructor.
Consideration of physiological activities of microorganisms, with special emphasis on metabolic capabilities of bacteria and other microorganisms.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, in combination with BIO 5973, Directed Research, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7041 Biology Colloquium

(1-0) 1 hour credit. Prerequisite: Graduate standing.

Discussions of current journal articles, reviews, and recent advances in specialized areas of the biological sciences. May be repeated for credit as topics vary. The grade report for this course is either "CR" (satisfactory participation in the colloquium) or "NC" (unsatisfactory participation in the colloquium). (Formerly BIO 5041. Same as EES 6941. Unless topic varies, credit cannot be earned for both BIO 7041 and EES 6941.)

7051 Seminar in Life Sciences

(1-0) 1 hour credit. Prerequisite: Graduate standing.

Formal presentations of research by outside authorities in the biological sciences. May be repeated for credit. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar).

7101 Cell and Molecular Biology Introductory Colloquium

(1-0) 1 hour credit. Prerequisite: Graduate standing.

Required course for first-year Cell and Molecular Ph.D. students. Discussions of current journal articles, reviews, and recent advances in specialized areas of the biological sciences. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). Cannot be repeated for credit.

7113 Supervised Teaching in Biology

3 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.

Required course for Biology doctoral students. Participation in instructing an established lecture or laboratory course, including delivering lectures and assisting with preparation and grading of exams. May be repeated for credit.

7143 Principles of Biological Scientific Writing

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course will provide an overview of scientific grant and manuscript preparation. The class will be directed toward producing a Ph.D. dissertation proposal and a predoctoral fellowship application.

7211-6 Doctoral Research

1 to 6 hours credit. Prerequisite: Admission to either the Neurobiology or Cell and Molecular Biology Doctoral program.

May be repeated for credit.

7311-3,5,8 Doctoral Dissertation

1, 2, 3, 5, or 8 hours credit. Prerequisites: Admission to candidacy for the Doctoral degree.

May be repeated for credit.

7413 Research Ethics and Responsible Conduct in Research

(3-0) 3 hours credit.

A case-study approach to formal training in the responsible conduct of research. Includes areas of conflict of interest, responsible authorship, policies for handling misconduct, policies regarding the use of human and animal subjects, and data management.

7513 Advanced Biochemistry

(3-0) 3 hours credit. Prerequisites: BIO 5113 and BIO 5123.

Topics in biochemical structure, regulation, signaling, and analysis.

7542,3 Bioprocessing and Protein Purification Laboratory

(0-4, 0-6) 2 or 3 hours credit. Prerequisite: Enrollment in Master's in Biotechnology program.

Small- to large-scale growth of microorganisms and eukaryotic cells followed by downstream processing of culture supernatants and/or cell pellets, and protein purification.

7563 Practicum in Biotechnology

3 hours credit. Prerequisites: Enrollment in Master's in Biotechnology program and at least 9 hours credit.

An internship in a Biotechnology company in San Antonio. Must have approval of Biotechnology Graduate Studies Committee.

7571-3 Experimental Techniques in Biology

(0-2, 0-4, 0-6) 1 to 3 hours credit. Prerequisite: Consent of instructor.

Topics include research methods in cell and molecular biology, molecular neurobiology, and microbiology. May be repeated for credit as topics vary. (Formerly BIO 5571-3.)

DEPARTMENT OF CHEMISTRY

The Master of Science (M.S.) in Chemistry and the Doctor of Philosophy (Ph.D.) in Chemistry programs offer opportunities for advanced study and research designed to prepare students for roles in industry, government, research institutes, or educational institutions. For the M.S. program, the thesis option is recommended for students who are planning a career in research or who contemplate pursuing a doctorate in their program of study. A nonthesis option is available for students with other goals. The Ph.D. program is broad-based and will prepare students for a variety of options in chemistry and related fields upon graduation.

Chemistry includes graduate programs of study in analytical and environmental chemistry, bioorganic chemistry, biophysical chemistry, bioinorganic chemistry, inorganic chemistry, organic chemistry, and physical chemistry.

A limited number of teaching and/or research assistantships and fellowships are available to qualified students. Financial assistance is awarded on a competitive basis.

Master of Science Degree in Chemistry

The purpose of the Master of Science (M.S.) degree program in Chemistry is to offer students the opportunity to acquire a sound preparation of the fundamentals in several areas of chemistry, to introduce students to recent advances in chemical theory and methods, and to encourage research in a specific area of study.

Graduate study in chemistry is offered leading to the M.S. degree with the following interest areas: analytical and environmental chemistry, bioorganic chemistry, bioinorganic chemistry, biophysical chemistry, inorganic chemistry, organic chemistry, and physical chemistry.

Faculty expertise in each of the interest areas offers the opportunity for direct student-faculty interaction for thesis development through coursework and research. Additional cooperative projects and programs are available with other area research institutions.

Qualified students are encouraged to apply for teaching and/or research assistantships and fellowships. Requests should be sent to the Graduate Advisor of Record for chemistry when application is made for admission to UTSA.

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, applicants must have a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in upper-division work, preferably in chemistry. All undergraduate chemistry courses must be completed with a minimum grade point average of 3.0.

Applicants must submit scores from the Graduate Record Examination (GRE). When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. A minimum of two letters of recommendation from persons familiar with the applicant's undergraduate scholastic record must be sent to the Department of Chemistry at the same time application is made for admission to UTSA. Background or remedial courses in chemistry may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 500 and 600 (paper version) or 173 and 250 (computerized version). See Chapter 2, Admission, of this catalog for details.

Thesis Option in Chemistry

Degree Requirements. The Master of Science in Chemistry program requires the successful completion of a minimum of 33 semester credit hours. Candidates must complete the following:

A. Required courses (27 semester credit hours):

CHE	5263	Advanced Analytical Chemistry	3 hours
CHE	5313	Advanced Biochemistry	3 hours
CHE	5453	Advanced Inorganic Chemistry	3 hours
CHE	5643	Advanced Organic Chemistry	3 hours
CHE	5843	Advanced Physical Chemistry	3 hours
CHE	5981	Graduate Seminar in Chemistry	3 hours
CHE	6951-3	Independent Study	3 hours
CHE	6983	Master's Thesis, including an oral defense of the written thesis	6 hours

Registration for CHE 5981 Graduate Seminar in Chemistry is required for each semester of residence, although no more than 3 semester credit hours may be applied to the Master's degree.

- B. A minimum of 6 semester credit hours of electives in chemistry, as approved by the Graduate Advisor of Record, is required.
- C. Students must pass a final oral comprehensive examination, scheduled during the student's last semester of work, for completion of the degree program.
- D. Students must successfully defend their thesis research results before their Graduate Committee prior to the submission of the thesis to the Dean of the Graduate School for approval.

Nonthesis Option in Chemistry

Degree Requirements. This program requires the successful completion of a minimum of 33 semester credit hours. Candidates for the degree must complete the following:

A. Required courses (27 semester credit hours):

CHE	5263	Advanced Analytical Chemistry	3 hours
CHE	5313	Advanced Biochemistry	3 hours
CHE	5453	Advanced Inorganic Chemistry	3 hours
CHE	5643	Advanced Organic Chemistry	3 hours
CHE	5843	Advanced Physical Chemistry	3 hours
CHE	5981	Graduate Seminar in Chemistry	3 hours
CHE	6951-3	Independent Study	3 hours
CHE	6991-3	Directed Research	6 hours

Registration for CHE 5981 Graduate Seminar in Chemistry is required for each semester of residence, although no more than 3 semester credit hours may be applied to the Master's degree. The laboratory work in chemistry should be taken as Independent Study and Directed Research.

- B. 6 semester credit hours of elective organized support coursework within the College of Sciences or College of Engineering, as approved by the Graduate Advisor of Record.
- C. Students must pass a final examination, scheduled during the student's last semester of work, for completion of the degree program.

Doctor of Philosophy Degree in Chemistry

The Department of Chemistry offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Chemistry. The Ph.D. in Chemistry is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, applicants must have a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in upper-division and graduate work, preferably in chemistry. Applicants must submit scores from the Graduate Record Examination (GRE) with their application. When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. A minimum of three letters of recommendation from persons familiar with the applicant's undergraduate (and graduate, where applicable) scholastic record must be sent to the Department of Chemistry at the same time application is made for admission to UTSA. Background or remedial courses in chemistry may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 500 and 600 (paper version) or 173 and 250 (computerized version). See Chapter 2, Admission, of this catalog for details.

Degree Requirements. The Doctoral degree requires a minimum of 86 semester credit hours beyond the baccalaureate degree. The curriculum consists of 21 semester credit hours of formal coursework, required teaching, research, and completion of the dissertation following advancement to candidacy. Enrollment in the Chemistry Research Colloquium and Chemistry Graduate Seminar is required each semester of enrollment and may be taken for a maximum combined total of 12 semester credit hours. A minimum of 53 semester credit hours in doctoral research, including 12 semester credit hours of doctoral dissertation, must be completed. The student must have a grade point average of 3.0 or greater (on a 4.0 scale) in the core courses and elective courses combined. Each student must be a teaching assistant for a minimum of one academic year. Submission of a satisfactory research proposal in an area outside the dissertation research is required. Students matriculating with a Master's degree may use up to 30 semester credit hours toward the degree, provided the courses are comparable to core and elective courses.

Program of Study

A. Core curriculum (12 semester credit hours required):

CHE	5263	Advanced Analytical Chemistry
CHE	5313	Advanced Biochemistry
CHE	5453	Advanced Inorganic Chemistry
		or
CHE	5643	Advanced Organic Chemistry
CHE	5843	Advanced Physical Chemistry

B. Colloquia and seminars (maximum 12 semester credit hours required):

CHE	5981	Graduate Seminar in Chemistry
CHE	7911	Chemistry Research Colloquium

C. Doctoral research (minimum 53 semester credit hours required):

CHE	6991-3	Directed Research (minimum 18 hours)
CHE	7921-3	Doctoral Research (minimum 23 hours)
CHE	7931-3	Doctoral Dissertation (minimum 12 hours)

D. Electives (minimum 9 semester credit hours required; chosen with consent of advisor):

CHE	5833	Computational Chemistry
CHE	6603	Introduction to Polymer Chemistry
CHE	6863	NMR Spectroscopy
CHE	6883	Mass Spectrometry
CHE	7263	Recent Advances in Bioanalytical Chemistry
CHE	7403	Bioinorganic Chemistry
CHE	7433	Organometallic Chemistry
CHE	7603	Bioorganic Chemistry
CHE	7623	Methods of Organic Synthesis
CHE	7673	Advanced Topics in Medicinal Chemistry
CHE	7683	Topics in the Chemistry of Natural Products
CHE	7813	Molecular Thermodynamics
CHE	7823	Chemical Kinetics and Dynamics
CHE	7833	Quantum Chemistry
CHE	7853	Biophysical Chemistry
CHE	7903	Progress in Chemistry - Doctoral
CHE	7973	Special Problems

The entire program of study must be approved by the student's Dissertation Advisor, Dissertation Committee, and Graduate Program Committee and must be submitted to the Dean of the Graduate School for final approval.

Advancement to Candidacy. All students seeking a doctoral degree at UTSA must be admitted to candidacy. One of the requirements for admission to candidacy is passing the Doctoral Qualifying Examination. Students should consult the University's Doctoral Degree Regulations (Chapter 6 of this catalog) for the other requirements.

Qualifying Examination. The qualifying examination is divided into written and oral portions. The written portion will be organized by the Graduate Program Committee. Students should contact the Graduate Advisor for details. The oral portion must be taken within one year after passing the written portion of the qualifying examination and will be evaluated by the student's Dissertation Committee.

Final Oral Examination. The final oral defense consists of a public presentation of the dissertation and a closed oral defense. It is administered and evaluated by the student's Dissertation Committee and covers the dissertation and the general field of the dissertation. The Dissertation Committee must approve the dissertation.

COURSE DESCRIPTIONS

CHEMISTRY

(CHE)

5263 Advanced Analytical Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 3213 or an equivalent.

The physical and chemical principles of modern analytical chemistry with emphasis on error analysis, signals and noise, electrochemical techniques, analytical separations, and selected spectroscopic methods based on absorption and emission. (Formerly CHE 5163. Credit cannot be earned for both CHE 5263 and CHE 5163.)

5313 Advanced Biochemistry

(3-0) 3 hours credit. Prerequisite: Undergraduate biochemistry.

Advanced topics in modern biochemistry, including cell signaling, apoptosis, trafficking and processing of proteins, DNA array technology, and various aspects of bioinformatics. Ligand interactions and the thermodynamics and mechanisms underlying how these important macromolecules interact with each other. Spectroscopic determination of nucleic acid and protein structures, and reactions using techniques such as nuclear magnetic resonance spectroscopy, mass spectrometry and x-ray diffraction.

5453 Advanced Inorganic Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 4463 or equivalent.

Modern theories of chemical bonding, structure of inorganic compounds, reaction mechanisms, cluster compounds, organometallic chemistry, and bioinorganic chemistry. (Formerly CHE 5133. Credit cannot be earned for both CHE 5453 and CHE 5133.)

5643 Advanced Organic Chemistry

(3-0) 3 hours credit. Prerequisites: 8 semester credit hours each of undergraduate organic chemistry and physical chemistry or graduate standing in chemistry.

An advanced study of topics in organic chemistry such as stereochemistry, conformational analysis, nonbenzenoid, aromaticity, molecular orbital theory, and organic reaction mechanisms. Applications of these concepts to the structure and reactivity of biomolecules such as peptides and proteins, nucleic acids, and carbohydrates. (Formerly CHE 5113. Credit cannot be earned for both CHE 5643 and CHE 5113.)

5833 Computational Chemistry

(3-0) 3 hours credit. Prerequisites: CHE 3804 and CHE 4812, or equivalents.

The application of molecular mechanical, molecular orbital, and density functional methods to problems of molecular structure, property, reactivity, and spectroscopy. (Formerly CHE 7843. Credit cannot be earned for both CHE 5833 and CHE 7843.)

5843 Advanced Physical Chemistry

(3-0) 3 hours credit. Prerequisites: CHE 3804 and CHE 4812, or equivalents.

An advanced study of group theory, and its application to molecular orbital theory, electronic/vibrational/rotational spectroscopy, and chemical reactivity.

5912 Introduction to Chemical Research

(0-6) 2 hours credit. Prerequisite: Graduate standing in Chemistry.

Participation in various research laboratories (3-lab rotation) throughout the semester to become familiar with the ways research is formulated and carried out. One month will be spent in each of three different laboratories attending all group meetings and research colloquia associated with the research group. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance) and will be based on attendance.

5923 Teaching and Research Practice and Ethics

3 hours credit. Prerequisites: Graduate standing in Chemistry and concurrent designation as a teaching assistant in the Chemistry program or consent of instructor.

The course is designed to improve the instructional effectiveness of graduate students teaching at the college level. The course will cover, but is not limited to, board-work, clear speech, teacher-student interaction, professional responsibilities, course content and pace, grading policy, quiz writing, sensitivity training to student needs, information on technical support, and guest lecturers on special topics. Research ethics will be discussed based on case studies. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).

5981 Graduate Seminar in Chemistry

(0-3) 1 hour credit. Prerequisite: Graduate standing in Chemistry or consent of the Graduate Advisor of Record.

Current research and literature seminars presented by faculty, visiting lecturers, and doctoral candidates. Students in the Doctoral chemistry program must register every semester while in residence, but only 8 hours will apply toward the Doctoral degree.

6603 Introduction to Polymer Chemistry

(3-0) 3 hours credit. Prerequisite: Consent of graduate student advisor.

Fundamental concepts of polymer chemistry, including mechanisms for synthesis, kinetics, and copolymerization; molecular weight, stereoisomerism, morphology, solubility, and thermal transitions; visco- and rubber elasticity; and the molecular basis for physical properties.

6863 NMR Spectroscopy

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

A lecture course with demonstrations dealing with the basic theory and applications of one- and two-dimensional nuclear magnetic resonance spectroscopy, including the interpretation of spectra. The parameters and the pulse sequences for various types of NMR experiments and explanations of how molecular structural information can be obtained will be presented.

6883 Mass Spectrometry

(2-3) 3 hours credit. Prerequisite: Consent of instructor.

