
GRADUATE CATALOG

2011–2013

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
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 2011

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Students should refer to *UTSA Information Bulletin* (<http://utsa.edu/infoguide/>) for additional policies, procedures, and information directly related to their enrollment at UTSA.

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.

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admission

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CHAPTER

admission

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ADMISSION

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 by calling 1-800-717-GMAT. The institution code for UTSA is 6919, for both the GRE and the GMAT. At the time the student enrolls, the test score must be less than five (5) years old. 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, to the extent such information is available. 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.
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.
6. Have approval of the Dean of the Graduate School.

Admission is based on the last 60 hours attempted in all undergraduate, graduate and postgraduate coursework. Students must list on the application for graduate admission all community colleges, colleges and universities attended and request an official

transcript from each institution attended be sent to the Graduate School. Official transcripts from the institution conferring the last degree must be on file at the Graduate School prior to enrollment. 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. Holding 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. Submission of test scores or other indicators of preparation for graduate study that are unavoidably lacking at the time of admission.
3. Completion of additional coursework or other study to remove deficiencies, with such makeup work to be in addition to the regular degree requirements; any undergraduate courses in addition to coursework to remove deficiencies must not exceed 18 hours and must be completed with a grade point average of “B” (3.0 on a 4.0 scale) or better.
4. 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 2, 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 as 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 Graduate Reinstatement in Chapter 2, 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 may result 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.

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.

Admission is based on the last 30 hours attempted in all undergraduate, graduate and postgraduate coursework. Students must list on the application for graduate admission all community colleges, colleges and universities attended and request an official transcript from each institution attended be sent to the Graduate School. Official transcripts from the institution conferring the last degree must be on file at 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.

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 that students 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.

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.
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 the *UTSA Information Bulletin*).

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. 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 in 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 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 on all graduate-level coursework taken.
3. Be in good standing at the last institution attended.
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.

Admission is based on the last 30 hours attempted in all undergraduate, graduate and postgraduate coursework. Students must list on the application for graduate admission all community colleges, colleges and universities attended and request an official transcript from each institution attended be sent to the Graduate School. Official transcripts from the institution conferring the last degree must be on file at 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.

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.
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.

Applicants must meet the following criteria:

1. Meet the graduate admission requirements as a degree-seeking applicant.
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. For qualifying minimum IELTS scores, refer to the Graduate School Web site (www.graduateschool.utsa.edu). Scores must be sent directly to the Graduate School. At the time the student enrolls, the test score must be less than two (2) years old. Our institution code is 6919.

	TOEFL Internet	TOEFL Paper
English Language Assessment Program (ELAP) Exempt	100	600
Master's Admission Qualification*	61	500
Doctoral Admission Qualification	79	550

*The minimum score required on the TOEFL. Individual degree programs may have higher TOEFL or IELTS requirements for their various programs. Consult the individual department Web sites for more information.

Participation in UTSA's English Language Assessment Program (ELAP), before registration, is required of students with TOEFL scores below 600 (paper version) or 100 (Internet based) or an IELTS score below 7. Based on this assessment, students needing additional instruction in English are required to enroll in appropriate English for International Students (EIS) courses.

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.

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
Grand Cayman	United Kingdom
Grenada	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 for The College Board. For more information visit www.ets.org/toefl.

3. Submit a financial statement guaranteeing the 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. The application, nonrefundable application fee (\$80 online), and official supporting credentials should be 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 Deadlines and Fees below.

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 (Standard or Supplemental) at the Graduate Level

An applicant who desires to work on teacher certification in EC–6, Special Education, or Secondary Mathematics and Science, and who holds a bachelor's degree should apply as a graduate degree-seeking student to the Graduate Program Committee for the M.A. in Education for teacher certification. Those interested in teaching at the grades 4–8 level should apply to the Accelerated Teacher Education Program (ATEP) in the College of Education and Human Development. Applicants who desire to work on certificates in Bilingual Education and English as a Second Language 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 (for Bilingual Education certification), or the M.A. in Teaching English as a Second Language (for English as a Second Language certification). A student who is simultaneously seeking a master's degree in education should apply for admission to the M.A. in Education Program, the M.A. in Bicultural-Bilingual Studies Program, or the M.A. in Teaching English as a Second Language Program.

Students interested in graduate teacher certification programs in EC–6, Special Education, or Secondary Mathematics and Science must complete an application to the Graduate School in the COEHD, and an application packet for admission to the teacher certification program. Admission to graduate school does not automatically admit a candidate to teacher certification,

nor does the completion of degree requirements guarantee completion of Texas certification requirements. However, students must be accepted to graduate school before they can be accepted to the teacher certification program. Students must meet the requirements for graduation for the M.A. in Education, and also meet the TExES state requirements for certification to complete their program.

Information and application materials for graduate teacher certification are located on the COEHD Web page and are submitted to the Graduate Certification Program Coordinator (GCPC) in the Department of Interdisciplinary Learning and Teaching. These programs follow a cohort model with new cohorts accepted once a year in the Spring Semester. Upon review of the application information for teacher certification by the GCPC, potential candidates will be notified of their status with regard to admission to the Teacher Certification Program.

Any student seeking a teaching certificate in the state of Texas must meet the basic state requirements for admission to the Teacher Certification Program as well as the UTSA admission requirements. This includes passing scores on either the Texas Higher Education Assessment (THEA), ACCUPLACER, COMPASS, or ASSET. For further information on these and other requirements, please review the application materials located on the COEHD Web page.

UTSA students must submit to a criminal history background check every semester they interact directly with any minor(s) or legal adult(s) of diminished capacity as a requirement for course completion. UTSA is no longer allowed by state law to conduct criminal background checks. This is now the sole responsibility of the school districts. Students who are unable to meet the criminal background check standards for the school districts may not be able to complete a course or the Teacher Certification Program. If a student is rejected twice by districts in one semester because of criminal history, students will not be able to continue in the program until such time as the criminal background check is cleared. In accordance with Sec. 53.021, Texas Occupation Code, the State Board for Educator Certification (SBEC) may suspend or revoke a teacher certificate or refuse to issue a teacher certificate for a person who has been convicted of a felony or misdemeanor for a crime that directly relates to the duties and responsibilities of the teaching profession.

Recommendations for teacher certification (to the Texas Education Agency) are made by the College of Education and Human Development Certification Officer 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 applying 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.

APPLICATION DEADLINES AND FEES

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, applicants 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.graduateschool.utsa.edu 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	
UTSA graduates or degree candidates	\$30
Non-UTSA graduates	\$45
International applicants	\$80

UTSA Graduate (Master's level) Application Deadlines*

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 appropriate academic program or visit the Graduate School Web site at www.graduateschool.utsa.edu for more information.

Doctoral Level

The deadline for doctoral applications is February 1, for Fall Semester admission. Some doctoral programs offer Spring Semester admission, for which the application deadline is October 1; consult the appropriate academic program regarding Spring Semester admission. 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 be required to submit a new application with a nonrefundable fee (see application fee table) for the following available semester.

UTSA Doctoral Application Deadlines

Semester	Deadline
Fall	February 1
Spring	October 1

ADMISSION PROCEDURES

Each applicant for admission is responsible for ensuring that all required official 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 will not be returned.

Students granted admission to a master's program at UTSA who do not register for courses the semester of admittance or for the following long semester must reapply for admission.

Doctoral students who are admitted but do not register for courses the semester of admittance must reapply for the next available term. 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 academic year, since files for admitted students who do not register for courses are not retained after that period. (See program descriptions in Chapter 6, Graduate Program Requirements and Course Descriptions, for specific program admission requirements.)

READMISSION

Master's and doctoral level 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.

Master's Level

UTSA master's students who have attended a semester but have not been in attendance for two full years are required to reapply and submit an application for graduate admission, along with a nonrefundable application fee (see application fee table), by the application deadline.

Doctoral Level

UTSA doctoral students who have not been in attendance for one long semester must submit an application for graduate admission, along with a nonrefundable application fee (see application fee table), by the application deadline.

Military Service

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 reactivated 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.

general academic regulations

CHAPTER

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CHAPTER

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 <https://asap.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 on different campuses, one at the Main 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.

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 calendar in *ASAP* at <https://asap.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 or the online registration calendar 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 semester 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, no more than 6 semester credit hours in a five-week summer term, and no more than 12 semester credit hours in a ten-week summer term. In particular, a student may enroll in no more than 3 semester credit hours in the May Mini-mester.

A student may enroll in no more than 15 semester credit hours during an entire Summer Semester, regardless of the combination of terms.

Dropping Courses

Students may drop courses from their schedules for a limited time each semester. The online registration calendar for 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 calendar each semester for 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 calendar for the Automatic "W" Date. The change becomes official after it is processed by the Office of the Registrar.

The Automatic "W" Date for graduate students is the end of the ninth week of classes for Fall and Spring semesters, the end of the third week of classes for a five-week Summer term, and the end of the sixth week of classes for a ten-week Summer term. Appropriate adjustments are made for the Automatic "W" Date for shorter Summer terms (see the online registration calendar).

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 a 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.

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 Friends of the UTSA Library cardholders; further details are available from the library 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 cancelled. Students may apply for readmission for a subsequent semester provided they have resolved the cause of cancellation.

Withdrawal from the University

Continuing students who wish to withdraw (drop all courses for which they are enrolled during a specific semester) from the University before the first class day of the Fall or Spring Semester may do so via *ASAP*. Students who wish to withdraw from the University before the start of Summer classes may withdraw via *ASAP* through the Friday prior to the start of the May Mini-semester. All other Summer withdrawals must be completed as stated in the following paragraph.

Students who find it necessary to withdraw (drop all courses for which they are enrolled during a specific term) must submit a completed Withdrawal Form at the Enrollment Services Center. The Withdrawal Form must have all required signatures for the withdrawal to be processed. The Withdrawal Form is available online on the Office of the Registrar's Web site.

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 after Census Date receive grades of "W" in all classes.

Students who withdraw from all classes are subject to the University'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.

Withdrawals for international graduate students also require the consent of the Office of International Programs.

Academic appointments (Teaching Assistant and Graduate Assistant positions) may not extend beyond the effective date of a student's withdrawal.

Withdrawal for Military Service

A student who withdraws as a result of being called to active military service may choose (1) to receive a refund of tuition and fees for the semester; (2) if eligible, to be assigned an incomplete (IN) in each course (refer to section Explanation of Credit, Grading System, and Symbols in this chapter); or (3) at the instructor's discretion, to receive a final grade in courses where he or she has completed a substantial amount of coursework and has demonstrated sufficient mastery of the course material.

Medical and/or Mental Health Withdrawal from the University

Students experiencing a significant and unforeseeable medical or mental health challenge, compromising the student's ability to effectively participate in their educational program, may request withdrawal from classes or, in rare circumstances, reduce their course loads at the University without unnecessary academic penalty. A Medical or Mental Health (M/MH) Withdrawal from the University should be considered only when all other options are exhausted by the student. Such withdrawals can be granted only for the current or immediately preceding semester. No other "retroactive" withdrawals shall be approved beyond the eligibility period.

Students should refer to the Academic Calendar for the established withdrawal and drop dates. A student granted M/MH Withdrawal or course load reduction will be assigned a grade of "W" for the affected courses. If the effective date of the withdrawal or course load reduction is on or before the Census Date, no record of the courses will appear on the student's transcript.

Students will be limited to one M/MH Withdrawal during their academic career at UTSA, unless given special permission by the Dean of the Graduate School. Challenges identified by the student as a result of their issues will be evaluated by the appropriate Service Director (Director of Operations, Student Health Services for a medical issue or Director of Counseling Services for a mental health issue or their respective designees). During the withdrawal process, recommendations will be provided to the Dean of the Graduate School on the student's behalf in an effort to ensure the student is able to continue their academic pursuits without hindrance once they decide and are permitted to return to the University.

Medical/Mental Health Withdrawal Request Procedures

M/MH Withdrawal requests must be submitted in writing to the appropriate service office (medical withdrawals to Student Health Services; mental health withdrawals to Counseling Services). Such requests must be accompanied by recent evaluation supported through documentation from a licensed doctor, physician, medical provider, or mental health professional. Hospitalization records from a recent admission, if relevant, should also accompany any application. All documents and any other requirements made by the Service Director (or their designee) must be provided or completed within one month of the initial request. If the application is not completed within one month, the file will be closed and no further action will be taken unless a new application is initiated before the end of the eligibility period.

The appropriate Service Director or their respective designee will review the request and any supporting documentation to determine whether the medical or mental health issues adversely affecting the student's ability to function academically were substantial enough to warrant the student's withdrawal under this policy. Upon that review, the appropriate Service Director or their respective designee will provide a written recommendation to the Dean of the Graduate School communicating their assessment. The Dean will have one month to process their decision and make the final determination regarding the status of each application. The student will be notified of the final determination in writing in a manner consistent with the policies and procedures established by the Dean of the Graduate School.

Any refund of tuition and/or fees will follow the University's Refund Policy for Withdrawal or Dropped Courses (see Chapter 3 of the UTSA Information Bulletin) at the time of the effective date of the withdrawal. The effective date of the withdrawal will be determined by the Dean of the Graduate School. Appeals may be submitted in writing to the Executive Director of Student Health and Counseling Services. All appeal recommendations will go back to the Dean for review. The Dean's decision based on the appeal recommendation shall be final.

Request to Return Following a Medical/Mental Health Withdrawal

Students who are granted M/MH Withdrawals and wish to return to UTSA must submit their request for re-enrollment in writing to the appropriate Service Director or their respective designee. Such requests must be supported by a current release of information form from the licensed doctor, physician, medical provider, or mental health professional providing their care. The respective Service Director or their designee has the authority to require a current and comprehensive assessment of the student prior to recommendation. The respective Service Director or their designee will evaluate the information provided by the primary provider to ensure that it supports the student's re-enrollment, and will forward a written recommendation to the Dean. The Dean will inform the student, in writing, of the decision as to whether the student's return is appropriate. In addition, before

being allowed to re-enroll, students must correspond with the Director of the respective service and/or the Director of Disability Services in order to forecast any possible needs and to facilitate maximizing the student's potential for a successful return.

Confidentiality of Medical/Mental Health Withdrawal Requests

The student's written request for the withdrawal as well as the Service Director's recommendation will remain the responsibility of the respective service involved to maintain, while only the Dean's decision will become part of the Student's Education Record. Medical and mental health background information is not shared with the Dean unless a special request has been made by the Dean with the student's approval in writing. The Dean will keep all shared medical and mental health related information confidential. Any supporting medical or mental health documentation will be maintained confidentially in compliance with policies and ethical standards applicable to Student Health Services and Counseling Services.

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) or 61 and 100 (Internet 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

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 or online. See the UTSA Web site at <http://utsa.edu/registrar/transcripts.cfm> for details on how to request a transcript.

While enrolled at UTSA, students who attend other colleges or universities are required to submit official academic transcripts to Graduate Admissions from every college or university attended at the end of the semester during which coursework was undertaken, even if courses have been withdrawn. This includes concurrent enrollment while attending UTSA. Failure to do so may result in the rejection of the transcript request, cancellation of enrollment, permanent dismissal from UTSA, or other appropriate disciplinary action. 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 record 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 the *UTSA Information Bulletin*.

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.

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, with approval of the Graduate School.

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 ID 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 ID Number Change Forms should be supported by appropriate legal documentation.

Change of Address

Currently enrolled students who have changed their address must notify the Graduate School on the appropriate form or on the UTSA Web site in *ASAP* at <https://asap.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 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 Online Consortium (UTOC). Degree-seeking graduate students taking courses through this system, that are not hosted by UTSA, must still meet all UTSA residence requirements. For information on the UT Online Consortium, see Chapter 6, Academic Resources and Student Services, of the *UTSA Information Bulletin* or the UTOC Web site at www.utcoursesonline.org.

Independent Study Courses

No more than six hours of independent study courses or directed research, 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.

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 Online Consortium (UTOC) and declare UTSA as their home institution will have the courses taken at other institutions through the UTOC listed on their UTSA transcript and counted in their UTSA grade point average. Other credit courses taken through the UTOC 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.

Grade Symbol	Grade Points	Meaning of Grade Symbol
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 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* at <https://asap.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.

Additional work performed by a student may not be used to raise a grade that has been reported to the Office of the Registrar.

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. The excused absence is permitted only if the student will not miss more than twenty-five percent of the total number of class meetings or the contact hour equivalent (not including the final examination period) for the specific course or courses in which the student is enrolled at the beginning of the period of active military service (19 Texas Administrative Code, § 4.9).

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 calendar will receive a grade of “F.”

Academic and Grade Grievance Procedure

In resolving any student grievance regarding grades, evaluations or other academically-related concern or incident regarding a faculty member, the student must first make a serious effort to resolve the matter with the faculty member with whom the grievance originated. It is University policy that individual faculty members retain primary responsibility for assigning grades and evaluations. The faculty member’s judgment regarding grades and evaluations is final unless compelling evidence shows discrimination, differential treatment, factual mistake, or violation of a relevant University policy. In resolving a student grievance regarding other academically-related issues involving a faculty member, the student must follow the same process as used when grieving a grade or evaluation. If the matter is not resolved, the student may file a formal 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 semester in which the grade was assigned or the other concern or incident occurred.

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 Dean of the College and then, if an undergraduate student, to the Dean of Undergraduate Studies, and if a graduate student, to the Dean of the Graduate School. Appeals must be submitted on the Student Academic and Grade Grievance Form. The decisions of the Deans of Undergraduate Studies and the Graduate School are final. The administrator handling the appeal at each level will notify individuals involved, including those who have already ruled on the appeal, once a decision has been rendered.

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.

ACADEMIC STANDING

A student’s academic standing, whether the student is a doctoral student, a graduate degree-seeking student, a special graduate student, or a non-degree-seeking graduate student, is defined as 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 is admitted on probation with conditions and fails to meet a condition.
4. 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.

Graduate Reinstatement

A student who has been dismissed academically may petition for reinstatement after one long semester (Fall or Spring) has elapsed from the date of dismissal. Under exceptional circumstances, a petition may be considered earlier. Students are required to complete a reinstatement packet along with a letter containing all explanations, recommendations, or doctors' statements in support of the student's request for reinstatement and submit them 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 Graduate School prepares the petition for reinstatement and submits it to the Department's Graduate Program Committee. The 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 Fall, Spring, and Summer semester. Commencement ceremonies are held in December and May at the end of the Fall and Spring semesters. With the exception of doctoral students, students who graduate at the end of the Summer Semester may participate in either the May or the December Commencement ceremony. Doctoral students may participate in the December Commencement ceremony.

Doctoral students may participate in commencement ceremonies only after completing all requirements for graduation, including the successful defense of the dissertation and subsequent acknowledgement by the Graduate School of all required documentation. Specifically, a doctoral student intending to graduate in the Summer Term and who has not completed the successful defense of the dissertation and filed the appropriate documentation with the Graduate School may not participate in the Spring Commencement ceremony. Summer Term graduates are welcome to participate in the December Commencement ceremony following their Summer Term graduation.

Information regarding Graduation and Commencement is available at <http://utsa.edu/registrar/graduation.cfm>.

Applying for the Degree

It is the student's responsibility to officially apply for his or her degree by submitting an Application for Graduation online through *ASAP*. Students must read and follow instructions carefully to ensure the application is accurate and successfully

submitted. When the application has been accepted, students receive a confirmation number. Students having problems submitting the application should contact Graduation Coordination at graduationcoordination@utsa.edu.

While enrolled at UTSA, students who attend other colleges or universities are required to submit official academic transcripts to Graduate Admissions from every college or university attended at the end of the semester during which coursework was undertaken, even if courses have been withdrawn. This includes concurrent enrollment while attending UTSA. Failure to do so may result in the rejection of the graduation application, cancellation of enrollment, permanent dismissal from UTSA, or other appropriate disciplinary action.

The following are deadlines for submitting an application for graduation. Dates are for the semester in which the student expects to graduate:

- September 15 for the Fall Semester
- February 15 for the Spring Semester
- June 15 for the Summer Semester
 - Summer candidates wishing to participate in the May ceremony must apply by February 15.

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

A student who completes all degree requirements but fails to apply for the degree may obtain a Letter of Degree Awarded from Graduation Coordination after the close of the semester in which all degree requirements are met.

Students who receive services from the University, including faculty supervision, during the semester in which they have applied to graduate must be enrolled for that semester.

Applying for a Graduate Certificate

It is the student's responsibility to apply for his or her certificate by submitting a completed Application for Graduate Certificate to the Enrollment Services Center no later than September 15 for the Fall Semester, February 15 for the Spring Semester, or June 15 for the Summer Semester (see Chapter 3, Graduate Certificates, in this catalog). The application of any student applying for a certificate after the established deadlines will be processed the following semester. The application form is located at <http://utsa.edu/registrar/forms.html>. Students with questions about the application should contact Graduation Coordination at graduationcoordination@utsa.edu.