The basic principles of interpreting mass spectra and how they are produced. The effect the method of ion production has on the observed mass spectra, and the theory and operation of various types of mass spectrometers will be covered. The basic theory of ion-molecule reactions and other advanced topics will be presented.

6903 Progress in Chemistry - Master's

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for a specialized study of current aspects of chemistry not normally available as part of the regular course offerings. The course may be repeated for credit, but not more than 6 hours may be applied to the Master's degree.

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

6991-3 Directed Research

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

The directed research course may involve either a laboratory or a theoretical problem. Normally a written report is required. May be repeated for credit, but not more than 6 hours or 18 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively. (Formerly CHE 5973.)

7263 Recent Advances in Bioanalytical Chemistry

(3-0) 3 hours credit. Prerequisites: Consent of instructor and Graduate Advisor of Record.

A survey of modern analytical techniques used in studies of biological interest from both theoretical and practical perspectives.

7403 Bioinorganic Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 4303 or CHE 4463, or equivalent.

Study of the functions, reaction sites, mechanisms, molecular architecture, and medicinal aspects of metal ions in biological systems including bioorganometallic compounds. A discussion of the experimental techniques will be included.

7433 Organometallic Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 4463 or equivalent.

Preparation, bonding and reactivity of organometallic compounds, both main group and transition metals.

7603 Bioorganic Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 2623 or consent of instructor.

Chemical transformations of biologically important organic compounds; examination of enzyme active sites. Discussion of theories of catalysis, stereochemistry, electron-transfer, and molecular structure in the context of biological systems. (Formerly CHE 5503. Credit cannot be earned for both CHE 7603 and CHE 5503.)

7623 Methods of Organic Synthesis

(3-0) 3 hours credit. Prerequisite: CHE 2623 or consent of instructor.

A study of modern methods of organic functional group transformation, simple carbon skeleton construction, asymmetric synthesis, introduction to the synthon concept and to retrosynthetic analytical methodology for designing rational synthetic approaches to complex organic molecules of biological interest. (Formerly CHE 6123. Credit cannot be earned for both CHE 7623 and CHE 6123.)

7673 Advanced Topics in Medicinal Chemistry

(3-0) 3 hours credit. Prerequisites: Consent of instructor and Graduate Advisor of Record.

Approaches to drug design and development; a rational target-oriented approach and a combinatorial approach. Mechanisms of drug action on enzymes, receptors, and nucleic acids. Strategies for the preparation of series of analogs for the structure-activity investigations.

7683 Topics in the Chemistry of Natural Products

(3-0) 3 hours credit. Prerequisites: CHE 5643 and CHE 7623.

Selected topics in the chemistry and biochemistry of natural products and related compounds of biological and medicinal interest. Course may be repeated for credit when topics vary, but not more than 6 hours may apply to the Doctoral degree. (Formerly CHE 6183. Credit cannot be earned for both CHE 7683 and CHE 6183.)

7813 Molecular Thermodynamics

(3-0) 3 hours credit. Prerequisite: CHE 5843.

A molecular approach to the study of the physiochemical properties of gases, liquids, and solids. (Formerly CHE 5213. Credit cannot be earned for both CHE 7813 and CHE 5213.)

7823 Chemical Kinetics and Dynamics

(3-0) 3 hours credit. Prerequisite: CHE 5843.

An advanced study of topics in chemical kinetics and dynamics. (Formerly CHE 5223. Credit cannot be earned for both CHE 7823 and CHE 5223.)

7833 Quantum Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 5843.

The application of quantum mechanical methods to many-body chemical systems. (Formerly CHE 5243. Credit cannot be earned for both CHE 7833 and CHE 5243.)

7853 Biophysical Chemistry

(3-0) 3 hours credit. Prerequisite: CHE 5843.

The study of the structure/function relations of proteins, nucleic acids, membranes, and other macromolecular biomolecules using spectroscopic methods. (Formerly CHE 5513. Credit cannot be earned for both CHE 7853 and CHE 5513.)

7903 Progress in Chemistry - Doctoral

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for a specialized study of current aspects of chemistry not normally available as part of the regular course offerings. The course may be repeated for credit, but not more than 6 hours may be applied to the Doctoral degree.

7911 Chemistry Research Colloquium

1 hour credit. Prerequisite: Graduate standing in Chemistry.

Discussions of current journal articles, reviews, and recent advances in specialized areas of chemistry (including current research progress of students). May be repeated for credit as topics vary. The grade report for this course is either "CR" (satisfactory participation in the colloquium) or "NC" (unsatisfactory participation in the colloquium).

7921-3 Doctoral Research

1 to 3 hours credit. Prerequisite: Graduate standing in Chemistry.

Doctoral research and preparation. May be repeated for credit, but not more than 18 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-3 or CHE 7931-3, depending on progress, is required each term in which the dissertation is in progress.

7931-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and dissertation director.

Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-3 or CHE 7931-3, depending on progress, is required each term in which the dissertation is in progress.

7973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to the Doctoral degree.

DEPARTMENT OF COMPUTER SCIENCE

Master of Science Degree in Computer Science

The Master of Science (M.S.) degree in Computer Science offers integrated studies involving software and hardware. A thesis option is available for students who wish to obtain research experience. The Department of Computer Science also offers a Concentration in Computer and Information Security and a Concentration in Software Engineering as part of the Master of Science degree.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 5, Master's Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, a Bachelor of Arts or Bachelor of Science degree in Computer Science equivalent to that offered by UTSA is required. Students who do not qualify for unconditional admission may be admitted on a conditional basis. Students who are admitted on a conditional basis may be required to complete specific undergraduate courses as conditions of admission. If such courses are listed as deficiencies, they will not count toward the graduate degree. In such cases, students should anticipate that additional time will be required to complete the degree.

Degree Requirements. Candidates for the degree are required to successfully complete a minimum of 36 semester credit hours of graduate coursework as described in the program of study.

Program of Study

A. Core courses (12 semester credit hours):

CS	5363	Programming Languages and Compilers
CS	5513	Computer Architecture
CS	5523	Operating Systems
CS	5633	Analysis of Algorithms

B. Electives (18 semester credit hours):

Students must complete at least 18 semester credit hours of additional eligible graduate courses, 12 hours of which must be in the Department of Computer Science. With prior approval of the Graduate Advisor of Record, students may apply a maximum of 6 hours of graduate courses from other disciplines to the degree.

C. Master's thesis or additional electives (6 semester credit hours):

Students must either write a Master's thesis and enroll in a minimum of 6 semester credit hours of CS 6983 Master's Thesis or complete 6 hours of additional graduate coursework in the Department of Computer Science.

D. Final oral exam:

Students must pass a final comprehensive oral examination for completion of the degree program.

Concentration in Computer and Information Security

This concentration gives an overview of issues in computer and information security along with detailed technical experience in several specialty areas. All students pursuing this concentration must fulfill the degree requirements for the Master of Science in Computer Science and as part of the electives for the degree students must take the following course:

CS	5323	Principles of Computer and Information Security
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and 2 courses selected from the following list:

CS	5343	Developing Secure Systems and Software
CS	6353	Unix and Network Security
CS	6373	Applied Cryptography
CS	6393	Advanced Topics in Computer Security

Concentration in Software Engineering

This concentration gives students a broad knowledge of current theories, models, and techniques in software engineering to provide a basis for problem identification and analysis, software design, development, implementation, verification, and documentation. All students pursuing this concentration must fulfill the degree requirements for the Master of Science in Computer Science and as part of the electives for the degree students must take the following course:

CS	5103	Software Engineering
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and 2 courses selected from the following list:

CS	5123	Software Testing and Quality Assurance
CS	5153	User Interfaces and Usability
CS	5343	Developing Secure Systems and Software
CS	6133	Software Specification and Verification
CS	6193	Advanced Topics in Software Engineering

Doctor of Philosophy Degree in Computer Science

The Department of Computer Science offers advanced coursework and research leading to the Doctor of Philosophy (Ph.D.) degree in Computer Science. Successful Ph.D. candidates must demonstrate an in-depth knowledge of computer science and must deliver an original contribution to the field.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. The minimum requirements for admission to the Doctoral degree program in Computer Science in addition to University-wide graduate admission requirements are as follows:

- a B.A., B.S., or M.S. degree in computer science or a related area;
- the Graduate Record Examination (GRE) general test—verbal, math, and analytical sections. The GRE computer science subject test is strongly recommended but not required. When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds; and
- three letters of recommendation attesting to the applicant's readiness for doctoral study.

Admission is competitive. Satisfying the minimum requirements does not guarantee admission. An application should also include a résumé and a statement of research experience and interest. Applicants will automatically be considered for scholarships, and teaching and research assistantships.

Degree Requirements. Candidates for the degree are required to successfully complete a minimum of 90 semester credit hours of graduate coursework as described in the program of study.

Program of Study

A. Core courses (12 semester credit hours):

CS	5363	Programming Languages and Compilers
CS	5513	Computer Architecture

CS	5523	Operating Systems
CS	5633	Analysis of Algorithms

B. Electives (18 semester credit hours):

Students must complete at least 18 semester credit hours of additional eligible organized graduate courses in the Department of Computer Science.

C. Computer science research (42 semester credit hours minimum):

CS	7123	Research Seminar (6 semester credit hours minimum)
CS	7211-6	Doctoral Research (18 semester credit hours minimum)
CS	7311-6	Doctoral Dissertation (18 semester credit hours minimum)

D. Flexible Electives (18 semester credit hours):

Students must complete an additional 18 semester credit hours selected from organized graduate courses, independent study, research seminar, doctoral research and doctoral dissertation. With prior approval of the Graduate Advisor of Record, students may apply a maximum of 6 hours of graduate courses from other disciplines to the degree.

Transfer of Credit. Students may transfer prior graduate study up to 30 semester credit hours from another institution toward the Doctor of Philosophy degree in Computer Science with the approval of the Graduate Studies Committee. Each student's transcript will be evaluated by the Graduate Studies Committee, and credit will be determined on a course-by-course basis to satisfy the requirements of the degree.

Advancement to Candidacy. Students seeking a doctoral degree must be admitted to candidacy. The requirements for admission to candidacy include passing a Doctoral Qualifying Examination and a Doctoral Dissertation Proposal Examination. Students should consult the University's Doctoral Degree Regulations (Chapter 6 of this catalog) for other requirements.

Qualifying Examination. The Doctoral Qualifying Examination is scheduled at the beginning of each Fall and Spring Semester. Full-time doctoral students must take the qualifying examination by the beginning of their third semester. Students who fail their first attempt are allowed to make a second attempt on the next qualifying examination date. No more than two attempts to pass the qualifying examination are permitted. After a student has passed the qualifying examination, the student must select a doctoral advisor and register for CS 7211-6 Doctoral Research every semester until the student passes the Doctoral Dissertation Proposal Examination.

Doctoral Dissertation Proposal Examination. After a student has passed the qualifying examination and has made progress in doctoral research, the next step is the Doctoral Dissertation Proposal. The student has to form a Dissertation Committee chaired by the student's doctoral advisor and prepare a written proposal for a dissertation topic. The Dissertation Committee will conduct an oral examination during which the student presents the dissertation proposal. The presentation is followed by a period of questioning based on the dissertation proposal. Unanimous approval of the Dissertation Committee is required to pass the oral examination. No more than two attempts to pass the oral examination will be permitted. After a student has passed the Doctoral Dissertation Proposal Examination, the student must register for CS 7311-6 Doctoral Dissertation every semester until the student completes the degree.

Doctoral Dissertation and Final Oral Examination. After a student has passed the Doctoral Dissertation Proposal Examination, the next steps are writing a dissertation and passing the Final Oral Examination. The Final Oral Examination is administered and evaluated by the student's Dissertation Committee and covers the dissertation and the general field of the dissertation. The Final Oral Examination consists of an open presentation of the dissertation followed by an oral examination. Unanimous approval of the Dissertation Committee is required to pass the Final Oral Examination. Also, the dissertation must be unanimously approved by the Dissertation Committee.

COURSE DESCRIPTIONS COMPUTER SCIENCE (CS)

5053 Computing and the World Wide Web

(3-0) 3 hours credit.

An introduction to computer applications and the World Wide Web for non-computer scientists. Cannot be applied to the Master of Science degree or the Doctor of Philosophy degree in Computer Science. (Credit cannot be earned for both CS 5053 and CS 5003.)

5063 Computers for Teachers

(3-0) 3 hours credit. Prerequisite: Some programming experience.

Modern approaches to computing and program design in an object-oriented programming language such as Java. Emphasis in this course is on the design and implementation of computer-based solutions to problems in a variety of application areas. Curriculum materials and teaching strategies will be developed for teaching these concepts at the high school level. Cannot be applied to the Master of Science degree in Computer Science or the Doctor of Philosophy degree in Computer Science. (Formerly CS 5023. Credit cannot be earned for both CS 5063 and CS 5023.)

5073 Advanced Topics for Teachers

(3-0) 3 hours credit. Prerequisite: CS 5063 or an equivalent.

A formal and in-depth study of algorithms, data structures, and abstraction using an object-oriented language such as Java. Curriculum materials and teaching strategies will be developed for teaching these topics. Large programs such as case studies will be used to present some of these topics along with examples of how to use a case study in the high school curriculum. Cannot be applied to the Master of Science degree in Computer Science or the Doctor of Philosophy degree in Computer Science.

5083 Computer-based Multimedia for Teachers

(3-0) 3 hours credit. Prerequisite: CS 5053 or an equivalent.

Creation and use of multimedia to enhance student learning. Emphasis in this course is on designing and creating web-based multimedia resources to illustrate and clarify difficult concepts. Existing graphical software packages will be used to accomplish the creation of instructional multimedia materials. Cannot be applied to the Master of Science degree in Computer Science or the Doctor of Philosophy degree in Computer Science.

5103 Software Engineering

(3-0) 3 hours credit. Prerequisite: CS 4773 or software development experience.

Introduction to methods and tools for the requirements analysis and design stages of software life cycles. Discussion of software requirements including elicitation, modeling notations, analysis, and documentation. Brief overview of process models and project management. Examination of major architectural styles in existing software systems, design methods, design patterns, and reverse engineering. Course will include design experience using CASE tools.

5113 Computer Graphics

(3-0) 3 hours credit. Prerequisites: CS 3343 and MAT 2233.

The course covers interactive 3-D computer graphics, polygonal representations of 3-D objects, boolean operations, interactive lighting models, interactive texture mapping, shadow generation as well as image-based techniques such as stencils, hidden-line removal, silhouette edges, rendering and global illumination.

5123 Software Testing and Quality Assurance

(3-0) 3 hours credit. Prerequisite: CS 4773 or software development experience.

Introduction of testing techniques for software systems: unit testing, integration testing, system testing, acceptance testing, and regression testing; test plan and test case design; quality assurance; verification and validation.

5153 User Interfaces and Usability

(3-0) 3 hours credit. Prerequisite: CS 4773 or software development experience.

This course focuses on the development of high-quality user interfaces. The course reviews the basics of user interface development, tools, and use-case driven design techniques; examines the elements of good design and usability, metrics for usability, and procedures for user testing.

5233 Artificial Intelligence

(3-0) 3 hours credit. Prerequisite: CS 3343.

This course covers the construction of programs that use knowledge representation and reasoning to solve problems. Major topics include informed search, logical and probabilistic inference, machine learning, planning, and natural language processing.

5253 Expert Systems

(3-0) 3 hours credit. Prerequisite: CS 5233.

This course presents an in-depth study of the area of artificial intelligence known as expert systems. Example expert systems are examined as a means of identifying the generally accepted methodologies for developing such systems as well as the basic research issues involved.

5263 Bioinformatics

(3-0) 3 hours credit. Prerequisite: Graduate standing in Computer Science or consent of instructor.

Introduction to bioinformatics. Problem areas such as sequence analysis and gene component analysis, structure prediction, gene ontology, phylogenetic inference, gene regulation, and pathway construction and analysis will be approached from a computational viewpoint.

5293 Numerical Linear Algebra

(3-0) 3 hours credit. Prerequisite: MAT 3633 or an equivalent.

Direct and iterative methods for solving general linear systems, the algebraic eigenvalue problem, least square problems, and solutions of sparse systems arising from partial differential equations. (Same as MAT 5293. Credit cannot be earned for both CS 5293 and MAT 5293.)

5323 Principles of Computer and Information Security

(3-0) 3 hours credit. Prerequisites: CS 3733 and CS 4873.

An introduction to the protection of computer systems and networks. Topics include authentication, access controls, malicious logic, formal security methods, assurance and trust in computer systems and networks, firewalls, auditing and intrusion detection, cryptography and information hiding, risk management, computer forensics, and ethics.

5343 Developing Secure Systems and Software

(3-0) 3 hours credit. Prerequisite: CS 3733.

An examination of methods for designing secure computer systems, networks, and software. Topics include the security development process, security policies and models, threat modeling, security code reviews and testing, the formal verification process, validation, and assessments.

5353 Formal Languages, Automata, and Theory of Computation

(3-0) 3 hours credit. Prerequisites: CS 3233 and CS 3343.

Formal models of computation and syntax such as Turing machines, finite automata, non-determinism, formal languages, regular and context free grammars, complexity classes and NP-completeness.

5363 Programming Languages and Compilers

(3-0) 3 hours credit. Prerequisites: CS 3233 and CS 3343.

A study of programming languages with an emphasis on their implementation. Topics include lexical analysis, language syntax, control structures, the binding of names, procedures, and their implementation in compilers.

- 5443 Database Management Systems**
(3-0) 3 hours credit. Prerequisite: CS 3743.
Design and implementation of database management systems. Topics include storage management, query optimization, concurrency control, crash recovery, integrity, and security in relational databases, object-oriented databases, object-relational databases, parallel databases, and distributed databases.
- 5513 Computer Architecture**
(3-0) 3 hours credit. Prerequisites: CS 3733 and CS 4753.
Study of modern computer architecture, including parallel computers, multiprocessors, pipelines, and fault tolerance.
- 5523 Operating Systems**
(3-0) 3 hours credit. Prerequisites: CS 3733 and CS 4753.
Operating systems concepts with an emphasis on distributed systems. Topics include process management and threads, inter-process communication, distributed objects and remote invocation, distributed naming and directory services, distributed file systems, middleware such as CORBA, access control and security.
- 5603 Numerical Analysis**
(3-0) 3 hours credit. Prerequisite: MAT 3633 or consent of instructor.
Emphasis on the mathematical analysis of numerical methods. Areas of study include solution of nonlinear equations and function optimization, approximation theory, and numerical quadrature. (Same as MAT 5603. Credit cannot be earned for both CS 5603 and MAT 5603.)
- 5623 Simulation Techniques**
(3-0) 3 hours credit. Prerequisites: CS 1723 and STA 3523 or STA 3543.
This course introduces discrete-event simulation techniques, statistical models in simulation, random number generation, input modeling, output analysis and comparisons, and verification and validation of simulation models.
- 5633 Analysis of Algorithms**
(3-0) 3 hours credit. Prerequisite: CS 3343.
Models of computation and algorithm design and analysis techniques such as divide-and-conquer, greedy algorithms, dynamic programming, graph algorithms, amortized analysis.
- 5971-6 Directed Research**
1 to 6 hours credit. Prerequisites: Graduate standing in Computer Science and permission in writing (form available) of the instructor and the Graduate Advisor of Record.
The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours of CS 5971-6 and CS 6953, regardless of discipline, will apply to a degree. This course will not apply to the Ph.D. degree.
- 6103 Distributed Software Development**
(3-0) 3 hours credit. Prerequisites: CS 5103 and CS 5523.
Development and management of distributed software, including cooperative tools and CASE. The course considers the aspects of managing the configuration of software during its life cycle. Topics include identification, control, auditing, and status accounting. Simulation of a configuration control board process.
- 6133 Software Specification and Verification**
(3-0) 3 hours credit. Prerequisite: CS 5103.
This course introduces the theory and practice of formal methods for the specification and verification of computer-based systems. It emphasizes various techniques for modeling behavior of sequential and concurrent systems and reasoning about properties of models using automated analysis tools.

6193 Advanced Topics in Software Engineering

(3-0) 3 hours credit. Prerequisite: CS 5103.

Advanced topics in an area of software engineering. Topics may include but are not limited to agile software development, model-driven software development, designing embedded and real-time software, empirical software engineering, re-engineering and software maintenance, and client/server development using open source tools. May be repeated for credit when topics vary.

6243 Machine Learning

(3-0) 3 hours credit. Prerequisite: CS 5233 or CS 5633.

This course studies machine learning techniques in the area of artificial intelligence. Topics include inductive learning, unsupervised learning, speedup learning, and computational learning theory.

6253 Neural Networks

(3-0) 3 hours credit. Prerequisite: CS 5233 or CS 5633.

Analysis of neural networks. Topics selected from biological nervous systems and learning, threshold logic units, perceptrons, spatial and temporal associative memories, Hopfield nets, backpropagation, Boltzmann machines, Kohonen networks, the Neocognitron, and mathematical models of neural systems. Advanced topics include neural network design, competitive learning, the CMAC model, adaptive resonance theory, bidirection associative memories, Kanerva self-propagating search, advanced simulated annealing, neurocomputer implementations, and advanced genetic algorithms.

6293 Advanced Topics in Bioinformatics

(3-0) 3 hours credit. Prerequisite: CS 5263.

Advanced topics in bioinformatics. Topics may include but are not limited to efficient combinatorial algorithms for manipulating sequences, data mining techniques for biological data, biological imaging, and structural bioinformatics. May be repeated for credit when topics vary.

6353 Unix and Network Security

(3-0) 3 hours credit. Prerequisite: CS 5323.

A technical survey of the fundamentals of computer and information security as it relates to networks and the UNIX operating system. Issues include authentication, common and advanced attack techniques for both the OS and networks, defensive strategies, intrusion detection, scan techniques and detection, forensics, denial of service techniques and defenses, libpcap, libdnet and libnet programming.

6363 Advanced Compiler Construction

(3-0) 3 hours credit. Prerequisite: CS 4713 or CS 5363.

Areas of study include code generation techniques for vector machines and multiprocessors, implementation of higher-level imperative and functional languages, and run-time system support for distributed programming languages.

6373 Applied Cryptography

(3-0) 3 hours credit. Prerequisite: CS 5323.

A course in applied cryptography with an emphasis on applying cryptographic techniques to solve real-world problems. Topics include a review of cryptographic primitives such as symmetric and asymmetric (public-key) cryptosystems, digital signatures, pseudo-random sequences, and hash functions. An emphasis will be placed on utilizing advanced protocols to solve problems such as key management in various environments and applications.

6393 Advanced Topics in Computer Security

(3-0) 3 hours credit. Prerequisite: CS 5323.

Analysis of computer security. The topics may include but are not limited to database and distributed systems security, formal models for computer security, privacy and ethics, intrusion detection, critical infrastructure protection, network vulnerability assessments, wireless security, trusted computing, and highly dependable systems. May be repeated for credit when topics vary.

- 6453 Advanced Database Systems**
(3-0) 3 hours credit. Prerequisite: CS 5443.
Design and implementation of advanced database systems. Topics include data models, storage management, query optimization, transaction processing, integrity, security, and performance evaluation of emerging new database systems. Current database research topics will be explored.
- 6463 Advanced Topics in Computer Science**
(3-0) 3 hours credit. Prerequisites: Graduate standing in Computer Science and consent of instructor.
Advanced topics in an area of computer science. May be repeated for credit when topics vary.
- 6513 Advanced Architecture**
(3-0) 3 hours credit. Prerequisites: CS 5513 and CS 5523.
Areas of study include advanced architectures, including massively parallel and distributed systems. Issues of communication, fault tolerance, and performance are addressed.
- 6523 Distributed Operating Systems**
(3-0) 3 hours credit. Prerequisites: CS 5513 and CS 5523.
Distributed operating systems issues, including migration, naming, reliability, security, resource allocation, and scheduling are addressed in heterogeneous and homogeneous systems. Time-critical data such as video and audio are considered.
- 6533 Multimedia Systems**
(3-0) 3 hours credit. Prerequisite: CS 5523.
A course on the organization and structure of modern multimedia systems. Topics include image and video compression, quality of service concepts, network support for multimedia, operating systems support for multimedia, streaming video over the Internet and security issues in multimedia systems.
- 6543 Networks**
(3-0) 3 hours credit. Prerequisite: CS 5523.
This course introduces the underlying concepts and principles of modern computer networks, with emphasis on protocols, architectures and implementation issues in the Internet.
- 6553 Performance Evaluation**
(3-0) 3 hours credit. Prerequisites: CS 5513 and CS 5523.
This course introduces analytical modeling, simulation analysis, and experimental evaluation of computer systems and networks. Particular emphasis will be placed on the analysis and design of medium- to large-scale distributed computer systems and networks.
- 6613 Parallel Numerical Methods and Software**
(3-0) 3 hours credit. Prerequisites: CS 5603 and CS 6643.
The major goal of this course is to introduce students to the methods, tools, and ideas of parallel numerical computation. Important scientific application development and the basic methods for their solutions are addressed. Relevant mathematical software is reviewed, and its use is outlined. Extensive examples and case studies are given. Techniques for constructing parallel numerical software are studied.
- 6643 Parallel Processing**
(3-0) 3 hours credit. Prerequisite: CS 5513.
Parallel models of computation, performance measurement, and modeling of parallel algorithms and application studies on parallel computers.

6653 Parallel Algorithms

(3-0) 3 hours credit. Prerequisites: CS 5513 and CS 5633.

Theoretical analysis of parallel algorithms and models. Studies of the fastest and most efficient parallel algorithms for a variety of problems. Emphasis is on fundamental results and techniques and on rigorous analysis of algorithmic performance. The structures and mapping relationships between the dominant network architectures and algorithms are also covered.

6723 Image Processing

(3-0) 3 hours credit. Prerequisites: CS 5633 and MAT 2233 or an equivalent.

Topics include image acquisition, enhancement, transformations, filters, compression, segmentation and edge detection, morphology, and recognition.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing in Computer Science and permission in writing (form available) of the instructor and the Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours of CS 5971-6 and CS 6953, regardless of discipline, will apply to a degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to a degree.

6983 Master's Thesis

3 hours credit. Prerequisite: Consent of thesis advisor.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

7123 Research Seminar

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

Presentation and analysis of literature in a selected area of research. May be repeated, a minimum of 6 hours is required for the Doctoral degree.

7211-6 Doctoral Research

1 to 6 hours credit. Prerequisite: Successful completion of the Doctoral Qualifying Examination.

May be repeated, a minimum of 18 hours is required for the Doctoral degree.

7311-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.

May be repeated, a minimum of 18 hours is required for the Doctoral degree.

DEPARTMENT OF EARTH AND ENVIRONMENTAL SCIENCE

Master of Science Degree in Environmental Science

The Department of Earth and Environmental Science offers opportunities for advanced study and research leading to the Master of Science degree in Environmental Science. The Master of Science degree is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations as outlined in this catalog and indicated below.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, all prospective students must have a Bachelor of Arts or Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in upper-division and graduate work. The degree should be in biology, ecology, environmental science, chemistry, geology, geography, engineering, or some other related scientific discipline. Additionally, it is expected that applicants will have taken coursework in organic chemistry and statistics. Applicants lacking these requirements will be considered on a case-by-case basis.

Applicants whose native language is not English must score at least 550 (paper) or 213 (computer) on the Test of English as a Foreign Language (TOEFL). Applicants must submit three letters of recommendation from persons familiar with the applicant's academic record, a letter of research interest, and scores from the Graduate Record Examination (GRE). All supporting documents should be sent to the Department Chair. Incomplete applications will not be considered until all required items are in an applicant's file. When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds.

The Graduate Studies Committee, comprised of members selected from the graduate faculty, will be responsible for recommending acceptance into the program and will take the lead in advising students. Some teaching assistantships, research assistantships, or research fellowships are available, but require a separate application; requests should be addressed to the Chair of the Department of Earth and Environmental Science.

Degree Requirements. The Master of Science degree requires a minimum of 36 semester credit hours beyond the baccalaureate degree (exclusive of coursework or other study required to remove deficiencies). The faculty have six areas of specialization or emphases in the Environmental Science program that include water resources, environmental quality and remediation, environmental management, conservation ecology, spatial analysis, and natural hazards. A thesis option is recommended for students who want an opportunity to develop expertise in research, including experimental design, data collection, and data analyses. The thesis option is recommended for students who are planning a career in environmental education, research, or who are planning to go on and earn a doctorate degree. A nonthesis option is available for those who want the opportunity to earn the Master of Science degree primarily through organized coursework.

Research interests of the graduate faculty include the areas indicated above; however, specific information about research in progress is available from the department office or from individual faculty members. The broad nature of the environmental science program allows students the opportunity to broaden their scientific background at the graduate level. Individual programs are organized around each student's interests in consultation with the student's graduate advisor and graduate committee.

Degree candidates are required to complete a minimum of 36 semester credit hours approved by the student's Graduate Advisor of Record. These credit hours are subject to the following conditions:

Core Curriculum Requirements. All candidates for the Master of Science in Environmental Science must complete the following 11 semester credit hours of coursework:

EES	5013	Survey of Environmental Science
EES	5023	Environmental Statistics
EES	5503	Environmental Policy and Law

EES	5981	Graduate Seminar in Environmental Science and Engineering
EES	6941	Environmental Science Colloquium

1. A minimum of 20 semester credit hours of graduate credit in organized classes must be earned within the department; 11 of these 20 credit hours must include the core curriculum listed above. Up to 6 semester credit hours of approved upper-division undergraduate coursework and a maximum of 2 semester credit hours in a graduate seminar or 2 semester credit hours in colloquium (EES 5981 Graduate Seminar in Environmental Science and Engineering or EES 6941 Environmental Science Colloquium) may be applied to the 20 semester credit hours.
2. An additional 16 semester hours of graduate credit as approved by the Graduate Advisor of Record is required. This may include 6 hours of EES 6953 Independent Study. Students electing the thesis option must complete 6 semester hours of EES 6983 Master's Thesis as part of this total and only 6 semester credit hours can be applied to the Master's degree program.

Thesis Option Requirements. All candidates for the Master of Science in Environmental Science with thesis option must complete a minimum of 6 semester credit hours of the following:

EES	6983	Master's Thesis
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Thesis Option. Candidates for the Master of Science degree electing the thesis option must also pass a comprehensive examination. The examination for thesis students will be oral, and will cover the thesis proposal prepared by the student in one of the areas of environmental science, and will take one to two hours to complete. Candidates must successfully defend the thesis research before their Graduate Committee. Part of the thesis defense will be a public presentation in an open, advertised forum.

Nonthesis Option Requirements. Nonthesis students should consult the Graduate Advisor of Record on their program of study. Candidates are required to pass a written comprehensive examination that will cover at least four major areas of environmental science, and will take three to four hours to complete. This examination is usually taken after the student has completed at least 30 semester credit hours of coursework. If EES 6961 Comprehensive Examination is taken, it does not contribute toward the 36-semester-credit-hour minimum.

Graduate Committee. As specified by University regulations, candidates for the Master of Science degree must have a Graduate Committee. The Committee will be chaired by the student's graduate advisor and will consist of a minimum of two other members. The Committee should be appointed in the first semester of the student's graduate program. Each student must decide if they are going to complete the thesis option or nonthesis option because that will determine the type of committee appointed. Certain rules must be adhered to concerning the composition of the Master's Thesis Committee and the Master's Comprehensive Examination Committee. Only tenured or tenure-track faculty members can chair these committees, and no more than one member of either committee can be a nontenured or a nontenure-track faculty member or be from another university or be from another department.

Comprehensive Examination. Candidates for the Master of Science degree must pass a comprehensive examination administered by their Graduate Committee. The student should normally schedule this examination the semester before the degree requirements are to be completed. The student's Graduate Committee will determine the content of the examination. Normally, the examination will consist of academic material that the student is expected to have mastered during his or her course of study. The examination may only be taken twice. If it is not passed the first time it may be scheduled again in the following semester.