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 the *UTSA Information Bulletin*, Appendix B, Sec. 203.

Students are not at liberty to disregard previous college work attempted. All students transferring to UTSA *must list all* colleges and universities attended on their UTSA application for admission. While enrolled at UTSA, students who attend other colleges or universities are required to submit official academic transcripts to Graduate Admissions from every college or university

attended at the end of the semester during which coursework was undertaken, even if coursework has been withdrawn. This includes concurrent enrollment while attending UTSA. Failure to do so may result in the rejection of the admission application, withdrawal of any offer of acceptance, cancellation of enrollment, permanent dismissal from UTSA, or other appropriate disciplinary action.

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.

certificate
programs

CHAPTER

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CHAPTER

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

Applicants who are currently enrolled in a graduate degree program at UTSA have already met University requirements for admission. In this case, no formal application process is necessary. The applicant 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 applicant's program is housed, and the Graduate School.

Applicants who are not currently enrolled in a graduate degree program at UTSA 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. If admitted as a special graduate student, the applicant 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 an applicant requires prerequisite background courses to adequately prepare for the courses included in the certificate program, this will be noted in the applicant's file. The applicant will be notified that the prerequisite courses must be taken before enrolling in certificate program coursework.

Any applicant 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 applicant wishes to be admitted into 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.

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

Applicants 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. The following graduate certificate programs are offered:

Certificate of Professional Development in Geographic Information Science

Department of Geological Sciences

The purpose of the Professional Certificate in Geographic Information Science is to train individuals from a broad range of academic disciplines to be competent users of Geographic Information Science and the related tools of Remote Sensing and Web-based GIS data publication and sharing. Although the program is generally oriented toward geological sciences professionals, individuals with business, social science, medical, engineering, computer science, criminal science or education backgrounds will benefit from this professional certificate. Individuals completing this certificate will gain a practical and hands-on knowledge of Geospatial Science. See Department of Geological Sciences section in this catalog for more information.

Graduate Certificate in Bilingual Reading Specialist

Department of Bicultural-Bilingual Studies

The Certificate in Bilingual Reading Specialist offers specialized training for those who possess a valid teaching license and wish to become better prepared to provide appropriate reading instruction to students in bilingual programs in public schools. See Department of Bicultural-Bilingual Studies section in this catalog for more information.

Graduate Certificate in Creative Writing

Department of English

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 nontraditional 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 nonacademic 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. See Department of English section in this catalog for more information.

Graduate Certificate in Higher Education Administration

Department of Educational Leadership and Policy Studies

The Graduate Certificate in Higher Education Administration will provide an opportunity for higher education professionals working or seeking to work in the myriad of higher education institutions in the region to develop their knowledge and skills in higher education administration. With a large and expanding four-year university and community college student population, this certificate program will enhance the professional preparation and development opportunities for current and prospective higher education administrators. See Department of Educational Leadership and Policy Studies section in this catalog for more information.

Graduate Certificate in Historic Preservation

Department of Architecture

Historic Preservation is a process of design for continuity and the management of change within an existing historic context. The Graduate Certificate in Historic Preservation offers specialized education in historic preservation design, technology, planning and management through graduate-level courses. See Department of Architecture section in this catalog for more information.

Graduate Certificate in Keyboard Pedagogy

Department of Music

The Certificate in Keyboard Pedagogy is designed for the active pre-college piano teacher who is interested in continuing their education through a program that is focused on practical courses in their field. See Department of Music section in this catalog for more information.

Graduate Certificate in Keyboard Performance

Department of Music

The Certificate in Keyboard Performance is a graduate option that allows exclusive focus on the performance aspects of musicianship. See Department of Music section in this catalog for more information.

Graduate Certificate in Nonprofit Administration and Leadership

Department of Public Administration

The Certificate in Nonprofit Administration and Leadership provides students with the opportunity to develop essential technical and analytical skills for leading and managing nonprofit organizations. These skills include: fundraising, grant writing, financial management, strategic planning, collaboration, and advocacy. The Certificate prepares students in the business skills

required to manage social and human service, arts, religious, advocacy, and educational nonprofit organizations. The program also has a strong focus on the importance of leadership in preserving the unique role and purpose of the nonprofit sector in American society. This focus emphasizes the role of the nonprofit sector as a mechanism for participation important to preserving democracy. See Department of Public Administration section in this catalog for more information.

Graduate Certificate in Security Studies

Department of Political Science and Geography

The Graduate Certificate in Security Studies is a program that mainly serves the needs of San Antonio regional professionals, such as leaders in military and civilian contract functions, who require advanced education short of full degree programs and in areas directly connected with their work in homeland security and defense at national, state, and local levels. The Department of Political Science and Geography is responsible for all coordination of students participating in the Certificate program. See Department of Political Science and Geography section in this catalog for more information.

Graduate Certificate in Spanish Translation Studies

Department of Modern Languages and Literatures

The Certificate in Spanish Translation Studies focuses on the language skills necessary to perform translation. Translation is defined as the rendering of a written text from a source language into another, while interpretation is the rendering of spoken language from a source language into another. Although this program concentrates on the former rather than on the latter, both draw on the same type of general linguistic skills as those gained by studies in literature, language, and culture. This certificate focuses more closely on practical applications in modern day life than does the more comprehensive Master's degree. See Department of Modern Languages and Literatures section in this catalog for more information.

Graduate Certificate in Teaching English as a Second Language

Department of Bicultural-Bilingual Studies

The Certificate in Teaching English as a Second Language offers specialized training for people who would like to begin working in the field of English language teaching (ELT), either as a first job or a mid-career change. Completion of the certificate prepares individuals to work in areas including but not limited to community-based language schools for immigrants and refugees, private language schools abroad, corporate training/consulting, missionary/aid work, or private tutoring. See Department of Bicultural-Bilingual Studies section in this catalog for more information.

Graduate Certificate in Urban and Regional Planning

Department of Architecture

The Certificate in Urban and Regional Planning provides students with an introductory understanding of the historical, social, international, and physical context of comprehensive land use planning and sustainable urbanism. See Department of Architecture section in this catalog for more information.

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, by submitting an Application for Graduate Certificate (application is available online at <http://utsa.edu/registrar/forms.html>) to the Enrollment Services Center, no later than September 15 for the Fall Semester, February 15 for the Spring Semester, or June 15 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 have been met. It is also the responsibility of the student

to apply for the certificate by the established deadline by submitting a paper application to the Office of the Registrar, as explained above.

If a student has graduated from one of UTSA's approved graduate degree programs and then wishes to apply for a certificate using hours previously earned, the student must apply for admission to UTSA as a special (non-degree-seeking) graduate student and indicate their intent to seek admission into a certificate program. See admission policy for certificate programs.

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

master's degree regulations

CHAPTER 4

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CHAPTER

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 satisfactorily complete all coursework as specified in his or her discipline's program of study, and, if Option I is selected, must satisfactorily complete 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 he or she intends to graduate (for deadlines, see the online registration calendar).
5. The student must satisfactorily complete 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).
9. The majority of graduate coursework for a master's program must be completed at UTSA.

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 (according to department standards) the 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. If registered for no other courses, students must be enrolled in 6961, Comprehensive Examination.

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 6, 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 I 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 6 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; it is understood the text is still being modified.
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.
5. The format of the thesis must follow University regulations. The detailed requirements of thesis formatting guidelines and deadlines are available on the Graduate School's Web site at www.graduateschool.utsa.edu. The original copy must conform to the most current format prescribed in the Guide for the Preparation of a Master's Thesis at the time of submission to the Graduate School.
6. Submit two original, unbound copies of the approved thesis to the Graduate School by the published deadline. The two unbound copies are for the library. Arrangements and expenses for personal 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. Students are responsible for uploading their complete thesis to UMI for publishing with the option of ordering personal copies for binding.
7. Copies of theses and dissertations are available to the general public through the UTSA Library.
8. Acceptance of the thesis requires final approval from the Dean of the Graduate School.

Thesis for Linguistics Students

Theses are normally written in English. Petitions to write in another language pertinent to the research must be submitted to the Graduate Program Committee when the student enrolls in a thesis course. See Graduate Advisor before registering for thesis hours. Petition must be approved by the Graduate Program Committee and Dean of the Graduate School.

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 6, 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 regionally accredited institution or with proof of equivalent accreditation from a foreign institution upon the approval of the appropriate Graduate Program Committee in which the major area is located.

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

The student's Graduate Advisor of Record and the College evaluate transcripts and designate 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 his or her 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. Undergraduate courses accepted for graduate-level credit are not applied toward core or required courses.

Not Accepted

Audited Courses. No UTSA credit is granted for courses that are audited; no official record is made of enrollment in classes on an audit basis.

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.)

doctoral degree regulations

CHAPTER

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doctoral degree regulations

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DEGREE REQUIREMENTS

University-wide Requirements

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

1. The student must be admitted as a doctoral 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. The student must maintain continuous enrollment in doctoral-level courses until time of graduation. Exceptions are made for students on an approved leave of absence.
4. Upon satisfying the admission to candidacy requirements, the student must be approved for admission to candidacy by the Graduate Program Committee, academic College and the Dean of the Graduate School.
5. Upon satisfying the Dissertation Committee requirements and upon recommendation of the Graduate Program Committee, the academic College, and the Graduate School, the Dissertation Committee is appointed.
6. The student must pass the final oral examination (defense of dissertation).
7. All completed coursework included in the final program of study must have been taken within the preceding eight years to include successful completion and defense of the dissertation.
8. 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 calendar).
9. 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.
10. No courses in which grades of less than “C” (below 2.0 on a 4.0 scale) were earned may be applied to a doctoral degree.
11. To graduate, all doctoral students must have a grade point average of at least a 3.0 (on a 4.0 scale).
12. The majority of graduate coursework must be completed at UTSA.

Residence Requirement

Depending on doctoral program requirements, a student may be required to 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.

Continuous Doctoral Enrollment

By the twelfth (12th) class day of each Fall and Spring Semester of each academic year, all doctoral students are required to be enrolled in doctoral-level classes until the time of graduation. Some doctoral programs also require enrollment in the Summer Semester. Students should verify whether Summer Semester enrollment is mandatory in their program. For students whose programs do not require Summer enrollment, registration during the Summer Semester is not necessary unless the student intends to make use of University facilities or faculty time.