Doctor of Philosophy Degree in Environmental Science and Engineering

The degree program bridges two Colleges, the College of Sciences and the College of Engineering, and two departments, the Department of Earth and Environmental Science (EES) and the Department of Civil and Environmental Engineering (CEE), which share responsibilities in providing classes, research, and facilities for the program. Areas of research emphasis include water resources, environmental quality, environmental remediation, pollution control, conservation ecology, spatial analysis,

remote sensing, and natural hazards. The Ph.D. in Environmental Science and Engineering (ESE) is awarded to candidates who display an in-depth understanding of the subject matter and demonstrate the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, all prospective students must meet the following minimum requirements for admission to the Doctor of Philosophy in Environmental Science and Engineering degree program:

For unconditional admission, applicants must have either a Master of Science or Engineering degree from an accredited institution with a minimum grade point average of 3.0 in all graduate coursework and either a Bachelor of Science or Engineering degree from an accredited institution with a minimum grade point average of 3.0 in the last 60 hours of undergraduate coursework. Applicants who do not meet the above criteria may be admitted conditionally. Generally, students admitted conditionally are required to take leveling courses and meet other requirements as specified by the Doctoral Studies Committee (DSC).

Applicants must submit:

- An electronic application through Embark. <https://apply.embark.com/grad/utsa/32/>.
- Original and sealed official transcripts from all universities the applicant attended. Transcripts more than a year old will not be accepted.
- Three original letters of recommendation from persons familiar with the applicant's academic potential and readiness to enter a Ph.D. program. Letters of recommendation more than six months old will not be accepted.
- Original documentation of General Aptitude Test on the Graduate Record Examination (GRE). GRE scores more than five years old will not be accepted.
- A personal statement of research experience, interests, and goals with current résumé/curriculum vita.

Applicants whose native language is not English must meet University requirements for the Test of English as a Foreign Language (TOEFL; see Chapter 2, Admission, of this catalog for TOEFL score requirements). The TOEFL notification letter must be an original, not a photocopy.

Admission is competitive. Satisfying these requirements does not guarantee admission. To receive consideration, all of the above-listed admission materials must be received by the Graduate School by February 1. All new students begin in the Fall Semester. The Graduate School may require additional documents.

Degree Requirements. The Doctoral program in Environmental Science and Engineering will require students to complete a minimum of 60 semester credit hours beyond the Master's degree. This coursework will include courses that have been designed to provide advanced instruction in areas considered to form the foundation for the disciplines of Environmental Science and Engineering. Any grade lower than "B" in a graduate coursework will not count toward the 60 hours required. Remedial coursework require a "B" or better and does not count toward the 60 hours. Students can apply, with approval from their Dissertation Advisor and DSC, up to 12 semester credit hours of graduate coursework toward degree requirements, if not applied towards their M.S. degree.

Students with only a baccalaureate degree will have to meet additional requirements as specified by the University, the DSC, and the Dissertation Advisor.

Program of Study

A. Core Curriculum (9 semester credit hours required):

CE	6113	Global Change
		or
EES	5043	Global Change

CE	6273	Analyses of Environmental Problems
		or
EES	6273	Analyses of Environmental Problems

and a minimum of one of the following courses:

CE	5813	Risk and Design Analysis in Civil Engineering
EES	5233	Experimental Design and Analysis
CE	6033	Multivariate Analysis in Environmental Science and Engineering
		or
EES	6033	Multivariate Analysis in Environmental Science and Engineering

B. Seminars (minimum 3 semester credit hours):

CE	6221	Graduate Seminar in Environmental Science and Engineering
		or
EES	5981	Graduate Seminar in Environmental Science and Engineering

C. Doctoral Research and Dissertation (minimum 30 semester credit hours):

CE	7211-3	Doctoral Research (15 hours minimum)
		or
EES	7211-3	Doctoral Research (15 hours minimum)

AND

CE	7311-3	Doctoral Dissertation (15 hours minimum)
		or
EES	7311-3	Doctoral Dissertation (15 hours minimum)

D. Electives (18 semester credit hours are required):

The 18 semester credit hours of electives that are required will be determined by the student in conjunction with their Dissertation Advisor and must be approved by the student's Dissertation Committee. The elective hours may come from classes from the other departments with approval of the Dissertation Advisor and must be stated on the Program of Study.

Approved course offerings and descriptions are listed both in the College of Sciences, Department of Earth and Environmental Science, and in the College of Engineering, Department of Civil and Environmental Engineering.

Dissertation Committee. Students must choose a Dissertation Committee that consists of five graduate faculty members, including their Dissertation Advisor, with a minimum of one graduate faculty member from each department. The Dissertation Committee is responsible for the qualifying examinations and supervising the Dissertation. Students must submit the names of the Dissertation Committee to the DSC by the end of the completion of 18 semester credit hours of graduate coursework. Before scheduling the written qualifying examination, students must choose the members of the Dissertation Committee. The Dissertation Committee members remain the same for the qualifying examinations unless a change is approved by the DSC.

Advancement to Candidacy. Students seeking a doctoral degree at UTSA must be admitted to candidacy. Admission into the doctoral program does not guarantee advancement to candidacy. In order to advance to candidacy, students must:

- file an approved Program of Study with the DSC and the Graduate School;
- successfully complete the core curriculum;
- pass the written qualifying examination;

- submit an acceptable, original, written research proposal; and
- pass the oral qualifying examination.

The Program of Study, with all required approvals, must be filed before the written qualifying examination can be scheduled. Students must also complete the core curriculum and any additional, required courses before taking the written qualifying examination. The written qualifying examination must be passed before the oral qualifying examination can be scheduled. Students must also have received all required approvals for the written research proposal before taking the oral qualifying examination.

Students should consult the University's Doctoral Degree Regulations (Chapter 6 of this catalog) for all other requirements.

Written Qualifying Examination. The written qualifying examination will come from the core curriculum courses and from elective courses taken in the student's research area. This examination will provide students with an opportunity to demonstrate both knowledge of environmental science and engineering and preparation for conducting Ph.D.-level research at UTSA. Students must take the written qualifying examination before the completion of 30 semester credit hours of Ph.D.-level coursework. Students will take the written qualifying examination before the end of the third long semester of enrollment in the Ph.D. program. Part-time students may have to deal with alternative deadlines.

To schedule the written qualifying examination, students must notify the DSC, in writing, of the Dissertation Committee membership and of the proposed examination time schedule. A minimum of four weeks is required for the Dissertation Committee members to prepare the components of the written qualifying examination. The Dissertation Committee will decide how many components the examination will contain; there will be a minimum of three and a maximum of five components; and there will be at least one component from each of the CEE and EES departments. Each component administered must be passed. The Dissertation Committee will evaluate the written examination and will notify the student of the results. The Dissertation Advisor reports the written qualifying examination results to the DSC and the Graduate School.

Students who fail their first attempt at the written qualifying examination will be allowed one additional attempt. No more than two attempts to pass the written examination will be permitted. Upon successful completion of the written qualifying examination, the oral qualifying examination can be scheduled.

Research Proposal and Oral Qualifying Examination. Students will write their research proposal and take their oral qualifying examination at the end of the semester in which the written qualifying examination was taken or at the beginning of the subsequent semester. Students must notify the DSC, in writing, at least three weeks before the oral qualifying examination is scheduled. Students will write and submit for approval an original research proposal that includes an introduction, objectives, methods, possible results, some discussion and appropriate literature citations and references. The student's Dissertation Advisor and Dissertation Committee must approve the student's research proposal before the oral qualifying examination can be scheduled.

The oral qualifying examination is a defense of the student's proposed research. It will provide students with an opportunity to demonstrate both the depth of knowledge and the level of preparation for the proposed research. The oral presentation will include the dissertation topic, the experimental approach, the originality of the research, and the potential contribution to the scientific field. At the conclusion of the oral qualifying examination, including questions and answers, the Dissertation Committee will privately discuss and vote on the student's performance. Unanimous approval of the Dissertation Committee is required to pass the oral qualifying examination. The Dissertation Advisor will report the oral qualifying examination result to the DSC and the Graduate School.

Students who fail the first oral qualifying examination will be allowed one additional attempt. No more than two attempts to pass the oral qualifying examination will be permitted.

Dissertation. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation. The Dissertation Committee guides and critiques the candidate's research. Candidates are encouraged to publish the results of their research. The format of the dissertation document will follow the guidelines and rules published by the Graduate School and general University regulations in Chapter 6, Doctoral Degree Regulations.

Final Oral Dissertation Defense. The Dissertation Advisor must notify the Graduate School in writing at least two weeks prior to the final scheduled oral defense. The final oral defense consists of public presentation of the dissertation, including questions and answers; the Dissertation Committee will privately discuss and vote on the student's performance. The Dissertation Advisor will report the oral defense results to the DSC and the Graduate School. Awarding of the degree is based on the approval of the Dissertation Committee and the acceptance of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements.

Master of Science Degree in Geology

The Master of Science (M.S.) degree program in Geology offers students the opportunity for advanced study and research leading to the M.S. degree in the following emphasis areas: water resources (hydrogeology), environmental geology, geochemistry and isotope geochemistry, and applied geology.

Qualified students are encouraged to apply for teaching and/or research assistantships and fellowships. Requests should be addressed to the Chair of the Department of Earth and Environmental Science when the application is submitted for admission to UTSA.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have completed an undergraduate degree in geology (equivalent to UTSA's) or a bachelor's degree in chemistry, physics, mathematics, computer science, life sciences, or engineering from an accredited institution of higher education. Applicants with deficiencies in their academic background are required to consult with the Graduate Advisor of Record to establish an acceptable program of study with the approval of the graduate faculty. In such cases, students should anticipate that additional time will be required to complete the degree.

Applicants must submit three letters of recommendation from persons familiar with the applicant's academic record, and scores from the Graduate Record Examination (GRE). The letters of recommendation should be sent to the Department Chair. Incomplete applications will not be considered until all required items are in an applicant's file. When GRE scores are used to determine an admission, applicants will be compared to applicants with similar socioeconomic backgrounds.

Thesis Option in Geology

Degree Requirements. The Master of Science degree in Geology requires the successful completion of a minimum of 33 semester credit hours.

Candidates for the degree must complete:

A. Geology core curriculum (8 semester credit hours)

EES	5981	Graduate Seminar in Environmental Science and Engineering	2 hours
		or	
EES	5991	Graduate Seminar in Geology	2 hours
EES	6983	Master's Thesis	6 hours

No more than 2 semester credit hours of EES 5981 Graduate Seminar in Environmental Science and Engineering or EES 5991 Graduate Seminar in Geology and a minimum of 6 semester credit hours of EES 6983 Master's Thesis can be applied to the Master's degree.

B. Candidates must choose one of the following four emphases: Water Resources (Hydrogeology), Environmental Geology, Geochemistry and Isotope Geochemistry, Applied Geology (25 semester credit hours):

Water Resources (Hydrogeology)

12 semester credit hours:

EES	5483	Environmental Hydrogeology
EES	5603	Physical Hydrogeology
EES	5713	Groundwater Modeling
EES	6523	GIS for Water Resources

13 semester credit hours minimum, selected from the graduate course offerings in geology, environmental science, civil engineering, and biology with approval of the Graduate Advisor of Record.

Environmental Geology

11 semester credit hours:

EES	5223	Advanced Environmental Geology
EES	5404	Dynamics of Geomorphic Landscapes
EES	5414	Fluvial Geomorphology

9 semester credit hours minimum, selected from the graduate course offerings in geology.

5 semester credit hours minimum, selected from the graduate course offerings in the College of Sciences or College of Engineering. Elective coursework may be taken with approval of the Graduate Advisor of Record.

Geochemistry and Isotope Geochemistry

11 semester credit hours:

EES	6001	Seminar in Geochemistry and Isotope Geochemistry
EES	6203	Aqueous Geochemistry
EES	6303	Application of Stable Isotopes in Geochemistry
EES	6304	Isotope Geology

14 semester credit hours minimum, selected from the graduate course offerings in College of Sciences or Engineering, with approval of the Graduate Advisor of Record.

Applied Geology

25 semester credit hours minimum, selected from graduate course offerings with the approval of the Graduate Advisor of Record.

- C. Under special circumstances, students may take up to 6 semester credit hours of upper-division undergraduate work in the College of Sciences or College of Engineering with approval of the Graduate Advisor of Record.
- D. Students must pass a final oral comprehensive examination. This examination should be scheduled during the student's last semester of work, for completion of the degree program.

Nonthesis Option in Geology

The nonthesis option applies only to the Water Resources (Hydrogeology) and Environmental Geology emphases.

Degree Requirements. The Master of Science degree in Geology requires the successful completion of a minimum of 39 semester credit hours.

Candidates for the degree must complete:

A. Geology core curriculum (5 semester credit hours):

EES	5981	Graduate Seminar in Environmental Science and Engineering	2 hours
		or	
EES	5991	Graduate Seminar in Geology	2 hours
EES	5971-3	Directed Research	3 hours

No more than 2 semester credit hours of EES 5981 Graduate Seminar in Environmental Science and Engineering or EES 5991 Graduate Seminar in Geology and 3 semester credit hours of EES 5973 Directed Research can be applied to the Master's degree.

B. Candidates must choose one of the following two emphases (34 semester credit hours):

Water Resources (Hydrogeology)

12 semester credit hours:

EES	5483	Environmental Hydrogeology
EES	5603	Physical Hydrogeology
EES	5713	Groundwater Modeling
EES	6523	GIS for Water Resources

22 semester credit hours minimum, selected from the graduate course offerings in geology, environmental science, civil engineering, and biology with approval of the Graduate Advisor of Record.

Environmental Geology

11 semester credit hours:

EES	5223	Advanced Environmental Geology
EES	5404	Dynamics of Geomorphic Landscapes
EES	5414	Fluvial Geomorphology

9 semester credit hours minimum, selected from the graduate course offerings in geology.

14 semester credit hours minimum, selected from the graduate course offerings in geology, environmental science, civil engineering, chemistry, and biology with approval of the Graduate Advisor of Record.

C. Under special circumstances, students may take up to 6 hours of upper-division undergraduate work within the College of Sciences or College of Engineering with approval of the Graduate Advisor of Record.

D. Candidates are required to pass a written comprehensive examination that covers several major areas of geology. This examination is usually taken after students have completed at least 30 semester credit hours of coursework. If EES 6961 Comprehensive Examination is taken, it does not contribute toward the 39-semester-credit-hour minimum.

Graduate Committee. As specified by University regulations, candidates for the Master of Science degree must have a Graduate Committee. The Committee will be chaired by the student's graduate advisor and will consist of a minimum of two other members. The Committee should be appointed in the first semester of the student's graduate program. Each student

must decide if he or she is going to complete the thesis or nonthesis option because that will determine the type of committee appointed. Certain rules must be adhered to concerning the composition of the Master's Thesis Committee. Only tenured or tenure-track faculty members can chair these committees, and no more than one member can be a nontenured or a nontenure-track faculty member or be from another university or be from another department.

Comprehensive Examination. Candidates for the Master of Science degree must pass a comprehensive examination administered by their Graduate Committee. The student should normally schedule this examination the semester before the degree requirements are to be completed. The student's Graduate Committee will determine the content of the examination. Normally, the examination will consist of academic material that the student is expected to have mastered during his or her course of study. The examination may only be taken twice. If it is not passed the first time, it may be scheduled again in the following semester.

Certificate of Professional Development in Geographic Information Science

The purpose of the Professional Certificate in Geographic Information Science is to create individuals from a broad range of academic disciplines who are competent users of Geographic Information Science and the related tools of the Global Positioning System and Remote Sensing. Although the program is generally oriented towards earth and environmental science professionals, individuals with business, social science, medical, engineering, criminal science or education backgrounds will benefit from this professional certificate. Individuals completing this certificate will gain a practical and hands-on knowledge of Geographic Information Science. All courses taken in the Professional Certificate in Geographic Information Science program can be applied towards a Master's degree in Environmental Science with an emphasis in environmental spatial analysis.

Description of Certificate Program. The Certificate of Geographic Information Science is a 15-hour program. Degree-seeking, special graduate or non-degree-seeking students from any discipline at UTSA are allowed to complete the Certificate of Geographic Information Science program. Candidates for the certificate should ideally complete the program within one year, but not more than two years. Students will be assigned a faculty advisor from the Department of Earth and Environmental Science for guidance in the program.

Certificate Curriculum. The following Environmental Science courses addressing Geographic Information Science are required to complete the certificate program:

EES	5033	Geographical Information Systems
EES	5053	Remote Sensing
EES	6503	GPS Mapping
EES	6513	Advanced GIS
EES	6543	Internet Served GIS

COURSE DESCRIPTIONS EARTH AND ENVIRONMENTAL SCIENCE (EES)

5013 Survey of Environmental Science

(3-0) 3 hours credit. Prerequisite: Graduate standing.

An integrative examination of living and nonliving environmental systems. A detailed study of interrelationships among plants, animals, and the environment, addressing the chemical, physical, and biological properties of living systems, and the principles that drive their evolution. (Formerly ES 5013. Same as BIO 5013. Credit cannot be earned for both EES 5013 and ES 5013 or BIO 5013.)

5023 Environmental Statistics

(3-0) 3 hours credit. Prerequisites: MAT 1033 and STA 1993 or their equivalents, or consent of instructor.

Introductory course in systems analysis emphasizing its application for the management of environmental and public systems. Problem formulation, mathematical modeling, and procedures are introduced through case studies that

include energy consumption, soil contamination, leak detection, and air pollution. In these case studies, students become acquainted with quantitative governmental regulations formalized by the Environmental Protection Agency. Quantitative tools include exploratory data analysis, design of experiments, analysis of variance, regression analysis, and time series. Optimization techniques are taught within regression analysis. (Formerly ES 5023. Credit cannot be earned for both EES 5023 and ES 5023.)

5033 Geographical Information Systems

(2-2) 3 hours credit.

Application of the computer to environmental planning and management problems through a Geographical Information System (GIS). Using the computer as a mapping device for query, analysis, creation and display of spatially related data. Additional topics include using the Global Positioning System (GPS) for data acquisition. (Formerly ES 5033. Credit cannot be earned for both EES 5033 and ES 5033.)

5043 Global Change

(3-0) 3 hours credit. Prerequisite: Graduate standing in the program or consent of instructor.

Changes in the global distribution of plants and animals and the causes of the changes will be examined. Factors that are apparently coupled to changes in the atmosphere and environmental temperature will be examined. (Formerly ES 5043. Same as CE 6113. Credit cannot be earned for both EES 5043 and ES 5043 or CE 6113.)

5053 Remote Sensing

(2-2) 3 hours credit. Prerequisites: MAT 1073, and PHY 1603 or PHY 1943.

Fundamental remote sensing theory and technology will be introduced and emphasized as well as remote sensing applications to land surface, ocean, and atmosphere. Emphasis will be on the interaction of electromagnetic energy with the Earth's surface and different types of remote sensing for data collection. (Formerly ES 5053. Credit cannot be earned for both EES 5053 and ES 5053.)

5063 Environmental Microbiology

(3-0) 3 hours credit. Prerequisite: BIO 3713 or consent of instructor.

To provide a basic understanding of environmental microbiology primarily from two aspects: microbial interactions with chemical pollutants in the environment and the fate of microbial pathogens in the environment. Topics covered include microbial environments, detection of bacteria and their activities in the environment, microbial biogeochemistry, bioremediation, and water quality. (Same as BIO 5063. Credit cannot be earned for both EES 5063 and BIO 5063.)

5073 Environmental Microbiology Laboratory

(2-3) 3 hours credit. Prerequisite: BIO 3722 or consent of instructor.

To provide an understanding of environmental microbiology laboratory techniques using both traditional and molecular research skills. Basic techniques for isolation and characterization of environmental soil and water microflora including methods for enumeration and measurement of physiological activity. (Same as BIO 5073. Credit cannot be earned for both EES 5073 and BIO 5073.)

5083 Remote Sensing Image Processing and Analysis

(2-2) 3 hours credit. Prerequisite: ES 4093, or EES 5053, or consent of instructor.

Fundamentals, algorithms, and techniques of remote sensing image processing, information extraction and analysis, including radiometric and geometric corrections, image enhancement, image sharpening, principal components analysis, image classification, spectral analysis, vectorization, integration with GIS, etc.

5093 Remote Sensing in Hydrology

(2-2) 3 hours credit. Prerequisite: ES 4093, or EES 5053, or consent of instructor.

Apply remote sensing to derive parameters of surface hydrology and hydrometeorology such as precipitation, land surface temperature and emissivity, heat flux, evaporation, evapotranspiration, soil moisture, surface water, water quality, snow and ice, and soil erosion. The contents will also include radar hydrology, microwave techniques and mapping of soil moisture and precipitation, and remote sensing in hydrologic modeling.

- 5103 Applied Ecology**
(3-0) 3 hours credit.
The impact of humanity's activities on the environment: their effect on water, land, animal, and human resources. An evaluation of present and future strategies to preserve a healthy environment. (Formerly ES 5103 and ES 6203. Credit cannot be earned for EES 5103, and either ES 5103 or ES 6203.)
- 5123 Project Analysis**
(3-0) 3 hours credit.
This course examines the complex processes and factors in the evaluation of large-scale projects involving natural resources. It brings together the tools required to evaluate the physical, economic, financial, legal, and political constraints of these projects. (Formerly ES 5123 and ES 6873. Credit cannot be earned for EES 5123, and either ES 5123 or ES 6873.)
- 5213 Environmental Geology**
(3-0) 3 hours credit. Prerequisite: GEO 4063 or consent of instructor.
Geologic materials and processes as related to their influence on the human physical environment. Effects of landscape modification and geologic hazards such as earthquakes and landslides. Properties of minerals, rocks, and soils and geologic aspects of waste disposal and water resources are examined. (Course cannot be used for graduate credit by students in Geology.) (Formerly ES 5213. Credit cannot be earned for both EES 5213 and ES 5213.)
- 5223 Advanced Environmental Geology**
(3-0) 3 hours credit. Prerequisites: GEO 4063 and EES 5213, or consent of instructor.
Study of the geology of the environment, with emphasis on the physical and social effects of catastrophic geologic processes. (Formerly GEO 5203. Credit cannot be earned for both EES 5223 and GEO 5203.)
- 5233 Experimental Design and Analysis**
(3-0) 3 hours credit. Prerequisite: EES 5023 or an equivalent, or consent of instructor.
Fundamental concepts of the statistical design and analysis of environmental experiments will be presented. Students will be required to design experiments and to analyze data using computer software. (Formerly ES 5233. Credit cannot be earned for both EES 5233 and ES 5233.)
- 5243 Advanced Plant Ecology**
(3-0) 3 hours credit. Prerequisites: BIO 3283 and BIO 3292, or consent of instructor.
A study of the major biomes of the world, including North America and Texas, and the factors that influence the development of these biomes. Special consideration is given to species interactions that lead to high and low density species. (Formerly ES 5243. Same as BIO 5243. Credit cannot be earned for both EES 5243 and ES 5243 or BIO 5243.)
- 5253 Contaminant Transport in Porous Media**
(3-0) 3 hours credit.
The transport of contaminants in a subsurface environment. Effects of dispersion, interphase mass transfer, transformation reactions, and porous-media heterogeneity on transport: covers aqueous (dissolved) and multiphase (immiscible liquid, gas) systems.
- 5263 Microbial Ecology**
(3-0) 3 hours credit. Prerequisite: BIO 3713 or consent of instructor.
Interrelationships between microorganisms and their environment, including natural habitats of microorganisms, normal human flora, and pathogens. Special consideration is given to application of genetically engineering microorganisms for environmental problems. (Formerly ES 5263. Same as BIO 5263. Credit cannot be earned for both EES 5263 and ES 5263 or BIO 5263.)

5404 Dynamics of Geomorphic Landscapes

(3-3) 4 hours credit. Prerequisite: GEO 4113, or consent of instructor.

Mechanics of surficial processes and the landscapes they build. Application of geomorphic principles to select environmental issues. Field trips required. (Formerly EES 5304 and GEO 5304. Credit can be earned for only one of the following: EES 5404, EES 5304, or GEO 5304.)

5414 Fluvial Geomorphology

(3-3) 4 hours credit. Prerequisite: EES 5404, or consent of instructor.

Advanced examination of fluvial processes and landforms. Emphasis on open channel flow, sediment transport, channel form and adjustment, and floodplain formation. Field trips required.

5423 Advanced Mineralogy

(2-3) 3 hours credit. Prerequisites: GEO 3043 and GEO 3052, or consent of instructor.

Study of crystal chemistry, thermodynamics, and phase equilibria of various mineral groups; petrology and paragenesis relationships are examined. Field trips required. (Formerly GEO 5423. Credit cannot be earned for both EES 5423 and GEO 5423.)

5424 Landscape Evolution

(3-3) 4 hours credit. Prerequisite: EES 5404, or consent of instructor.

Introduction to modeling landscape evolution. Emphasis on interactions between climate tectonics, and geomorphic processes.

5454 Advanced Paleontology

(3-3) 4 hours credit. Prerequisites: GEO 3083, GEO 3123, and GEO 3131, or consent of instructor.

In-depth paleontological analyses of fossils from 1-3 taxonomic groups. Current scientific controversies and literature will be emphasized. Course may include a survey of cutting-edge research, definition and solution of a current unsolved problem, or the writing of a publishable research paper proposing a hypothesis to resolve that problem. Field trips required. (Formerly GEO 5454. Credit cannot be earned for both EES 5454 and GEO 5454.)

5483 Environmental Hydrogeology

(3-0) 3 hours credit.

Physical processes that control flow of water and chemical solutes through the hydrologic system, chemical and biological interactions that occur in the hydrologic system, and human impacts on water quality and quantity.

5493 Water Pollution Control

(3-0) 3 hours credit.

Principles and methods of water pollution control process design and operation; selection and optimization of total treatment processes as well as appurtenances and accessory equipments; and methods involved in the design process and the selection of the hardware. (Formerly ES 5493. Credit cannot be earned for both EES 5493 and ES 5493.)

5503 Environmental Policy and Law

(3-0) 3 hours credit.

Current environmental enabling acts and regulations are covered, with emphasis on federal acts, such as the National Environmental Policy Act, Clean Water Act, Resource Conservation and Recovery Act, and associated regulations. Management strategies for environmental compliance are also presented. (Formerly ES 5503. Credit cannot be earned for both EES 5503 and ES 5503.)

5504 Advanced Stratigraphy

(3-3) 4 hours credit. Prerequisites: GEO 3083, GEO 3123, and GEO 3131, or consent of instructor.

Chronologic study of stratigraphic systems, physical properties and facies, depositional and paleogeographic implications, correlation, nomenclature, and biostratigraphy. Sequence stratigraphy and seismic and log analyses are studied. Field trips required. (Formerly GEO 5504. Credit cannot be earned for both EES 5504 and GEO 5504.)

- 5603 Physical Hydrogeology**
(3-0) 3 hours credit. Prerequisite: GEO 4623 with a grade of "C" or better, or consent of instructor.
Geologic principles governing the flow of subsurface water with an emphasis on physical hydrogeology, interaction of surface and groundwater, hydrogeologic properties and their measurement, flow in the unsaturated zone, mass transport, evolution of aquifer systems, and an introduction to groundwater modeling. Field trips required. (Formerly GEO 5603. Credit cannot be earned for both EES 5603 and GEO 5603.)
- 5713 Groundwater Modeling**
(3-0) 3 hours credit. Prerequisite: EES 5603 or consent of instructor.
Focus is on using MODFLOW code to model the occurrence and movement of groundwater. Course will discuss hydrogeologic data for modeling, modeling protocol, and MODFLOW packages. Multiple graphics-rich user model interfaces commonly used in groundwater science will be learned. Other computer programs for simulating groundwater flow may be included. (Formerly EES 5703. Credit cannot be earned for both EES 5713 and EES 5703.)
- 5743 Plant-Microbe Interactions**
(3-2) 3 hours credit. Prerequisite: A 2000-, 3000- or higher-level microbiology or plant physiology course, or consent of instructor.
The study of molecular and cellular aspects of the interaction between plants and microorganisms in the environment, such as mycorrhizae, pathogenic fungi, Agrobacterium, pathogenic bacteria and plant viruses. Topics include microbial virulence, signaling, gene expression, and disease resistance in plants. Laboratory will focus on plant biochemical and microbiological methods as they relate to environmental problems.
- 5804 Igneous-Metamorphic Petrology**
(3-3) 4 hours credit. Prerequisites: GEO 3043, GEO 3052, GEO 3103, and GEO 3111, or consent of instructor.
Origin and evolution of magmas. Origin and development of metamorphic grade, facies, and textures. Detailed study of igneous and metamorphic rock suites. Field trips required. (Formerly GEO 5804. Credit cannot be earned for both EES 5804 and GEO 5804.)
- 5863 Field Analysis of Complex Geologic Problems**
(0-6) 3 hours credit. Prerequisites: GEO 4933 and GEO 4943, or an equivalent, and consent of instructor.
Field study of an area of complex geology. Field mapping, written reports, and field trips are required. May be repeated for credit up to a maximum of 6 hours when topic varies. (Formerly EES 5853 and GEO 5853. Credit cannot be earned for both EES 5863 and EES 5853 or GEO 5853.)
- 5894 Advanced Structural Geology**
(3-3) 4 hours credit. Prerequisites: GEO 3103 and GEO 3111, or consent of instructor.
In-depth study of the various aspects of structural geology: stress and strain, behavior of materials, failure criteria, fault analysis, rheological properties of geologic materials, fold analysis, and subsurface analysis. Field trips required. (Formerly GEO 5894. Credit cannot be earned for both EES 5894 and GEO 5894.)
- 5904 Carbonate Petrology**
(3-3) 4 hours credit. Prerequisites: GEO 3043, GEO 3052, GEO 3123, and GEO 3131, or consent of instructor.
Thin-section analysis and hand-specimen study of carbonate sediment and rocks, carbonate classifications, carbonate facies, models, and carbonate diagenesis. Field trips required. (Formerly GEO 5904. Credit cannot be earned for both EES 5904 and GEO 5904.)
- 5954 Sandstone Petrology**
(3-3) 4 hours credit. Prerequisites: GEO 3043, GEO 3052, GEO 3123, and GEO 3131, or consent of instructor.
Thin-section analysis and hand-specimen study of clastic rocks, classifications, interpretation of provenance, clastic sedimentary facies, and clastic diagenesis. Field trips required. (Formerly GEO 5954. Credit cannot be earned for both EES 5954 and GEO 5954.)

5971-3 Directed Research

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

The directed research course may involve a laboratory, field-based, or theoretical problem. May be repeated for credit, but not more than 3 hours, regardless of discipline, will apply to the Master's degree. (Formerly GEO 5971-3.)

5981 Graduate Seminar in Environmental Science and Engineering

(1-0) 1 hour credit. Prerequisite: Graduate standing in the program or consent of instructor.

Topical issues of current research will be examined. Presentations will be by current faculty, invited guests and Master's or Doctoral candidates. May be repeated for credit but only 2 hours may be applied toward the Master's degree. (Formerly ES 5991.)

5991 Graduate Seminar in Geology

(1-0) 1 hour credit. Prerequisite: Graduate standing in geology or consent of the Graduate Advisor of Record.

Topical issues chosen by faculty and current research seminars presented by faculty, visiting lecturers, and Master's degree candidates. May be repeated for credit but only 2 hours may be applied toward the Master's degree. (Formerly GEO 5991.)

6001 Seminar in Geochemistry and Isotope Geochemistry

(1-0) 1 hour credit.

Seminar will focus on literature review of cutting-edge research in geochemistry and isotope geochemistry, such as mantle geochemistry, evolution of mantle plumes, global climate and paleoclimate reconstructions, etc.

6003 Risk and Decision Analysis

(3-0) 3 hours credit. Prerequisite: EES 5023 or consent of instructor.

Advanced application of systems analysis to the solution of environmental problems and the building and solving of mathematical models. The role of analytical tools such as cost analysis, decision, and utility theory as they are applied to the efficient utilization of natural resources are also covered. (Formerly ES 6003. Credit cannot be earned for both EES 6003 and ES 6003.)

6013 Instrumental Environmental Methods for Environmental Analysis

(2-2) 3 hours credit. Prerequisite: One year of college chemistry or consent of instructor.