Doctoral students receiving funding may be required by their funding source to enroll on a full-time basis. Students should confirm with their doctoral program to ensure compliance with all funding requirements.

If a student has been admitted to candidacy for the doctoral degree, registration in the dissertation course or the equivalent is required. The only alternative to continuous registration is a leave of absence.

If a student who is not on approved leave fails to register by the twelfth (12th) class day, he or she may not return to the University without applying for readmission to the graduate program and must pay the Graduate School application fee. The application is reviewed by the Doctoral Studies Committee, which may choose to readmit the student or to deny admission.

Leave of Absence

Students enrolled in a doctoral program may apply for a leave of absence for one Fall or Spring semester when events such as illness or injury, active military service, or the need to provide care for a family member prevent active participation in the degree program. If the student has not yet been admitted to candidacy for the doctoral degree, this request must be approved in advance of the leave by the graduate adviser. If the student has been admitted to candidacy, the application must be approved in advance by the graduate adviser and the graduate associate dean of the college and Dean of the Graduate School. A leave of absence is required for Fall and Spring semesters (and/or Summer if doctoral program mandates Summer enrollment). Under no circumstances may a leave of absence be applied retroactively.

A leave of absence will prevent the student from receiving student funding from his or her program and may affect ability to receive financial aid or loans and/or to defer payments on loans. Students should contact the Office of Financial Aid with questions regarding financial aid or loan status.

A student returning from a leave of absence must enroll for the following Fall or Spring Semester or provide a written request for a leave of absence extension (a leave of absence may not exceed one year throughout the student's degree program). A student who does not register or who does not secure an approved leave of absence extension will be considered to have withdrawn and will be dropped from the program. For more information, visit the Graduate School Web site at www.graduateschool.utsa.edu.

TRANSFER OF CREDIT

Students are expected to complete all coursework at UTSA. Exceptions require approval of the appropriate Graduate Program Committee, academic College, and the Graduate School, and must meet conditions for transfer of credit. Work counted toward a degree at another institution cannot be transferred.

Conditions for transfer of credit:

1. Students must complete the form "Transfer of Graduate Credit towards Doctoral Degree."
2. The courses must have been completed with a "B" or better.
3. Coursework must be from an accredited university and have not been used in another degree program.
4. An official transcript from the institution where the coursework was completed must be submitted.
5. All coursework must have been completed no more than six years before the degree was awarded.
6. Coursework is subject to approval of the appropriate Graduate Program Committee and academic College in which the program is administered.
7. Courses must be defined as graduate-level work at the institution where the credit was earned.

Students should not take courses they plan to transfer from another institution the semester they plan to graduate due to the time limitation on receiving the grades and certifying the student for graduation.

Applicants with a master's degree in the field of the doctoral program of interest or related field may apply a maximum of 30 semester credit hours of previously earned graduate credit toward their doctoral degree, pending approval from the Graduate Program Committee, academic College, and Dean of the Graduate School; provided the credit has not been used toward another doctoral degree.

Limited Acceptability

UTSA Undergraduate Courses

Credit earned in undergraduate-level courses may not 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.

Courses Counted for Another Degree

No course counted toward another doctoral degree may be counted toward a doctoral degree at UTSA, either directly or by substitution.

In some circumstances, work completed for the master's degree may be included in the work for the doctoral degree, when it is applicable, provided it is acceptable to the candidate's supervising committee, the appropriate Graduate Program Committee, academic College, and the Dean of the Graduate School; provided the credit has not already been used toward another doctoral degree.

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 academic College, and 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. Pass a qualifying examination (written, oral, or both) prepared by the Graduate Program Committee and meet any other requirements specified by the Graduate Program Committee for the specific degree program.
5. Submit a proposed program of study.
6. Upon satisfying 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 academic College and 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 academic College and 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 examination 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. Final approval for the interim master's degree will not be processed for the current semester if received after the Census Date.

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 and the academic College, 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. The chair of the Dissertation Committee must be a member of the Graduate Faculty for that graduate program. Changes to the Dissertation Committee require documentation to be signed by the Department Chair, the Dean of the College, and the Dean of the Graduate School and must be received by the Graduate School.

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 academic College and the Graduate School that all degree requirements have been fulfilled.

Time Limit for Completing Doctoral Degree

Doctoral students have a time to degree completion of eight years comprised of six years from admission to candidacy and two years for dissertation. If the student takes an approved leave of absence, the time limit for reaching candidacy or completing the degree will be extended by the number of terms the student is on approved leave of absence. 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 academic College and the Dean of 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 is required to make arrangements for its publication with the Graduate School. Students are required to adhere to the detailed requirements of dissertation formatting guidelines and deadlines for submission of the dissertation. For information on deadlines, visit the Graduate School Web site at www.graduateschool.utsa.edu. Dissertations received after the posted deadline will not be accepted. Two unbound copies, including the original of the dissertation, must be on file at the Graduate School by the submission deadline. The two copies are for the UTSA library. Students are responsible for uploading their complete dissertation to UMI for publishing with the option of ordering personal copies for binding. The student is required to pay all associated fees.

The format of the dissertation must follow University regulations or it will not be accepted. The original copy must adhere to the most current dissertation formatting guidelines at time of submission. The student may request that the Graduate School delay in making the dissertation available to the public for one or more years in order to protect the patent or other rights. This request must be supported by a written recommendation from the dissertation supervisor.

Registration of copyright at the author's expense may be arranged, if desired and appropriate, by completing the online form through UMI when uploading the final draft. 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.

Acceptance of the dissertation requires final approval from the Dean of the Graduate School.

Approval of the Degree

Upon approval by the Dissertation Committee of the dissertation and its defense, the Graduate Program Committee certifies to the academic College and 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.

graduate program
requirements &
course descriptions

CHAPTER

6

6

CHAPTER

graduate program requirements & course descriptions

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college of architecture

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COLLEGE OF ARCHITECTURE

Master of Science Degree in Urban and Regional Planning

The Master of Science degree in Urban and Regional Planning is designed to prepare students for leadership roles and careers in the public and private sectors for the purpose of planning and designing communities and regions. The degree is in collaboration with the Department of Public Administration in the College of Public Policy. The program has a strong focus on land use planning; design; policy; and economic, environmental, and cultural issues that shape urban and regional land development patterns in terms of infrastructure, housing, and open space systems. Emphasis is placed on developing research capabilities and graphic skills needed in planning and design. The program's primary focus is to prepare students to become practitioners in the planning profession.

Admission Requirements. Applicants must satisfy University-wide graduate admission requirements.

A completed application package consists of the following:

- Completed Application form
- Official transcripts from all universities attended
- Graduate Record Examination (GRE) scores
- Two Letters of Recommendation addressing the applicant's academic and/or professional skills
- Letter of Intent, outlining the applicant's reasons for pursuing the Master of Science degree in Urban and Regional Planning and career plans
- Test of English as a Foreign Language (TOEFL) scores for international applicants whose first language is not English.

Applicants may be admitted as unconditional or conditional, degree-seeking graduate students, or as non-degree-seeking students. Admission as a special graduate student or as non-degree-seeking does not guarantee subsequent admission as a degree-seeking student; such students must reapply for degree-seeking status.

An application fee and all application materials must be sent directly to the UTSA Graduate School at One UTSA Circle, San Antonio, TX 78249. Please consult the College of Architecture's Web site (<http://utsa.edu/architecture/>) for applicable dates when the review of applications will begin and for more information about the College and its programs.

Degree Requirements. The minimum number of semester credit hours required for the Master of Science degree in Urban and Regional Planning, exclusive of coursework or other study required to remove deficiencies is 48. Students may pursue a thesis or nonthesis option.

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

A. 27 semester credit hours of the following required courses:

1. 15 semester credit hours of planning courses in the College of Architecture:

URP	5323	International Community Planning and Design
URP	5333	Introduction to Urban and Regional Planning
URP	5343	History and Theory of Urban and Regional Planning
URP	5363	Intermediate Urban Planning Methods
URP	5453	Urban and Regional Sustainability

2. 12 semester credit hours of public administration courses in the College of Public Policy:

PAD	5103	Planning and Land Use Law
PAD	5393	Economics for Public Affairs
PAD	5473	Land Use Policy
PAD	5563	Introduction to Urban Planning Methods

- B. 15 semester credit hours of electives, chosen in consultation with the Graduate Advisor of Record to meet degree candidates' individual needs. Students can select an area of focus involving four or more courses or take courses from a variety of areas that pertain to urban and regional planning. Electives may also be taken in other graduate programs with approval of the Graduate Advisor. The electives include:

ARC	5203	History and Theory of Preservation
ARC	5403	Historic Preservation Seminar
ARC	5423	Legal and Economic Aspects of Preservation
ARC	5613	American Architecture
ARC	5663	The Architecture and Cities of Northern Mexico
ARC	5673	Advanced Topics in the Architecture and Urbanism of Mexico
ARC	6003	Morphology of the Architecture and Landscape of South Texas and Borderlands
ARC	6013	Theories and Philosophies of Regionalism
ARC	6313	Health and the Built Environment
ARC	6323	Architecture, Health and Wellness
PAD	5033	Theories of Public Organizations
PAD	5223	Urban Management
PAD	5383	Housing Policy
PAD	5463	Collaborative Governance (formerly Intergovernmental Relations)
PAD	5483	Environmental Policy
PAD	5513	Urban and Regional Economic Development
PAD	5523	Community Sustainability
PAD	5583	Urban Policy
PAD	5813	Health Issues and Policies
PAD	6543	Urban Service Systems
URP	5313	International Housing Design and Neighborhood Planning
URP	5353	Structure and Function of Cities and Regions
URP	5373	Planning and Design of Suburbs
URP	5383	Planning and Housing for Rural Communities
URP	5393	Advanced Urban Planning Methods
URP	5433	Transportation Planning
URP	5443	Community Development
URP	5463	Environmental Planning and Assessment
URP	5473	Introduction to Health Planning

- C. 6 semester credit hours of the following “capstone” coursework consisting of either the Thesis or Nonthesis Option described below.

Thesis Option Requirements. All candidates for the Master of Science degree in Urban and Regional Planning with thesis option must complete 6 semester credit hours of URP 6983 Master’s Thesis (includes thesis defense/seminar presentation).

Nonthesis Option Requirements. All candidates for the Master of Science degree in Urban and Regional Planning with a nonthesis option must complete 6 semester credit hours consisting of URP 6943 Professional Internship and URP 6933 Planning Professional Report. Degree candidates in the nonthesis option are required to pass a comprehensive examination, and enroll in URP 6961 Comprehensive Examination if no other courses are being taken that term.

COURSE DESCRIPTIONS
URBAN AND REGIONAL PLANNING
(URP)

- 5313 International Housing Design and Neighborhood Planning**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 An examination of the evolution of international housing planning and design with emphasis on sustainable planning and design methods, materials, techniques, and solutions. (Formerly ARC 5313. Credit cannot be earned for both URP 5313 and ARC 5313.)
- 5323 International Community Planning and Design**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 A study of sustainable design, planning, economic, financial, and environmental issues that shape multicultural communities, regions and borders. (Formerly ARC 5323 and ARC 6233. Credit cannot be earned for more than one of the following: URP 5323, ARC 5323 or ARC 6233.)
- 5333 Introduction to Urban and Regional Planning**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 An introduction to planning for human needs as related to the physical layout and spatial design of communities and regions. (Formerly ARC 5333. Credit cannot be earned for both URP 5333 and ARC 5333.)
- 5343 History and Theory of Urban and Regional Planning**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 A survey of the history and theories of urban and regional planning. Includes consideration of the values and ethics of the planning profession and methods of participation. (Formerly ARC 5343. Credit cannot be earned for both URP 5343 and ARC 5343.)
- 5353 Structure and Function of Cities and Regions**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 A study of the social, political, economic, and changing physical design, form, and infrastructure of cities and regions. (Formerly ARC 5353. Credit cannot be earned for both URP 5353 and ARC 5353.)
- 5363 Intermediate Urban Planning Methods**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 Introduction to software in mapping, visualization, database graphics, and GIS for applications in urban and regional planning. (Formerly ARC 5363. Credit cannot be earned for both URP 5363 and ARC 5363.)
- 5373 Planning and Design of Suburbs**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 A survey of the historical evolution and relationship between suburbs and central cities, contemporary trends in suburban planning, and sustainable development options. (Formerly ARC 5373. Credit cannot be earned for both URP 5373 and ARC 5373.)
- 5383 Planning and Housing for Rural Communities**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 A survey of the comprehensive planning of small towns and housing in rural areas. Includes consideration of growth management techniques. (Formerly ARC 5383. Credit cannot be earned for both URP 5383 and ARC 5383.)
- 5393 Advanced Urban Planning Methods**
 (3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
 Advanced use of geographic information systems (GIS) and other planning modeling systems to analyze real-world problems or issues requiring spatial data analysis and modeling.

5433 Transportation Planning

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Seminar on urban transportation systems and policies, trends, economics, and land use and transportation interactions and evaluation techniques.

5443 Community Development

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Introduction to contemporary trends in urban development and redevelopment, focusing on planning and development techniques used to develop or revitalize urban areas.

5453 Urban and Regional Sustainability

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Seminar on the main challenges involved in the global planning and developing of sustainable cities and regions.

Issues covered include land use, transportation, housing and infrastructure, economic and social equity.

5463 Environmental Planning and Assessment

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Analysis of environmental issues and planning problems that impact metropolitan areas; air and water quality, solid waste, habitat conservation; and techniques for planning assessment and remediation.

5473 Introduction to Health Planning

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

This course provides a comprehensive introduction to fundamental concepts, principles, and methods of health planning aimed at the provision of health services, health-supportive facilities and the design of healthy communities.

6933 Planning Professional Report

(3-0) 3 hours credit. Prerequisites: URP 6943 and approval of the urban and regional planning Graduate Advisor of Record.

The directed planning research course is offered only for nonthesis option students who have completed URP 6943 Professional Internship. May be repeated for credit, but not more than 6 hours may be applied to the Master's degree.

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 Science degree in Urban and Regional Planning.

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 Science degree in Urban and Regional Planning.

6961 Comprehensive Examination

1 hour credit. Prerequisites: Graduate standing and permission of the urban and regional planning Graduate Advisor of Record to take the comprehensive examination.

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 URP 6961 may not be counted toward the Master of Science degree. May be repeated once.

6973,6 Special Topics

(3-0, 6-0) 3 or 6 hours credit. Prerequisite: Graduate standing or 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 Topic courses may be repeated for credit when topics vary, but not more than 6 semester credit hours of URP 6973 or 12 hours of URP 6976 will apply to the Master of Science degree in Urban and Regional Planning.

6983 Master's Thesis

3 hours credit. Prerequisites: Graduate standing and permission of the urban and regional planning Graduate Advisor of Record.

May be repeated for credit, but not more than 6 hours will apply to the Master of Science degree in Urban and Regional Planning. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress.

DEPARTMENT OF ARCHITECTURE

For its graduate programs, the College of Architecture 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.

Master of Architecture Degree – The Professional Program

The College of Architecture offers the Master of Architecture (M.Arch.) as a first professional degree for those intending to enter the professional practice of architecture. The M.Arch. is accredited by NAAB, the National Architectural Accrediting Board, the sole agency authorized to accredit U.S. professional degree programs in architecture. According to the NAAB 2009 Conditions for Accreditation:

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted a 6-year, 3-year, or 2-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

The University of Texas at San Antonio, College of Architecture, offers the following NAAB-accredited degree programs:

- M.Arch. 2 (preprofessional degree + 52 graduate credits)
- M.Arch. 3 (non-preprofessional degree + 91 graduate credits)

Next accreditation visit for all programs: 2016

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.

The M.Arch. 2 Program

The M.Arch. 2 program is designed for students who have earned architectural degrees (such as B.A., B.S., and B.E.D.) and consists of studies focused on developing the next generation of critical practitioners. This studio-based professional program is normally two years (52 semester credit hours) in length and is completed via an independently-derived, research-informed design project.

M.Arch. 2 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 hours of coursework (including all graduate and postgraduate coursework taken).

A completed application package consists of the following:

- Completed Application form
- Official transcripts from all universities attended
- Graduate Record Examination (GRE) scores

- Two (2) Letters of Recommendation
- Letter of Intent, outlining the applicant's anticipated focus of studies and its impact on subsequent professional practice
- Portfolio, documenting proficiency in design, graphic communications, and other creative work
- Test of English as a Foreign Language (TOEFL) scores for international applicants whose first language is not English.

An application fee and all application materials must be sent directly to the UTSA Graduate School at One UTSA Circle, San Antonio, TX 78249. Please consult the College of Architecture's Web site (<http://utsa.edu/architecture/>) for dates when the review of applications will begin and for more information about the College and its programs.

M.Arch. 2 Degree Requirements. Degree candidates must complete 52 semester credit hours of coursework consisting of the following:

A. 37 semester credit hours of the following required courses:

ARC	5133	Professional Practice and Construction in a Global Setting
ARC	5513	Advanced Building Technology & Structures
ARC	6126	Advanced Design Studio I
ARC	6136	Advanced Design Studio II
ARC	6146	Advanced Design Studio III
ARC	6931	Master's Project Preparation
ARC	6996	Master's Project
		Theory/Criticism Elective*
		History Elective*

B. 15 semester credit hours of electives selected from the list posted on the UTSA College of Architecture Web site and within the UTSA College of Architecture graduate handbook. No more than 6 semester credit hours of nonarchitecture (ARC) electives will apply toward the Master of Architecture degree and these electives should be selected in consultation with the Graduate Advisor of Record.

*Note: Courses which satisfy the required elective options (Theory/Criticism, History) will be posted on the UTSA College of Architecture Web site and within the UTSA College of Architecture graduate handbook.

The M.Arch. 3 Program

The M.Arch. 3 program is designed for students with undergraduate degrees in fields other than architecture. This professional program includes one year of preparatory studies (39 semester credit hours) beginning in the summer, in preparation for the following two years (52 semester credit hours) of the Master of Architecture (M.Arch. 2) program sequence. These preparatory studies are required to be completed in full, as a condition of admission. We encourage students from all disciplines to consider this program as a means for entering the profession of architecture.

M.Arch. 3 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 hours of coursework (including all graduate and postgraduate coursework taken).

A completed application package consists of the following:

- Completed Application form
- Official transcripts from all universities attended
- Graduate Record Examination (GRE) scores
- Two (2) Letters of Recommendation
- Letter of Intent, which speaks to the applicant's preparedness for the study of architecture
- Portfolio of work indicative of the applicant's preparedness for the study of architecture
- Test of English as a Foreign Language (TOEFL) scores for international applicants whose first language is not English.

An application fee and all application materials must be sent directly to the UTSA Graduate School at One UTSA Circle, San Antonio, TX 78249. Please consult the College of Architecture's Web site (<http://utsa.edu/architecture/>) for applicable dates when the review of applications will begin and for more information about the College and its programs.

M.Arch. 3 Degree Requirements. The M.Arch. 3 program requires up to 39 semester credit hours of preparatory studies and 52 semester credit hours of the M.Arch. 2 program sequence for this degree, exclusive of coursework or other study required to remove admission deficiencies. 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."

The M.Arch. 3 program in architecture consists of: a) preparatory studies; b) a performance evaluation; and c) the 52-semester-credit-hour M.Arch. 2 program sequence. The M.Arch. 3 program begins in the summer.

A. **Preparatory Studies.** 39 semester credit hours consisting of the following:

ARC	5183	Fundamentals of Architectural Design: Principles & Representation
ARC	5196	Fundamentals of Architectural Design: Studio

and 30 semester credit hours of coursework that includes a minimum of two consecutive semesters of design studios. This coursework is posted on the UTSA College of Architecture Web site and within the UTSA College of Architecture graduate handbook.

B. **Performance Evaluation.** Upon completion of preparatory studies, each student is subject to a performance evaluation intended to determine readiness to enter the M.Arch. 2 program sequence. The performance evaluation format is determined by the Department Chair and carried out by the faculty. Normally, failure to pass the performance evaluation should be followed by additional coursework or other work to remedy deficiencies or areas of weakness before the evaluation is conducted again. Failure to successfully pass the performance evaluation may result in the postponement of entering the M.Arch. 2 program sequence.

C. **M.Arch. 2 Program Sequence.** Degree candidates must complete 52 semester credit hours of coursework consisting of the following two areas of coursework: required courses and electives:

1. 37 semester credit hours of required courses (see M.Arch. 2 description above)
2. 15 semester credit hours of electives (see M.Arch. 2 description above)

Master of Science in Architecture Degree – The Research Program

The Master of Science in Architecture (M.S. Arch.) program is a nonstudio research program that prepares students for careers in research, teaching, consulting, and further graduate study. The focus of the program is research in architecture. Areas of research include historic preservation, urban and regional planning, architectural history, sustainability in architecture, and health and wellness. The program stresses critical writing and research methods. The educational opportunities are enriched by the College of Architecture's location in downtown San Antonio, which has a rich heritage of historic architecture and urbanism.