A survey of instrumental techniques and standard methods for analysis of environmental pollutants. Designed primarily for students interested in environmental management and remediation, the focus of the course will vary but will emphasize some aspect of environmental quality, water and soil in particular. (Formerly ES 6013. Credit cannot be earned for both EES 6013 and ES 6013.)

6023 Environmental Outreach and Interpretation

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Introduction to various methods for carrying out environmental education for influencing a community's awareness, knowledge and response to environmental issues. Course topics include the diffusion of innovations, media relations, urban and rural sociology, history of environmental extension in the United States and presentation techniques. (Formerly ES 6023. Credit cannot be earned for both EES 6023 and ES 6023.)

6033 Multivariate Analysis in Environmental Science and Engineering

(3-0) 3 hours credit. Prerequisites: EES 5023 and EES 5233 or their equivalents, or consent of instructor.

Fundamental concepts of Multivariate Analysis in Environmental Science and Engineering will be presented. Students will examine principle components, factor analysis, cluster analysis, multidimensional scaling, discriminate analysis, factor analysis, multivariate normal distributions, mean vectors and covariance matrix and tests of covariance matrices. (Same as CE 6033. Credit cannot be earned for both EES 6033 and CE 6033.)

6053 Topics in Geo-Environmental Engineering

(3-0) 3 hours credit. Prerequisites: CE 2633 and CHE 1113, or consent of instructor.

Topic 1: Fate and Transport of Contaminants in Environmental System. Principles of thermodynamics, fluid flow, flow in porous media, mass transport, reactive flow, bioremediation, and chemical reactions in natural environment.

Topic 2: Remediation Geotechnics. Site characterization; geo-environmental sampling and monitoring; clean-up geotechnics including pump and treat, soil vapor extraction, and air sparging; containment geotechnics including cut off walls and permeable reactive barriers (PRBs).

Topic 3: Waste Geotechnics. Containment systems; clay mineralogy; landfill design; geosynthetic liners; chemical compatibility of liners; leachate collection system; landfill covers and caps.

Topic 4: Modeling for Fate and Transport of Contaminants. Analytical and numerical modeling for fate and transport of reactive/non-reactive and degradable contaminants.

(Same as CE 6053. Credit cannot be earned for both EES 6053 and CE 6053.)

6103 Environmental Impacts

(3-0) 3 hours credit.

Atmosphere, lithosphere, hydrosphere, and biosphere are treated as interrelated systems. Human impact and interaction within and among these systems are studied. Preparation and evaluation of environmental impact statements and assessments are included. (Formerly ES 5203 and ES 6103. Credit cannot be earned for both EES 6103 and ES 5203 or ES 6103.)

6113 Advanced Plant Physiology

(3-0) 3 hours credit. Prerequisite: BIO 4603 or consent of instructor.

Principles of plant physiology and biochemistry, with particular emphasis on plant hormones, nitrogen fixation, plant respiration, photosynthesis, and current research work. (Formerly ES 6113. Same as BIO 6113. Credit cannot be earned for both EES 6113 and ES 6113 or BIO 6113.)

6123 Environmental Quality

(2-3) 3 hours credit. Prerequisites: A 2000- or 3000-level chemistry course, and ES 3024 or ES 3054, or consent of instructor.

Principles of surface and aquatic chemistry as applied to soil and natural water systems. Application of aforementioned principles in the study of environmental quality issues will be included. Laboratory will focus on analysis of pollutants using modern analytical techniques. (Formerly ES 6123. Credit cannot be earned for both EES 6123 and ES 6123.)

6133 Methods in Field Ecology

(3-0) 3 hours credit. Prerequisite: BIO 3283 or an equivalent.

Examination of techniques to collect, identify, and preserve plants and animals. Field methods used in the analysis of populations and communities are considered. (Formerly ES 6133. Same as BIO 6133. Credit cannot be earned for both EES 6133 and ES 6133 or BIO 6133.)

6183 Basin Analysis and Sedimentary Geology

(3-0) 3 hours credit.

An interdisciplinary integration of geodynamics, mathematical and physical modeling, and sedimentary geology. Emphasizes basin formation, nature and maturation of the basin fill, and timing of events. Case histories of various basins illustrate approaches. Field trips required. (Formerly GEO 6183. Credit cannot be earned for both EES 6183 and GEO 6183.)

6203 Aqueous Geochemistry

(2-3) 3 hours credit. Prerequisites: A 2000- or 3000-level chemistry course, and ES 3024 or ES 3054 or GEO 3374, or consent of instructor.

An in-depth study of geochemical principles and practices focusing primarily on the aquatic environment. Designed to familiarize advanced students of Geochemistry, Environmental Science, and Environmental Engineering with those aspects of applied chemistry that have relevance in the care of environmental research and practice. (Formerly GEO 6203. Credit cannot be earned for both EES 6203 and GEO 6203.)

6213 Advanced Ecology

(3-0) 3 hours credit. Prerequisite: BIO 3283 or an equivalent.

Interaction of organisms with their environment, allelopathy, competition, distribution, succession, and factors that control growth and dispersal. Special consideration is given to the concepts of climax, succession, and land management. (Formerly ES 6213. Same as BIO 6213. Credit cannot be earned for both EES 6213 and ES 6213 or BIO 6213.)

6243 Paleocology

(3-0) 3 hours credit. Prerequisites: BIO 3063 or GEO 3063 and GEO 3071, or consent of instructor.

Study of fossil organisms in their relation to past environments, and their interactions in extinct ecological communities. Use of fossils to interpret past environmental conditions, the broader history of life and evolutionary patterns, and the temporal contribution fossil communities provide to research of environmental change. Field trips required.

6253 Biodegradation of Organics in Soil and Groundwater

(3-0) 3 hours credit. Prerequisite: BIO 5123 or consent of instructor.

Description of modern pollution problems and potential remediation techniques focusing on the chemistry, biochemistry, and molecular biology of biodegradation of hazardous and toxic compounds. (Same as BIO 6253. Credit cannot be earned for both EES 6253 and BIO 6253.)

6273 Analyses of Environmental Problems

(3-0) 3 hours credit.

Problems will be presented and potential solutions will be explored from a variety of areas including soil, air, water, coastal and marine systems. Also examined will be potential impact on biotic and abiotic resources in terrestrial, aquatic and marine systems. (Same as CE 6273. Credit cannot be earned for both EES 6273 and CE 6273.)

6303 Application of Stable Isotopes in Geochemistry

(1-4) 3 hours credit. Prerequisites: CHE 6883 and EES 6304 or GEO 3374, or consent of instructor.

An advanced level introduction course to stable isotopes and their various applications for geoscientists. Students are to undertake a project in their respective area of interest and apply the isotopic principles to solve critical problems, prepare samples for isotopic ratio determination, and analyze them in an Isotope Ratio Mass Spectrometer. Various sample introduction techniques will also be introduced, using Elemental Analyzers (TC/EA and CHNS-EA), and Gas Bench techniques.

6304 Isotope Geology

(3-2) 4 hours credit. Prerequisite: GEO 3374.

The course will cover a brief review of theories of nuclear structure, stability of nucleus, nucleosynthesis and the origin of elements that gives an insight into the processes that lead to the abundance of chemical elements; geochronology using radioactive decay schemes; use of both radiogenic and stable isotopes in petrology, theory of stable isotopic fractionation and other pertinent areas. Laboratory methods for stable isotope sample preparation and hands-on experience with isotope ratio-mass spectrometry (IRMS). (Formerly GEO 6304. Credit cannot be earned for both EES 6304 and GEO 6304.)

6344 Micropaleontology

(3-3) 4 hours credit. Prerequisites: BIO 3063 or GEO 3063 and GEO 3071, or consent of instructor.

A study of microscopic fossil organisms that commonly produced a fossil record. Emphasis on taxonomy, evolution, and processing methods for biostratigraphically and paleoecologically important groups from Paleozoic and Mesozoic strata. Field trips required.

6354 Environmental Micropaleontology

(3-3) 4 hours credit. Prerequisites: BIO 3063 or GEO 3063 and GEO 3071, or consent of instructor.

A study of living and Cenozoic microscopic organisms as environmental proxies. Emphasis on interpreting environmental changes in modern and recent geological time utilizing taxonomic groups that commonly produce a fossil record. Field trips required.

6403 Advanced Geophysics

(3-0) 3 hours credit. Prerequisite: GEO 3383 or consent of instructor.

Seismological and other geophysical methods and data for studying the physical and mechanical properties of the earth's crust, mantle, and core. (Formerly GEO 6403. Credit cannot be earned for both EES 6403 and GEO 6403.)

- 6503 GPS Mapping**
(2-2) 3 hours credit. Prerequisite: EES 5033 or equivalent, or consent of instructor.
Methods for using the Global Positioning System to create natural resource inventory maps. Course will cover such topics as differential correction of data, coordinate systems, phase processing, base station and rover operation and mission planning. (Formerly ES 6503. Credit cannot be earned for both EES 6503 and ES 6503.)
- 6513 Advanced GIS**
(2-2) 3 hours credit. Prerequisite: EES 5033 or consent of instructor.
Geographic Information Systems (GIS) is an excellent tool for modeling, analyzing, and managing environmental systems. This course teaches advanced concepts and applications of industry standard GIS software in an environmental context. Additional topics include data acquisition with the Global Positioning System (GPS), digitizing, remote sensing, Graphical User Interface (GUI) manipulation, and scripting. (Formerly ES 6513. Credit cannot be earned for both EES 6513 and ES 6513.)
- 6523 GIS for Water Resources**
(3-0) 3 hours credit. Prerequisites: EES 6513 and GEO 4623, or consent of instructor.
Current approaches for using GIS to analyze and process spatial data for surface water and groundwater systems. Evaluate spatial and temporal responses of hydrologic systems to natural and man-made stresses.
- 6533 Diplomacy and Ethics for Resource Management**
(3-0) 3 hours credit.
Exploration of issues embedded in resource diplomacy and ethics in the twenty-first century. Resource diplomacy and ethics are examined in the context of technology, economics, and institutions. (Formerly ES 6533. Credit cannot be earned for both EES 6533 and ES 6533.)
- 6543 Internet Served GIS**
(2-2) 3 hours credit. Prerequisite: EES 5033 or consent of instructor.
Distributed Geographic Information (DGI) using a Geographic Information System (GIS) can be an extremely powerful tool for environmental outreach and public input. This course will focus upon developing GIS applications to be served out via the Internet or a Local Area Network (LAN). Additional topics include the use of Web authoring software. (Formerly ES 6543. Credit cannot be earned for both EES 6543 and ES 6543.)
- 6613 Subsurface Remediation**
(3-0) 3 hours credit. Prerequisites: EES 5483, GEO 4623, or consent of instructor.
A study of the removal and treatment of contaminants from soil and groundwater systems. Includes discussion of physical, chemical, and biological treatments of subsurface contamination.
- 6703 Environmental Biotechnology**
(3-0) 3 hours credit. Prerequisites: EES 5063 or EES 5263, and EES 5243, or consent of instructor.
Molecular methods for detection of microorganisms in the environment. Fate and survival of introduced organisms in the environment. Molecular mechanisms of microbial inactivation in waste treatment systems and microbial risk assessment.
- 6723 Advanced Environmental Regulations**
(3-0) 3 hours credit. Prerequisite: EES 5503 or equivalent, or consent of instructor.
A study of the environmental regulatory apparatus, and rules and regulations implemented to achieve those objectives of the environmental laws. (Same as CE 6723. Credit cannot be earned for both EES 6723 and CE 6723.)
- 6763 Environmental Phytoremediation**
(2-3) 3 hours credit. Prerequisites: A 2000-, 3000-, or higher-level plant physiology, biochemistry or genetics course, and ES 3024 or ES 3054, or consent of instructor.
The study of environmental pollution effects on physiological and ecological processes of plants, in both managed and unmanaged ecosystems. Pollutants under study include contaminants of air (such as ozone, sulphur dioxide and

UV-B radiation) and soil (such as metals and organic xenobiotics). Topics include principles, protocols and applications of molecular biology and biotechnology for genetic improvement of microbes/plants for environmental remediation. Laboratory will focus on plant biochemical, soil chemical and plant molecular biological methods and a group research project.

6803 Electron Microscopy and Microbeam Analysis

(1-4) 3 hours credit. Prerequisite: Consent of instructor.

Geological and geochemical applications of electron microscopy, X-ray microanalysis, and image analysis. The theory and development of electron imaging and analysis as well as case studies. The laboratory focuses on sample preparation, imaging, and elemental analysis. (Formerly GEO 6803. Credit cannot be earned for both EES 6803 and GEO 6803.)

6813 Water Resources

(3-0) 3 hours credit.

Application of management principles to the efficient use of water resources by people and their public and private institutions. Water is examined in terms of its value, use, and changing role in the context of economics, history, politics, and technology. (Formerly ES 6813. Credit cannot be earned for both EES 6813 and ES 6813.)

6823 Land Resources

(3-0) 3 hours credit. Prerequisite: EES 5033 or consent of instructor.

The changing role of land as a resource as it relates to human and technological development. Land use and land-use planning in the rural-urban fringe is considered, as is the management of land as a resource in range, forestry, and agricultural production. (Formerly ES 6823. Credit cannot be earned for both EES 6823 and ES 6823.)

6853 Energy Resources

(3-0) 3 hours credit.

Energy utilization, energy resources development, availability of alternatives and energy resources management, conservation, and policy are presented. Applicable physical principles related to the economics, conservation, and technology of energy are covered. (Formerly ES 6853. Credit cannot be earned for both EES 6853 and ES 6853.)

6863 Air Quality Management

(3-0) 3 hours credit.

Introduction to the field of air pollution control: sources and physical, chemical, and biological effects of air pollutants. Overall objectives and systematic efforts to deal with air pollution, including air quality criteria; development of air quality standards and plans for implementing them. (Formerly ES 6863. Credit cannot be earned for both EES 6863 and ES 6863.)

6883 Solid Waste Management

(3-0) 3 hours credit.

Practical aspects of solid waste management, with emphasis placed on the interrelationship of environmental, economic, institutional, and technological aspects of source reduction, recycling, waste to energy, and perpetual care. (Formerly ES 6883. Credit cannot be earned for both EES 6883 and ES 6883.)

6901-3 Experimental Techniques in the Environmental Sciences

(1-0, 2-0, 3-0) 1 to 3 hours credit. Prerequisite: Consent of instructor.

Topics will include various research methods in environmental science. May be repeated for credit as topics vary. (Formerly ES 6901-3. Unless topic varies, credit cannot be earned for both EES 6901-3 and ES 6901-3.)

6941 Environmental Science Colloquium

(1-0) 1 hour credit. Prerequisite: Graduate standing.

Discussions of current journal articles, reviews, and recent advances in specialized areas of the biological sciences. May be repeated for credit as topics vary. The grade report for this course is either "CR" (satisfactory participation in the colloquium) or "NC" (unsatisfactory participation in the colloquium). (Formerly ES 6941. Same as BIO 7041. Unless topic varies, credit cannot be earned for both EES 6941 and ES 6941 or BIO 7041.)

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree. (Formerly ES 6951-3 and GEO 6951-3.)

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). (Formerly ES 6961 and GEO 6961.)

6963 Internship

3 hours credit. Prerequisites: Graduate standing and consent of Graduate Advisor of Record.

An opportunity for students to work in a setting that permits them to apply what they have learned in the formal instruction part of the program. May be repeated for credit, but not more than 3 hours will apply to the Master's degree. (Formerly ES 6963. Credit cannot be earned for both EES 6963 and ES 6963.)

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when the topics vary, but not more than 6 hours, regardless of discipline, will apply to a Master's degree. Field trips may be required. (Formerly ES 6973 and GEO 6973.)

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. (Formerly ES 6983 and GEO 6983.)

7211-3 Doctoral Research

1 to 3 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.

May be repeated for credit, but no more than 15 hours may be applied to the Doctoral degree.

7311-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisite: Admission to candidacy for the Doctoral degree.

May be repeated for credit, but no more than 15 hours may be applied to the Doctoral degree.

DEPARTMENT OF MATHEMATICS

Master of Science Degree in Mathematics

The Master of Science degree in Mathematics is offered with two concentrations: mathematics and mathematics education.