M.S. Arch. 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.

A completed application package consists of the following:

- Completed Application form
- Official transcripts from all universities attended
- Graduate Record Examination (GRE) scores
- Two (2) Letters of Recommendation
- Letter of Intent

- Samples of expository writing
- Test of English as a Foreign Language (TOEFL) scores for international applicants whose first language is not English.

An application fee and all application materials must be submitted directly to the UTSA Graduate School at One UTSA Circle, San Antonio, TX 78249. Please consult the College of Architecture's Web site (<http://utsa.edu/architecture/>) for applicable dates when the review of applications will begin and for more information about the College and its programs.

M.S. Arch. Degree Requirements. The minimum number of semester credit hours required for the Master of Science degree in Architecture, 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 Graduate Advisor of Record (GAR) and a faculty advisor in their chosen field of study 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 the following required courses:

ARC	5173	Architectural Theory and Criticism
ARC	6433	Research Methods in Architecture
ARC	6983	Master's Thesis (repeated for a total of 6 credit hours)

B. 21 semester credit hours of electives to be selected in consultation with committee chair

C. 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 ARC 6961 will not count toward the 33 semester credit hours required for the degree.

Graduate Certificate in Historic Preservation

Historic Preservation is a process of design for continuity and the management of change within an existing historic context. The Graduate Certificate in Historic Preservation offers specialized education in historic preservation design, technology, planning and management through graduate-level courses.

The Graduate Certificate in Historic Preservation enables graduate students from multiple program areas to receive tangible confirmation of skills and comprehension in historic preservation. A Graduate Certificate in Historic Preservation offers students from any discipline the opportunity to take historic preservation classes with rationale and purpose. Certificate holders can gain employment advantages in fields related to archaeology, architecture, business, engineering, geography, historic preservation, history, interior design, landscape architecture, law, museum studies, political science, public policy, social science and urban and regional planning. Many government jobs within federal, state, and local agencies specifically require or desire graduate-level training in historic preservation. All states, many counties, and most large cities have nonprofit organizations and societies devoted to historic preservation. Within the construction industry there is currently a huge trend upwards in adaptive use of existing buildings, especially within previously abandoned downtown areas. There is widespread demand for professionals with specialized training in historic preservation. Interested individuals should contact the Historic Preservation Certificate Program Coordinator within the College of Architecture.

Certificate in Historic Preservation Admission Requirements. New and existing graduate students in “good standing” shall declare the intent to seek the Certificate by requesting permission to enter and complete the program. Students not currently enrolled in a graduate program may apply according to UTSA admission requirements for certificate programs (see Chapter 3, Certificate Programs, in this catalog). The Certificate Program Coordinator may determine that a student requires prerequisite background courses to adequately prepare for the courses of the Graduate Certificate Program.

Certificate in Historic Preservation Requirements. The Certificate requires 15 semester credit hours of coursework and 10 weeks (or 350 hours) of practical experience, such as an internship or other type of employment related to historic preservation. Two courses are required and an additional three courses must be selected from the list of approved courses. All requirements must be completed within a six-year period. Courses taken for the Graduate Certificate in Historic Preservation can be applied toward the Master of Architecture and the Master of Science in Architecture degrees. Students will be advised by the Historic Preservation Certificate Program Coordinator/Advisor.

A. 6 semester credit hours of the following required courses:

ARC	5203	History and Theory of Preservation
ARC	6423	Architectural Conservation Theory

B. Required Practical Experience, 10 weeks or equivalent (to be approved by the Certificate Program Coordinator)

C. 9 semester credit hours of approved elective courses selected from the following list:

ARC	5233	Architectural Surveys and Measured Drawings
ARC	5403	Historic Preservation Seminar
ARC	5423	Legal and Economic Aspects of Preservation
ARC	5613	American Architecture
ARC	6003	Morphology of the Architecture and Landscape of South Texas and Borderlands
ARC	6413	Preservation Technology
ARC	6433	Research Methods in Architecture

Graduate Certificate in Urban and Regional Planning

The purpose of the professional certificate in Urban and Regional Planning is to provide students with an introductory understanding of the historical, social, international, and physical context of comprehensive land use planning and sustainable urbanism.

The Certificate in Urban and Regional Planning is a 15-semester-credit-hour program. Degree-seeking, special graduate or non-degree-seeking students from any discipline at UTSA are allowed to complete the Certificate in Urban and Regional Planning (URP) program. Students will be advised by the URP Certificate Program Coordinator/Advisor. Interested individuals should contact the Urban and Regional Planning Certificate Program Coordinator within the College of Architecture.

Certificate in Urban and Regional Planning Admission Requirements. New and existing graduate students in “good standing” shall declare the intent to seek the Certificate by requesting permission to enter and complete the program. Students not currently enrolled in a graduate program may apply according to UTSA admission requirements for certificate programs (see Chapter 3, Certificate Programs, in this catalog). The Certificate Program Coordinator may determine that a student requires prerequisite background courses to adequately prepare for the courses of the Graduate Certificate Program.

Certificate in Urban and Regional Planning Requirements. The Urban and Regional Planning Certificate curriculum consists of 9 semester credit hours of required planning courses and 6 elective hours from the list defined in item B below. Courses taken for the Graduate Certificate in Urban and Regional Planning can be applied toward the Master of Science in Urban and Regional Planning, Master of Architecture, and Master of Science in Architecture degrees. Students will be advised by the Urban and Regional Planning Certificate Program Coordinator/Advisor.

A. 9 semester credit hours of the following required courses:

URP	5323	International Community Planning and Design
URP	5333	Introduction to Urban and Regional Planning
URP	5343	History and Theory of Urban and Regional Planning

B. 6 semester credit hours of approved elective courses selected from the following list:

ARC	5203	History and Theory of Preservation
ARC	5403	Historic Preservation Seminar
ARC	5423	Legal and Economic Aspects of Preservation
ARC	5613	American Architecture
ARC	5663	The Architecture and Cities of Northern Mexico
ARC	5673	Advanced Topics in the Architecture and Urbanism of Mexico
ARC	6003	Morphology of the Architecture and Landscape of South Texas and Borderlands
ARC	6013	Theories and Philosophies of Regionalism
ARC	6313	Health and the Built Environment
ARC	6323	Architecture, Health and Wellness
PAD	5033	Theories of Public Organizations
PAD	5223	Urban Management
PAD	5383	Housing Policy
PAD	5463	Collaborative Governance
PAD	5483	Environmental Policy
PAD	5513	Urban and Regional Economic Development
PAD	5523	Community Sustainability
PAD	5813	Health Issues and Policies
PAD	6543	Urban Service Systems
URP	5313	International Housing Design and Neighborhood Planning
URP	5353	Structure and Function of Cities and Regions
URP	5363	Intermediate Urban Planning Methods
URP	5373	Planning and Design of Suburbs
URP	5383	Planning and Housing for Rural Communities
URP	5393	Advanced Urban Planning Methods
URP	5433	Transportation Planning
URP	5443	Community Development
URP	5453	Urban and Regional Sustainability
URP	5463	Environmental Planning and Assessment
URP	5473	Introduction to Health Planning

COURSE DESCRIPTIONS

ARCHITECTURE

(ARC)

5113 Design and Leadership

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An in-depth study of design as a form of leadership in the emerging global environment. Includes consideration of leadership qualities to affect change through design and practice.

5123 Emerging Design and Practice in the Global Context

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An advanced study of architectural design and practice in the global context with a focus on Asia and India. Includes consideration of the similarities and differences between the cultural, economic, and regulatory frameworks.

- 5133 Professional Practice and Construction in a Global Setting**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An advanced study of national and international business and legal environments in the construction industry. Topics include agreement and delivery options, forms of construction, project procedures and administration, liability, contract documents, and ethics. (Formerly titled “Advanced and International Professional Practice and Ethics.”)
- 5163 Current Issues and Topics in Contemporary Architecture**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A critical survey of the leading issues, theories, writings, projects, and built works of architecture over the past 20 years.
- 5173 Architectural Theory and Criticism**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey of contemporary architectural theory and criticism from 1950 to the present. May be repeated for credit once when topics vary.
- 5183 Fundamentals of Architectural Design: Principles & Representation**
(3-0) 3 hours credit. Prerequisites: Graduate standing and permission of the architecture Graduate Advisor of Record.
An introduction to the basic principles and skills associated with architectural design for graduate students enrolled in the M.Arch. 3 program.
- 5196 Fundamentals of Architectural Design: Studio**
(1-10) 6 hours credit. Prerequisites: Graduate standing and permission of the architecture Graduate Advisor of Record.
An introductory design studio for graduate students enrolled in the M.Arch. 3 program. Considers design as an exploration of theoretical ideas and translation into architectural and urban spaces.
- 5203 History and Theory of Preservation**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An introduction to the history, philosophy, and methodology of historic preservation and restoration.
- 5233 Architectural Surveys and Measured Drawings**
(3-0) 3 hours credit. Prerequisites: Graduate standing and ARC 5203, or consent of instructor.
A survey of documentation and interpretation of sites and buildings and graphic recording techniques.
- 5303 International Practice**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An in-depth study of the professional, legal, social, and cultural issues that affect international architecture, construction, and urban development.
- 5403 Historic Preservation Seminar**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An advanced study of selected topics in architecture, design, preservation, and planning. May be repeated once for credit, when topics vary.
- 5423 Legal and Economic Aspects of Preservation**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey of the laws and regulations that affect preservation of the built environment, nationally, regionally, and locally. Includes considerations of fundamentals of legal protection for and regulation of historic cultural resources in light of contemporary attitudes toward the historic environment, and the 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.

- 5513 Advanced Building Technology & Structures**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An advanced study of building technology and structures. Includes consideration of sustainable techniques, technologies, building enclosure, structural behavior and systems, the integration of heating, cooling and ventilating systems, lighting, acoustics, electrical, plumbing and water, security, vertical circulation, and site and transportation for new and existing buildings.
- 5533 Contemporary Materials in Architecture and Design**
(1-4) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey and examination of contemporary materials from multiple perspectives. Includes consideration of the characteristics and applications of existing, new, and emerging materials. Includes design project.
- 5543 Advanced Digital Design and Fabrication Technologies in Architecture**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An in-depth examination of contemporary digital design and fabrication technologies in architecture and other design disciplines.
- 5563 Fabric Structures and Smart Textiles for Designers**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A hands-on introduction to lightweight fabric structures and smart textiles. Includes consideration of innovative means to integrate structural smart fabrics within architectural design environments.
- 5603 Advanced Seminar in Architectural History**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An in-depth study or survey investigating selected topics in architectural history. May be repeated once for credit, when topics vary.
- 5613 American Architecture**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey of the development of the architecture of the United States from the earliest human settlements to the present.
- 5643 Modern Architecture of Mexico**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey of the architecture and urbanism of Mexico from Independence in 1821 to the present.
- 5653 Pre-Columbian and Colonial Architecture of Mexico**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey of the architecture and urbanism of Mexico during the pre-Columbian and Colonial eras.
- 5663 The Architecture and Cities of Northern Mexico**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A detailed survey of the architecture and urbanism of the border states of Northern Mexico, primarily focusing on the modern era from 1821 to the present.
- 5673 Advanced Topics in the Architecture and Urbanism of Mexico**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An in-depth study of the major currents of thought and critical ideas regarding the architecture and urbanism of Mexico. Topics include the impacts of nationalism, modernity, tectonic culture, globalization, post-colonialism, automobile suburbia, and hybrid border architecture and urbanism.
- 5713 Environmental Architecture and Sustainability**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A study of history and theory of environmentally sustainable design. Includes the review of the general discourse of sustainability and consideration of the tools and techniques employed to produce sustainable architectural environments. (Formerly ARC 5153. Credit cannot be earned for both ARC 5713 and ARC 5153.)

5723 Applications in Sustainable Design

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An introduction to the integration of environmental performance criteria in architectural design. Includes the application of simulation methods, design decision support tools, rating systems (e.g., LEED), and consideration of building energy consumption patterns, conservation strategies, solar shading, solar access, integration of electric and daylight, and the life cycle analysis of materials and systems.

6003 Morphology of the Architecture and Landscape of South Texas and Borderlands

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

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.)

6013 Theories and Philosophies of Regionalism

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

A survey of the discourse of architectural regionalism. Includes consideration of regionalist theory and practice in the twentieth century, regional planning, critical regionalism, bioregionalism, sustainability, and issues such as modernity, globalization, cultural identity, authenticity, place, and tradition. (Formerly ARC 5213. Credit cannot be earned for both ARC 6013 and ARC 5213.)

6023 Vernacular Architecture

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An introduction to contemporary and past vernacular architecture. Includes specific consideration of global architecture developed by nonprofessionals and builders in response to climate, material availability, sociocultural patterns, and economic constraints that condition the adaptation of housing, farm, and industrial structures. (Formerly ARC 5623. Credit cannot be earned for both ARC 6023 and ARC 5623.)

6103 Design Process and Human Perception

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An examination of design processes as they relate to spatial, experiential, and perceptual considerations in architectural design. Includes exploration of architectural environments through philosophy, psychology, history, and literature.

6126 Advanced Design Studio I

(1-10) 6 hours credit. Prerequisite: Graduate standing.

An introduction to advanced architectural design, including the role of research, program preparation, and technological integration in architectural design.

6136 Advanced Design Studio II

(1-10) 6 hours credit. Prerequisite: ARC 6126.

An advanced architectural design studio, which allows faculty and students to explore a range of architecture-related topics in a studio setting. Content varies.

6146 Advanced Design Studio III

(1-10) 6 hours credit. Prerequisites: Graduate standing and consent of instructor.

An advanced architectural design studio, which includes the integration of building materials, services, and systems, technical documentation and comprehensive design.

6213 Biomimicry and Physical Computing in Design

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

A hands-on course using biomimicry to learn from biological processes. Includes physical computing, robotic technologies, and kinetic structures to develop working models of design solutions using biomimicry.

6313 Health and the Built Environment

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

A survey course examining the relationships between the design of the built environment and human health from physiological, psychological, organizational, sociological and ecological perspectives.

- 6323 Architecture, Health and Wellness**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An examination of the evidence-based approach to the design of healthy work, educational, residential, and recreational environments.
- 6333 Healthcare Design**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An examination of planning and design considerations for clinical and therapeutic healthcare facilities.
- 6413 Preservation Technology**
(1-4) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
A survey of techniques of preservation: methods of analysis, history of materials, and technology used in old buildings. Includes 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. Prerequisite: Graduate standing or consent of instructor.
An advanced study and critical analysis of current design theory and techniques for conservation of historic sites.
- 6433 Research Methods in Architecture**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
An examination of 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.
- 6816 Study Abroad: Advanced Design Studio III**
(0-12) 6 hours credit. Prerequisite: Consent of instructor.
An advanced architecture design studio associated with a study abroad program.
- 6823 Study Abroad: Advanced Architectural History/Theory**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
An advanced study in architectural history/theory associated with a study abroad program; involves field trips.
- 6833 Study Abroad: Advanced Architectural Representation**
(0-6) 3 hours credit. Prerequisite: Consent of instructor.
A graduate-level drawing and other media course associated with a study abroad program; involves field trips.
- 6931 Master's Project Preparation**
1 hour credit. Prerequisites: ARC 6126, ARC 6136, graduate standing and permission of the architecture Graduate Advisor of Record.
The course involves the research and preparation of a proposal for an independent design project. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). (Formerly ARC 6933. Credit cannot be earned for both ARC 6931 and ARC 6933.)
- 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. Prerequisites: Graduate standing and permission of the architecture Graduate Advisor of Record to take the comprehensive examination.

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 Master of Science degree. May be repeated once.

6973,6 Special Topics

(3-0, 6-0) 3 or 6 hours credit. Prerequisite: Graduate standing or 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 not more than 6 semester credit hours of ARC 6973 or 12 hours of ARC 6976 will apply to the Master of Architecture degree or the Master of Science degree.

6983 Master’s Thesis

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 the Master of Science 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

(0-12) 6 hours credit. Prerequisites: ARC 6931, graduate standing, and permission of the architecture Graduate Advisor of Record.

A comprehensive study focusing on an independent design proposal and the complete representation of the project. Students who earn a grade of “B” or better in this course will satisfy the comprehensive examination requirement.

**COURSE DESCRIPTIONS
CONSTRUCTION SCIENCE AND MANAGEMENT
(CSM)**

5133 Construction Practice in a Global Setting

(3-0) 3 hours credit.

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

5223 Building Information Modeling for Construction Management

(3-0) 3 hours credit.

Advanced techniques used in development and management of Building Information Models. Emphasis on constructability and management.

5243 Sustainable Construction and Delivery

(3-0) 3 hours credit.

Sustainability principles applied to design, construction and operation of built environment. Emphasis on site management and constructability.

5413 Advanced Topics in Construction Systems

(1-4) 3 hours credit.

The management of the construction process pertaining to large, complex, and unique buildings. The management of sustainable construction, adaptive use of existing buildings, and historic preservation projects will be included. (Formerly ARC 5413. Credit cannot be earned for both CSM 5413 and ARC 5413.)

- 5423 Advanced Topics in Project Controls and Scheduling**
(3-0) 3 hours credit.
Advanced techniques used in scheduling and planning processes in construction project control, including resource allocations and schedule recovery.
- 5433 Construction Safety Planning and Management**
(3-0) 3 hours credit.
Current construction safety and health issues. Development of site-specific plans and methodology to provide hazard reduction on job sites.
- 5633 Advanced Construction Management**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Organization and integration of construction resources and activities to include consideration of ethical practice, scheduling, methods of construction, project planning and management, cost accounting, and personnel utilization. (Formerly ARC 5633 and ARC 5753. Credit cannot be earned for more than one of the following: CSM 5633, ARC 5633, or ARC 5753.)
- 6943 Construction Internship**
3 hours credit. Prerequisites: Graduate standing, 18 semester credit hours of graduate work, and consent of instructor. Supervised full-time construction work experience with public agencies or private companies. 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 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 degree.
- 6973,6 Special Topics**
(3-0, 6-0) 3 or 6 hours credit. Prerequisite: Graduate standing or 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 not more than 6 hours of CSM 6973 or 12 hours of CSM 6976 will apply to the degree.

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.

All College of Business graduate business programs are accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines. These include the following programs:

- Executive Master of Business Administration
- Master of Business Administration degree, including all concentrations: Business Economics, Business of Health, Finance, Information Assurance, Information Systems, International Business, Management Science, Management of Technology, Marketing Management, Project Management, Real Estate Finance, and Tourism Destination Development
- Master of Business Administration Online
- Master of Science degree in Construction Science and Management
- Master of Science degree in Finance
- Master of Science degree in Finance – Real Estate Finance Concentration
- Master of Science degree in Information Technology
- Master of Science degree in Information Technology – Infrastructure Assurance Concentration
- Master of Science degree in Management of Technology
- Doctor of Philosophy degree in Business Administration, including all emphases: Accounting, Finance, Information Technology, Marketing, and Organization and Management Studies.

Master of Business Administration Degree

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. leveling courses. Students whose background is in business, but who have completed the M.B.A. leveling courses seven or more years before entering the program, may be required by the Admissions Subcommittee of the Graduate Program Committee to successfully complete the M.B.A. leveling 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 (upon review of the M.B.A. Committee, GRE scores may be accepted in lieu of the GMAT scores)
- a personal statement
- a current résumé with employment or other experience (optional)
- letters of reference (optional).

M.B.A. Leveling Courses. The following courses constitute the M.B.A. leveling 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
IS	5003	Introduction to Information Systems
MS	5003	Quantitative Methods for Business Analysis

Degree Requirements. The M.B.A. program requires 36 semester credit hours of work beyond any hours acquired in the M.B.A. leveling courses.

Candidates for the M.B.A. degree are required to successfully complete the M.B.A. Core courses, which are included in the following 24 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	5253	Ethics and Globalization (Students are required to complete this course in their first semester of enrollment in the M.B.A. program.)
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 36 semester credit hours.

Option 1: General M.B.A. Nonthesis Option. Under Option 1, students are required to complete the 24 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 24 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 4.

Option 3: Nonthesis M.B.A. Concentration Option. Under Option 3, students have an opportunity to concentrate in a particular area. For the following concentrations, specific requirements for each are discussed under the departments of the College of

Business: Business Economics, Finance, Information Assurance, Information Systems, Management Science, Management of Technology, Marketing Management, Project Management, Real Estate Finance, and Tourism Destination Development. See below for details on the interdepartmental M.B.A. with a concentration in the Business of Health.