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, a Bachelor of Arts or Bachelor of Science in Mathematics or a closely related field is highly recommended as preparation. Students who do not qualify for unconditional admission should anticipate that additional undergraduate and/or graduate coursework may be required to complete the degree. It is recommended that the applicant submit two letters of reference, preferably from those who can speak to the applicant's mathematical abilities.

Degree Requirements. Degree candidates are required to successfully complete 36 semester credit hours.

A. Students must choose one of the following concentrations:

Mathematics Concentration (18 semester credit hours):

MAT	5173	Algebra I
MAT	5203	Theory of Functions of a Real Variable I
MAT	5223	Theory of Functions of a Complex Variable I
MAT	5243	General Topology I
		or
STA	5503	Mathematical Statistics I
MAT	5283	Linear Algebra and Matrix Theory
MAT	5603	Numerical Analysis

Mathematics Education Concentration (15 semester credit hours):

MAT	5023	Problem-Solving Seminar
MAT	5033	Foundations and Fundamental Concepts of Mathematics
MAT	5043	Euclidean and Non-Euclidean Geometry
MAT	5203	Theory of Functions of a Real Variable I
MAT	5283	Linear Algebra and Matrix Theory

- B. Students must either write a Master's thesis or complete 6 semester credit hours of advanced courses in the department as approved by the Graduate Advisor of Record.
- C. Students must normally take an additional 12 (Mathematics Concentration) or 15 (Mathematics Education Concentration) semester credit hours of coursework chosen from eligible graduate courses in the Department of Mathematics. Students pursuing the concentration in Mathematics Education may apply a maximum of 9 semester credit hours of graduate coursework from other disciplines, MAT 6963 Topics in Mathematics Education, or a combination thereof, as approved by the Graduate Advisor of Record. Students pursuing the concentration in Mathematics may apply a maximum of 6 semester credit hours of graduate coursework from other disciplines as approved by the Graduate Advisor of Record.
- D. Students are required to pass an advanced comprehensive examination or successfully defend their thesis research results.

For more details and information about a sequence requirement, see the Graduate Advisor of Record and/or the College Web page at <http://www.utsa.edu/cos/departments.htm>.

Master of Science Degree in Applied Mathematics–Industrial Mathematics

The Master of Science Degree in Applied Mathematics–Industrial Mathematics is designed to provide students the opportunity for advanced training in marketable areas of Applied Mathematics, using research to solve real-world problems in the field of Applied Mathematics, and with preparation for leadership positions in the field. In order to provide students with advanced training in marketable areas, 15 semester credit hours of graduate mathematics courses and 12 semester credit hours of graduate courses in a discipline of professional specialization are required. Research exposure to and experience with real-world problems will be provided by enrollment in AIM 6943, Internship and Research Project. This course introduces students to research problems in the field as well as the opportunities to solve a real-life problem in an industrial setting. Students will prepare for leadership positions in the field by taking two courses in communication, leadership, and/or basic business practices.

Program Admission Requirements. To be admitted to the degree program for the M.S. in Applied Mathematics–Industrial Mathematics, applicants must satisfy the University-wide requirements for admission to graduate programs. The applicant must have completed a bachelor's degree in mathematics, science, engineering, or a related field and must have taken Calculus I, Calculus II, and Linear Algebra. The applicant must also submit three letters of reference from qualified scientists, mathematicians, or supervisors that can certify their ability to pursue studies in science at the master's level.

Degree Requirements. Degree candidates are required to successfully complete 36 semester credit hours. The M.S. Degree Program Committee will review adjustments or waivers to requirements on a case-by-case basis.

Candidates for the degree must complete:

A. 6 semester credit hours:

AIM	5113	Introduction to Industrial Mathematics
MAT	5283	Linear Algebra and Matrix Theory

B. 9 semester credit hours of electives selected from the following:

MAT	5203	Theory of Functions of a Real Variable I
MAT	5223	Theory of Functions of a Complex Variable I
MAT	5293	Numerical Linear Algebra
MAT	5603	Numerical Analysis
MAT	5613	Numerical Solutions of Differential Equations
MAT	5653	Differential Equations I
MAT	5673	Partial Differential Equations I
MAT	5973	Directed Research
MAT	6603	Optimization Techniques in Operations Research
MAT	6973	Special Problems

C. An additional 12 semester credit hours from four graduate courses selected from one or two disciplines in the student's professional area of specialization. Such disciplines include, but are not limited to, biology, chemistry, computer science, economics, finance, education, environmental science and engineering, mathematics, physics, civil engineering, electrical engineering, and mechanical engineering.

D. AIM 6943 Internship and Research Project

Upon completion of 12 semester credit hours in mathematics, a student is eligible to enroll in the Internship and Research Project course. The student must spend a semester in an industrial setting and must complete an internship-related project.

To complete the internship-related project, the student will:

- Submit a one-page preinternship proposal outlining the proposed work for approval by the student's Supervising Professor.

- Complete the proposed work after the internship has been completed.
- Defend the project before the deadlines set forth by the University.

Students already employed in industry can negotiate an alternative internship experience. In certain circumstances, an intensive research assistantship at UTSA can be substituted for the internship in industry.

- E. 6 semester credit hours selected from coursework in communications, leadership skills, and business principles. Examples include:

MGT	5003	Conceptual Foundations of Management
MGT	5043	Management and Behavior in Organizations
MGT	5093	Leadership
MGT	5133	Organizational Decision Making
MGT	5813	Strategic Human Resources Management

COURSE DESCRIPTIONS

MATHEMATICS

(MAT)

5003 Modern Mathematics for Teachers

(3-0) 3 hours credit.

A practical orientation concerned with the classroom uses of mathematics for teachers of K-12. This course may not be applied toward the Master of Science degree in Mathematics with a concentration in Mathematics.

5013 Computers for Mathematics Teachers

(3-0) 3 hours credit.

A course for mathematics teachers on integrating the computer into the mathematics curriculum, with a focus on mathematical problem solving through the use of mathematical software packages. This course may not be applied to the Master of Science degree in Mathematics with a concentration in Mathematics.

5023 Problem-Solving Seminar

(3-0) 3 hours credit.

Students will have the opportunity to engage in extensive experience and practice in solving mathematical problems.

5033 Foundations and Fundamental Concepts of Mathematics

(3-0) 3 hours credit.

Topics include the study of mathematics in antiquity as an empirical science, the shift from inductive reasoning to axiomatic structures, the development of geometry in the plane and 3-space, the discovery of analysis, the emergence of axiomatic systems, and the focus on algebraic structures. This course may not be applied to the Master of Science degree in Mathematics with a concentration in Mathematics.

5043 Euclidean and Non-Euclidean Geometry

(3-0) 3 hours credit.

Topics will be selected from advanced Euclidean and non-Euclidean geometry, solid analytic geometry, and differential geometry.

5103 Introduction to Mathematical Analysis

(3-0) 3 hours credit. Prerequisite: MAT 4213 or consent of instructor.

Axiomatic construction of the reals, metric spaces, continuous functions, differentiation and integration, partial derivatives, and multiple integration. This course may not be applied to the Master of Science degree in Mathematics with a concentration in Mathematics. For the Mathematics Education concentration, this course can substitute for MAT 5203. (Credit cannot be earned for both MAT 5103 and MAT 5203.)

- 5173 Algebra I**
(3-0) 3 hours credit. Prerequisite: MAT 4233 or consent of instructor.
The opportunity for development of basic theory of algebraic structures. Areas of study include finite groups, isomorphism, direct sums, polynomial rings, algebraic numbers, number fields, unique factorization domain, prime ideals, and Galois groups.
- 5203 Theory of Functions of a Real Variable I**
(3-0) 3 hours credit. Prerequisite: MAT 4213 or consent of instructor.
Measure and integration theory. (Credit cannot be earned for both MAT 5203 and MAT 5103.)
- 5213 Theory of Functions of a Real Variable II**
(3-0) 3 hours credit. Prerequisite: MAT 5203.
Further development of measure and integration theory, metric space topology, and elementary Banach space theory.
- 5223 Theory of Functions of a Complex Variable I**
(3-0) 3 hours credit. Prerequisite: MAT 3213 or MAT 4213.
Complex integration, Cauchy's theorem, calculus of residues, and power series.
- 5233 Theory of Functions of a Complex Variable II**
(3-0) 3 hours credit. Prerequisite: MAT 5223.
Infinite products, entire functions, Picard's theorem, Riemann mapping theorem, and functions of several complex variables.
- 5243 General Topology I**
(3-0) 3 hours credit. Prerequisite: MAT 4273 or consent of instructor.
Topological spaces, metric spaces, continua, and plane topology.
- 5253 General Topology II**
(3-0) 3 hours credit. Prerequisite: MAT 5243.
Areas of study include introductory algebraic topology and introduction to topology of manifolds.
- 5283 Linear Algebra and Matrix Theory**
(3-0) 3 hours credit. Prerequisite: MAT 2233 or an equivalent.
A study of linear algebraic structures and algebraic properties of matrices.
- 5293 Numerical Linear Algebra**
(3-0) 3 hours credit. Prerequisite: MAT 2233 or an equivalent.
Direct and iterative methods for solving general linear systems, the algebraic eigenvalue problem, least squares problems, and solutions of sparse systems arising from partial differential equations. (Same as CS 5293. Credit cannot be earned for both MAT 5293 and CS 5293.)
- 5313 Algebra II**
(3-0) 3 hours credit. Prerequisite: MAT 5173.
Areas of study include: groups, rings, fields, Galois theory, ideal theory, and representations of groups, module theory, and homological algebra.
- 5403 Functional Analysis I**
(3-0) 3 hours credit. Prerequisites: MAT 2233, MAT 4273, and MAT 5203, or their equivalents.
Topological vector spaces, inner product spaces, normed spaces, Hilbert spaces and Banach spaces, dual spaces, Hahn-Banach theorem, and bounded linear operators.
- 5413 Functional Analysis II**
(3-0) 3 hours credit. Prerequisite: MAT 5403.
Riesz representation theorem, spectral theory, Banach algebras, and C^* -algebras.

5553 Harmonic Analysis

(3-0) 3 hours credit. Prerequisites: MAT 3223 and MAT 4223, or consent of instructor.

Theory of the Fourier, Laplace, and Hilbert transforms. Elements of the distribution theory. Harmonic functions. Function spaces: L_p -spaces, Hardy spaces, Sobolev spaces.

5603 Numerical Analysis

(3-0) 3 hours credit. Prerequisite: MAT 3633 or consent of instructor.

Emphasis on the mathematical analysis of numerical methods. Areas of study include solution of nonlinear equations and function optimization, approximation theory and numerical quadrature. (Same as CS 5603. Credit cannot be earned for both MAT 5603 and CS 5603.)

5613 Numerical Solutions of Differential Equations

(3-0) 3 hours credit. Prerequisite: MAT 5603 or an equivalent.

Emphasis on the mathematical analysis of numerical methods. Areas of study include the analysis of single and multistep methods of ordinary differential equations. Analysis of finite difference and finite element methods for partial differential equations.

5653 Differential Equations I

(3-0) 3 hours credit. Prerequisites: MAT 3613 and MAT 4213, or consent of instructor.

Solution of initial-value problems, linear systems with constant coefficients, exponentials of operators, canonical forms and generic properties of operators, and contractions.

5663 Differential Equations II

(3-0) 3 hours credit. Prerequisite: MAT 5653.

Dynamic systems, the fundamental existence and uniqueness theorem, stability, the Poincare-Bendixson theorem, introduction to perturbation, and bifurcation theory.

5673 Partial Differential Equations I

(3-0) 3 hours credit. Prerequisite: MAT 3623, MAT 5663, or consent of instructor.

Classical theory of initial value and boundary value problems for partial differential equations.

5683 Partial Differential Equations II

(3-0) 3 hours credit. Prerequisite: MAT 5673.

Modern topics in partial differential equations.

5833 Perturbation Theory in Applied Mathematics

(3-0) 3 hours credit. Prerequisite: MAT 3613, MAT 5653, or consent of instructor.

Perturbation theory, asymptotic analysis, and boundary layer expansions.

5973 Directed Research

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6603 Optimization Techniques in Operations Research

(3-0) 3 hours credit. Prerequisite: MAT 2213, MAT 2233, or consent of instructor.

Analysis and application of optimization techniques in operations research. Emphasis on linear programming, nonlinear programming, and integer programming.

6901 Teaching Seminar

(1-0) 1 hour credit. Prerequisite: Designation as a teaching assistant in the Department of Mathematics.

Designed to improve the instructional effectiveness of graduate students' teaching at the college level. Topics include boardwork, clear speech, teacher-student interaction, professional responsibilities, course content and pace, grading

policy, test writing, sensitivity to student needs, information and technical support and guest lectures on special topics. This course may not be applied as credit toward a Master of Science degree in Mathematics.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the appropriate graduate program committee to take the Comprehensive Examination.

Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

6963 Topics in Mathematics Education

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. This course may be repeated for credit when topics vary but not more than 9 hours may be applied toward the Master's degree. This course may not be applied toward the Master of Science degree in Mathematics with a concentration in Mathematics.

6973 Special Problems

(3-0) 3 hours credit. Prerequisite: Consent of instructor.

An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Problems courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Master's degree.

6983 Master's Thesis

3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.

Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

COURSE DESCRIPTIONS APPLIED-INDUSTRIAL MATHEMATICS (AIM)

5113 Introduction to Industrial Mathematics

(3-0) 3 hours credit. Prerequisites: MAT 1214, MAT 1223, and MAT 2233, or consent of instructor.

The topics covered include quality control, Monte Carlo methods, linear programming, model fitting, frequency domain methods, difference and differential equations, and report writing. The course is not designed to substitute for any specialized course covering these topics in detail, but rather to survey their real-world applications.

6943 Internship and Research Project

3 hours credit. Prerequisites: Completion of at least 12 semester credit hours of coursework in mathematics or consent of the student's Supervising Professor; confirmation of approved internship.

Provides students with hands-on experience in industrial mathematics or a related field in a professional environment. The research work may be either an extended project or a variety of shorter assignments.

DEPARTMENT OF PHYSICS AND ASTRONOMY

The Master of Science (M.S.) in Physics and the Doctor of Philosophy (Ph.D.) in Physics programs offer opportunities for advanced study and research designed to prepare students for roles in industry, government, research institutes, or educational institutions. For the M.S. program, the thesis option is recommended for students who are planning a career in research or who contemplate pursuing a doctorate in their program of study. A nonthesis option is available for students with other goals. The Ph.D. program is broad-based and will prepare students for a variety of options in physics and related fields upon graduation.

Graduate students will be able to choose among several areas of specialization in experimental and theoretical physics, including condensed matter and advanced materials physics, biophysics, laser spectroscopy, theoretical particle physics and cosmology, mathematical physics, and computational physics. Areas of expertise among the adjunct faculty at Southwest Research Institute include space weather, ionosphere-thermosphere-mesospheric physics, plasmaspheric physics, magnetospheric physics, heliospheric physics, cometary and planetary science, space physics instrumentation, and computational space physics.

A limited number of teaching and/or research assistantships and fellowships are available to qualified students. Financial assistance is limited and is awarded on a competitive basis.

Master of Science Degree in Physics

The purpose of the Master of Science (M.S.) degree program in Physics is to offer students the opportunity to acquire a sound preparation of the fundamentals in several areas of physics, to introduce students to recent advances in physical theory and methods, and to encourage research in a specific area of study.

Faculty expertise in each of the interest areas offers the opportunity for direct student-faculty interaction for thesis development through coursework and research. Additional cooperative projects and programs are available with other area research institutions.

Qualified students are encouraged to apply for teaching and/or research assistantships and fellowships. Requests should be sent to the Graduate Advisor of Record for physics when application is made for admission to UTSA.

Admission Requirements. Students must satisfy the University-wide graduate admission requirements. Applicants must have a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in their last 60 credit hours of coursework, preferably in physics. Applicants with fewer than 12 credit hours of upper-division undergraduate physics coursework may be admitted as Special Graduate students under the condition that they complete 12 hours of upper-division undergraduate physics coursework before admission as Master's students.

Applicants must submit scores from the Graduate Record Examination (GRE). When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds. A minimum of two letters of recommendation from persons familiar with the applicant's undergraduate scholastic record must be sent to the Graduate School at the same time application is made for admission to UTSA. Background or remedial courses in physics may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 500 and 600 (paper version) or 173 and 250 (computerized version). See Chapter 2, Admission, of this catalog for details.

Thesis Option in Physics

Degree Requirements. The Master of Science program requires the successful completion of a minimum of 30 semester credit hours. Candidates must complete the following:

A. Required courses (21 semester credit hours):

PHY	5103	Classical Mechanics I
PHY	5203	Electrodynamics I
PHY	5303	Statistical Mechanics
PHY	6003	Quantum Mechanics I
PHY	6983	Master's Thesis, including an oral defense of the written thesis (repeated for a total of 6 semester credit hours)
PHY	7013	Research Seminar

Students must enroll in Master's Thesis each semester that they receive advice and assistance in writing the thesis until final approval of the completed thesis has been given and the thesis has been filed with the Dean of the Graduate School. However, no more than 6 hours will count toward the M.S. degree.

- B. 6 semester credit hours of general physics electives, as approved by the Graduate Advisor of Record.
- C. 3 semester credit hours of advanced physics electives, as approved by the Graduate Advisor of Record, preferably with affinity to the area of research.
- D. Students must pass a final oral comprehensive examination for completion of the degree program. The comprehensive examination is scheduled during the student's last semester of work.
- E. Students must successfully defend their thesis research results before their Graduate Committee prior to the submission of the thesis to the Dean of the Graduate School for approval.

Nonthesis Option in Physics

Degree Requirements. This program requires the successful completion of a minimum of 30 semester credit hours. Candidates for the degree must complete the following:

A. Required courses (12 semester credit hours):

PHY	5103	Classical Mechanics I
PHY	5203	Electrodynamics I
PHY	5303	Statistical Mechanics
PHY	7013	Research Seminar

- B. 9 semester credit hours of general physics electives and 9 semester credit hours from advanced physics electives, as approved by the Graduate Advisor of Record.
- C. Students must pass a final oral comprehensive examination for completion of the degree program. The comprehensive examination is scheduled during the student's last semester of work.

Doctor of Philosophy Degree in Physics

The Department of Physics, in partnership with the Southwest Research Institute, offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Physics. The Ph.D. in Physics is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their field of specialty.

The regulations for this degree comply with the general University regulations (refer to Chapter 3, General Academic Regulations, and Chapter 6, Doctoral Degree Regulations).

Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, applicants must have a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in the last 60 credit hours of undergraduate coursework and all graduate work, preferably in physics. Applicants must submit scores from the Graduate Record Examination (GRE) with their application. When GRE scores are used to determine an admission, applicants will be compared to applicants with similar socioeconomic backgrounds. A minimum of two letters of recommendation from persons familiar with the applicant's undergraduate (and graduate, where applicable) scholastic record must be sent to the Graduate School at the same time application is made for admission to UTSA. Background or remedial courses in physics may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). The English Language Assessment Procedure is a mandatory assessment for incoming international students whose TOEFL scores are between 500 and 600 (paper version) or 173 and 250 (computerized version). See Chapter 2, Admission, of this catalog for details.

Degree Requirements. The doctoral degree requires a minimum of 81 semester credit hours beyond the baccalaureate degree. The coursework in the Program of Study includes a Core Curriculum (9 semester credit hours), General Physics Electives (18 semester credit hours), and Advanced Physics Electives (18 semester credit hours). Research hours, including Research Seminar (3 semester credit hours), Directed and Doctoral Research (21 semester credit hours) and Dissertation (12 semester credit hours), totaling at least 36 semester credit hours, complete the Program of Study.

Program of Study

A. Core Curriculum (9 semester credit hours):

PHY	5103	Classical Mechanics I
PHY	5203	Electrodynamics I
PHY	5303	Statistical Mechanics

B. General Physics Electives (18 semester credit hours selected from the following):

PHY	6003	Quantum Mechanics I
PHY	6103	Classical Mechanics II
PHY	6113	Fluid Mechanics
PHY	6123	Plasma Physics and Magnetohydrodynamics (MHD)
PHY	6203	Electrodynamics II
PHY	6303	Quantum Mechanics II
PHY	6313	Solid State Physics
PHY	6323	Nonlinear Optics and Lasers
PHY	6403	Fundamentals of Space Physics
PHY	6413	Fundamentals of Astronomy
PHY	6503	Mathematical Physics I
PHY	6513	Mathematical Physics II
PHY	6523	Computational Physics
PHY	6613	Methods of Experimental Physics
PHY	6623	Space Physics Laboratory

C. Advanced Physics Electives (18 semester credit hours selected from the following):

Topics courses may be repeated for a total of 6 semester credit hours each.

PHY	7403	Topics in Biophysics and Biomedical Physics
PHY	7703	Topics in Space Physics and Astrophysics
PHY	7803	Topics in Theoretical Physics
PHY	7973	Special Topics in Physics

D. Doctoral Research (36 semester credit hours):

PHY	7001-3	Directed Research (6 hours; prior to passing qualifying exam)
PHY	7013	Research Seminar (3 hours)
PHY	7101-3	Doctoral Research (15 hours; after successfully passing qualifying exam)
PHY	7111-3	Dissertation (12 hours)

Students must enroll in PHY 7111-3 Dissertation each semester that they receive advice and/or assistance on their dissertation. However, no more than 12 semester credit hours will count toward the Ph.D. degree.

The entire program of study must be approved by the student's Dissertation Advisor, Dissertation Committee, and Graduate Program Committee and must be submitted to the Dean of the Graduate School for final approval.

Advancement to Candidacy. All students seeking a doctoral degree at UTSA must be admitted to candidacy. One of the requirements for admission to candidacy is passing the Doctoral Qualifying Examination. Students should consult the University's Doctoral Degree Regulations (Chapter 6 of this catalog) for the other requirements.

Qualifying Examination. The qualifying examination is divided into written and oral portions. The written portion will be organized by the Graduate Program Committee. Students should contact the Graduate Advisor for details. The oral portion must be taken within one year after passing the written portion of the qualifying examination and will be evaluated by the student's Dissertation Committee.

Final Oral Examination. The final oral defense consists of a public presentation of the dissertation and a closed oral defense. It is administered and evaluated by the student's Dissertation Committee and covers the dissertation and the general field of the dissertation. The Dissertation Committee must approve the dissertation.

COURSE DESCRIPTIONS

PHYSICS

(PHY)

- 5103 Classical Mechanics I**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Newtonian, Lagrangian, and Hamiltonian formulations. Orbital Dynamics, Symmetries, and conservation laws. Relativistic dynamics.
- 5203 Electrodynamics I**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Electrostatics and magnetostatics; boundary value problems, Maxwell's equations; plane waves; wave guides diffraction; multipole radiation.
- 5303 Statistical Mechanics**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Thermodynamics, equilibrium statistical mechanics, Boltzmann equation and the collision operator, moments of the Boltzmann equations, the Navier-Stokes equations, introduction to nonequilibrium concepts, ensembles, classical and quantum gases, statistical physics of solids.
- 6003 Quantum Mechanics I**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Postulates. Hilbert space formulation, the Schrödinger equation and one-dimensional problems, the hydrogen atom, symmetries, rotational invariance and angular momentum, spin, system with N-degrees of freedom.

6103 Classical Mechanics II

(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5103, or consent of instructor.
Hamilton-Jacobi theory, continuous media, nonlinear dynamics and chaos, instabilities, pattern formation, the three-body problem, dust, planets, and planetary systems.

6113 Fluid Mechanics

(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5103, or consent of instructor.
Ideal fluids, viscous flow, turbulence, sound propagation, shock waves, Rankine-Hugoniot Relations.

6123 Plasma Physics and Magnetohydrodynamics (MHD)

(3-0) 3 hours credit. Prerequisites: Graduate standing, PHY 5103 and PHY 5203, or consent of instructor.
Plasma equations, magnetohydrodynamics (MHD), waves and instabilities in two-fluid model, Vlasov and Fokker-Planck equations, Landau damping, turbulence in plasmas, radiation in plasmas, quasi-linear theory, wave-particle interaction, kinetic theory in space plasmas.

6203 Electrodynamics II

(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5203, or consent of instructor.
Relativistic formulation of Maxwell equations, radiation from moving charges, collisions of charged particles, radiation damping, introduction to plasmas, and magnetohydrodynamics.

6303 Quantum Mechanics II

(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5303 and PHY 6003, or consent of instructor.
Variational and WKB methods, time-independent and time-dependent perturbation theory, scattering, path integration, introduction to relativistic quantum mechanics and the Dirac equation.

6313 Solid State Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Lattice vibrations and thermal properties of solids; band theory of solids, transport properties of metals and semiconductors; optical properties; magnetic properties; magnetic relaxation; superconductivity, elementary excitations: phonons, electrons, spin waves; interactions: phonon-phonon, electron-electron, electron-phonon, theory of metals and semiconductors, transport theory; and optical properties.

6323 Nonlinear Optics and Lasers

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Topics to be discussed in this course will include Gaussian beam optics, interaction of electromagnetic radiation with matter, semi-classical laser theory, experimental laser systems, nonlinear optical susceptibilities, harmonic generation, wave mixing, electro-optic and acousto-optic effects, coherent transient effects, optical breakdown, and laser-plasma interactions.

6403 Fundamentals of Space Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
The Sun, solar models, solar and stellar winds, heliosphere and astrospheres, synthesis of elements in the Sun and stars, solar system composition and cosmic abundances, terrestrial magnetosphere, ionosphere and thermosphere, comparative planetary magnetospheres and atmospheres.

6413 Fundamentals of Astronomy

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Photometry, stellar models, variable stars, white dwarfs, neutron stars, supernovae, cosmic rays, galaxies and galactic structure, and introduction to cosmology.

6503 Mathematical Physics I

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Linear algebra, ordinary and partial differential equations, special functions, eigenvalue problems, complex analysis, group theory.

- 6513 Mathematical Physics II**
(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 6503, or consent of instructor.
Advanced topics in mathematical physics, topology, functional analysis, differentiable manifolds, Lie groups and algebras, and cohomology theory.
- 6523 Computational Physics**
(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5103 and 5203, or consent of instructor.
Introduction to numerical techniques for solving physics problems, theory of computation and applications to various branches of physics, sample problems might include chaotic motion and nonlinear dynamics, plasmas, particle trajectories, Monte Carlo simulations, dynamical and statistical descriptions of many-body problems, Hyperbolic, Parabolic, and Elliptic differential equations and solution techniques, Stability Analysis.
- 6613 Methods of Experimental Physics**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
This course is aimed at training graduate students in the basic aspects of experimental physics, such as instrumentation, data acquisition, and statistical treatment of data and error analysis, introduction to modern equipment control and data acquisition with LabVIEW, equipment design, detectors and interfaces.
- 6623 Space Physics Laboratory**
(1-4) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Vacuum systems, detectors, charged and neutral particle instruments, magnetic and electric field instruments, imagers (optical, UV, X-ray), instrument control and on-board data processing systems, spacecraft systems, data processing and analysis.
- 6953 Independent Study**
3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record.
Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work not normally or not often available as part of the regular course offerings. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the degree.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Approval of the appropriate Graduate Program Committee to take the Comprehensive Examination. Credit does not count toward total required hours for the M.S. degree.
Independent study course for the purpose of taking the Comprehensive Examination. May be repeated as many times as approved by the Graduate Program Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).
- 6983 Master's Thesis**
3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and thesis director.
Thesis research preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.
- 7001-3 Directed Research**
1 to 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
The directed research course may involve either a laboratory or a theoretical problem. Normally a written report is required. This course may be repeated for credit, but not more than 6 hours will apply to the Master's degree, or 18 hours toward the Doctoral degree.

7013 Research Seminar

3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Formal presentations of research by outside authorities, as well as current research seminars presented by faculty, visiting lecturers, and Ph.D. candidates. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). This course may include a written component.

7101-3 Doctoral Research

1 to 3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and dissertation director.

Doctoral research and preparation in the chosen area of concentration. May be repeated for credit, but not more than 18 hours will apply to the Doctoral degree.

7111-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and dissertation director.

Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

7403 Topics in Biophysics and Biomedical Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Topics may include the following:

Topic 1: Biophysical Chemistry. Molecular structure of biological systems, energetics and entropy, relationship between structure and function of proteins and nucleic acids, structure prediction, role of hydration.

Topic 2: Biomolecular Spectroscopy. Prerequisite: Completion of Topics class in Biophysical Chemistry.

Introduction to traditional and modern optical spectroscopic techniques to the study of biological molecules. Physical basis of absorption, fluorescence, circular dichroism, and FTIR spectroscopy. Introduction to time resolved techniques (time-correlated single photon counting, transient absorption spectroscopy). Photoacoustic calorimetry, near-field scanning optical microscopy, atomic force microscopy, small angle X-ray and neutron scattering.

Topic 3: Biophotonics. Optical methodologies for imaging, diagnosis, and therapy in biology and medicine. Review of basic elements of optics and optical sources, lasers and light-emitting solid state devices, in the context of biomedical applications. Dosimetry, tissue optics, and the principles of laser-tissue interaction. Current medical uses of lasers, along with their scientific and technical foundations.

Topic 4: Biomedical Physics. Use of fundamental physical laws and experimental techniques to numerous biomedical fields such as applications of lasers to ophthalmology, lithotripsy, and dentistry will be covered.

May be repeated for credit as topics vary.

7703 Topics in Space Physics and Astrophysics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Topics may include the following:

Topic 1: Heliospheric Physics. The connection between the Sun and solar wind. Formation of transient events such as Coronal Mass Ejections (CMEs), co-rotating interaction regions, solar energetic particles, plasma waves, pickup ions and mass loading, anomalous cosmic rays, heliospheric boundaries and interaction with the local interstellar medium, energetic neutral atoms (ENAs).

Topic 2: Magnetospheric Physics. Earth's bow shock, magnetopause, magnetotail, plasma sheet, ring current and plasmasphere. Current systems, reconnection, magnetospheric storms and substorms, ionospheric interactions, aurora borealis. The geocorona and ENA emissions.

Topic 3: Space Weather. Solar events, CMEs, flares, interplanetary shocks and solar energetic particles, solar event prediction. Magnetospheric preconditioning, energy storage and release. Energy dissipation and interaction with the Ionosphere, Thermosphere, Mesosphere, geomagnetic responses, indices and prediction. Societal consequences of space weather.

Topic 4: Planetary Science. Planets, planetary atmospheres, and planetary magnetospheres. Planetary formation, composition, dynamics, end evolution of the solar system. Comparative planetology, interplanetary dust, comets, asteroids, and Kuiper belt objects. Extra-solar planets, astrobiology, exobiology, and the search for life beyond Earth.

Topic 5: Computational Fluid Dynamics. Numerical Solution Techniques for Hyperbolic, Parabolic, and Elliptic differential equations. Matrix inversion and sparse-matrix inversion. Introduction to parallelization, MPI, and mesh refinement. The course will conclude with a project for a relevant numerical problem (e.g., a one-dimensional, time-dependent calculation of the formation of a supersonic solar wind).

Topic 6: Cosmology. Basics of general relativity. The cosmological principle and Friedmann models, thermal history of the universe, structure formation, the cosmic microwave background, baryonic structures formation, dark matter and dark energy, particle physics and the early universe, inflationary cosmology.

May be repeated for credit as topics vary.

7803 Topics in Theoretical Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Topics may include the following:

Topic 1: General Relativity. Special relativity, tensor analysis, Einstein field equations, the Schwarzschild solution, Newtonian limit, orbits, black holes, gravitational waves. Introduction to cosmology.

Topic 2: Advanced Condensed Matter Physics. High-temperature superconductivity, critical phenomena, quantum fluids, spin glasses, quantum wells and quantum dots, quantum Hall effect.

Topic 3: Quantum Field Theory and Particle Physics. Canonical field quantization, quantum electrodynamics, Feynman diagrams, renormalization, Feynman path integration, gauge symmetries, the standard model of particle physics (quantum chromodynamics and the electroweak theory). Introduction to unification and supersymmetry.

May be repeated for credit as topics vary.

7973 Special Topics in Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An organized course offering the opportunity for specialized study which may not normally or not often be available as part of the regular course offerings. May be repeated for credit as topics vary.

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