Master of Business Administration Degree – Business of Health 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 the business of health. It will assist students who enter with a wide range of work experience in their quest for advanced leadership and managerial roles within a variety of types of health care organizations.

Students choosing to concentrate in the business of health must complete the 24 semester credit hours of courses containing the M.B.A. Core.

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

A. Required courses (9 semester credit hours):

ACC	6763	Legal and Tax Strategies for Healthcare Organizations
ACC	6773	Seminar in Medicare Regulation
MGT	6123	Health Care Management

B. Elective courses (3 semester credit hours chosen from the following):

ACC	6783	Accounting for Healthcare Organizations
BLW	6553	Legal, Ethical, and Social Issues of Health Care Management
ECO	6543	Health Care Economics and Policy
MGT	6133	Organizational and Managerial Issues in Health Care Delivery
MGT	6923	Health Care Management Internship

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 admission 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 Executive Programs 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

The Master of Business Administration degree in International Business is designed to prepare students for successful careers in international management to meet the needs of businesses, government, and economic development agencies at the regional, national, and global levels.

The M.B.A. program in International Business is offered in a full-time sequenced format that allows students to complete degree requirements in one year. Some courses require study outside of the United States, and travel costs are not included in the program tuition. Independent study and internships outside of the United States are encouraged but not required.

Students pursuing this degree must demonstrate proficiency in one language in addition to English.

Program Admission Requirements. Applicants for admission to the M.B.A. program in International Business are required to meet the same general admission requirements set out for the M.B.A. degree. Additionally, it is strongly recommended that students have two years of full-time work experience.

Degree Requirements. The M.B.A. program in International Business consists of 44 semester credit hours of coursework. This includes three leveling classes (9 semester credit hours). Students in the M.B.A. in International Business are required to take the international sections of all courses. The courses and their sequencing are as follows:

Summer Semester

ACC	5003	Financial Accounting Concepts
ECO	5023	Managerial Economics
MGT	5003	Conceptual Foundations of Management
MGT	6971	Special Problems - International Ethics
MS	5003	Quantitative Methods for Business Analysis

Fall Semester

ACC	5023	Accounting Analysis for Decision Making
FIN	5023	Financial Management
IS	6971	Special Problems - Information Systems
MGT	5183	Global and Comparative Management
MGT	6971	Special Problems - International Law
MKT	5023	Marketing Management

Spring Semester

ECO	6323	International Trade and Finance
FIN	5833	International Financial Management
MGT	6971	Special Problems - International Human Resources
MKT	5673	International Marketing
MS	5023	Decision Analysis and Production Management
MS	6971	Special Problems - Global Supply Chain

M.B.A. International Capstone Experience

MGT 5903 Strategic Management and Policy (offered at non-U.S. locations during the 3-week mini-mester)

or

With approval, one of the internationally-located options listed below, to be completed from a non-U.S. location:

1. A capstone course offered at an approved school
2. An internship
3. An Independent Study (MGT 6953) supervised by a UTSA College of Business professor.

M.B.A. Online

The M.B.A. Online program is a Web-based, asynchronous degree program offered by a consortium of eight University of Texas System institutions through The University of Texas Online Consortium (UTOC). 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 M.B.A. Online program. While all UTSA students participating in the M.B.A. Online program will follow UTSA admission procedures, registration procedures and tuition and fees may differ. Students should consult the UTSA College of Business Web site at http://business.utsa.edu/graduate/mba_online.aspx for more information on the M.B.A. Online program and its courses.

Dual Master of Business Administration Degree and Master of Public Health Degree Program

This integrated dual degree program is designed to offer the opportunity for qualified graduate students to study both business administration and public health at the graduate level. It will assist students who enter with a wide range of work experience in their quest for advanced leadership and managerial or administrative roles within a variety of health care and public health organization types. The Master of Business Administration (M.B.A.) degree is offered through the UTSA College of Business, and the Master of Public Health (M.P.H.) degree is offered through The University of Texas School of Public Health (UTSPH) with courses available at its San Antonio Regional Campus.

Applicants will be admitted to the M.B.A. and M.P.H. degree programs independently, according to the admission schedule and policies of each institution. Applicants must submit all admission materials to each admission office independently and on time. Once a student has been admitted to both institutions, they will be reviewed for enrollment in the dual degree program by the Coordinating Committee and will receive a letter regarding the outcome of the review. Admission to the integrated dual degree program may occur after a student has already matriculated in the M.B.A., M.P.H., or both degree programs, as long as the student is still within the first-half of each program.

Each student shall be responsible for payment of tuition and fees at each institution at which the student is enrolled.

Required Courses. Students choosing the dual degree program must complete the 36 semester credit hours of M.B.A. coursework and the 45 semester credit hours of M.P.H. coursework. However, under this integrated dual-degree program, up to 12 semester credit hours of M.B.A. coursework can be applied to the M.P.H. requirements, and up to 12 semester credit hours of M.P.H. coursework can be applied to the M.B.A. requirements. These shared-credit courses substantially reduce the total time required for students to complete the programs, when compared with taking each of the two degree programs separately.

Students should refer to The University of Texas School of Public Health catalog (www.sph.uth.tmc.edu/sa/) for M.P.H. program admission and degree requirements.

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 five areas of emphasis: Accounting, Finance, Information Technology, Marketing, 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 2, General Academic Regulations, and Chapter 5, 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 based on several factors, including academic achievement, standardized test scores, employment history, a personal statement, letters of recommendation, and possibly an interview. 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 old) 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.

Candidates who do not possess a baccalaureate or master's degree in a business or business-related discipline with sufficient quantitative rigor are required to complete a program consisting of a minimum of 87 semester credit hours. The Doctoral Studies Committee for the major area discipline will determine a degree program for each candidate based upon that candidate's particular background. Candidates whose backgrounds are determined to be insufficient in specific areas may be directed to take additional background or leveling courses (See sections A, B, and C of the Program of Study) before proceeding to the program's required courses. Candidates who enter the program with the appropriate prior graduate coursework may be waived from some or all of the background requirements (sections A, B, and C).

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 87 semester credit hours beyond the bachelor's degree. Candidates who enter the program with prior graduate coursework may be waived from some of the background degree requirements in categories A, B, and C below, with approval from the discipline's Doctoral Studies Committee.

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. M.B.A. Core 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 three courses (9 semester credit hours) outside of the student's major discipline 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	5253	Ethics and Globalization
MGT	5903	Strategic Management and Policy
MKT	5023	Marketing Management
MS	5023	Decision Analysis and Production Management

Some or all of this requirement may be waived based on prior graduate coursework, with the approval of the discipline's Doctoral Studies Committee.

- B. Discipline background courses (5000-level courses or higher) in the major field or in a field directly related to (or relevant for) the major field (12 semester credit hours). Up to 9 credit hours of this requirement may be waived based on prior graduate coursework, with the approval of the discipline's Doctoral Studies Committee.
- C. Statistics/Quantitative background (5000 level or higher) (6 semester credit hours):*

6 semester credit hours of 5000-level (or higher) course in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Doctoral Studies Committee. Only courses relevant to the doctoral program of study will be approved to meet this requirement.

*If this requirement is met, the discipline Doctoral Studies Committee may approve the waiver of 3 hours of the 18 semester credit hours required in the Statistics and Research Methodology requirement (section E, below). Students without the approved Statistics/Quantitative background requirement will take all 18 credit hours of the Statistics and Research Methodology requirement.

- D. Seminar in teaching methods (3 semester credit hours):

GBA	7103	Doctoral Teaching Seminar
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- E. Statistics and Research Methodology (18 semester credit hours):

18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Doctoral Studies Committee. ** Courses include but are not limited to:

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	7013	Advanced Applied Business Statistical Methods
STA	7023	Applied Linear Statistical Models
STA	7033	Multivariate Statistical Analysis
STA	7083	Time Series Analysis
STA	7923	Bioinformatics and Data Mining II: Data Mining

**If the Statistics/Quantitative background requirement (section C, above) is met, the Doctoral Studies Committee may approve the waiver of 3 hours of the 18 semester credit hours required in the Statistics and Research Methodology requirement. Students without the approved Statistics/Quantitative background requirement will be required to take all 18 hours of the Statistics and Research Methodology requirement.

- F. Major Area Coursework:

- Four Ph.D.-level courses in major area (12 semester credit hours).
- Two directed electives approved by the Doctoral Studies Committee from among graduate-level courses in major area (6 semester credit hours).

G. Free Electives (3 semester credit hours):

One course to be approved by the Doctoral Studies Committee. The course may be from within or outside the College of Business and must be at the graduate level.

H. Doctoral Research (9 semester credit hours):

This requirement is met by doctoral research coursework.

I. 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 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 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)

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.

A survey of contemporary research design and data collection methods, including archival data, surveys, interviews, and qualitative research methods.

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 Department of Accounting is to advance accounting knowledge and practice through excellence in accounting education, high-impact research, and relevant continuing education and professional outreach activities that serve the constituents of the department in the state, nation, and globally.

All graduate programs in Accounting are separately accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines.

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 (the semester in which they are taking Intermediate Accounting II). Once admitted, these students are allowed to take graduate courses while, technically, undergraduate students. Students admitted to the 150-hour program will be reclassified from undergraduate to graduate student status when they have completed 120 semester credit hours of coursework toward their degree. 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	2013	Principles of Accounting I
ACC	2033	Principles of Accounting II
ACC	3023	Intermediate Accounting I
ACC	3033	Intermediate Accounting II
ACC	3043	Federal Income Taxation
ACC	3113	Accounting Information Systems
ACC	4013	Principles of Auditing
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.

All candidates must complete the following:

A. Theoretical Foundations (6 semester credit hours):

ACC	6003	Managerial Accounting Theory
ACC	6013	Financial Accounting Theory

B. Disciplinary Focus. 12 semester credit hours of graduate electives in accounting or taxation, approved by the Coordinator of Graduate Programs in Accounting. Students may choose to focus their graduate study in one of four different areas through their choice of these 12 hours. Focus areas include taxation, audit services, financial accounting and managerial accounting. See the graduate advisors or the Coordinator of Graduate Programs in Accounting to discuss these options.

C. Electives:

9 semester credit hours of graduate electives in accounting, taxation, finance, or information systems approved by the Coordinator of Graduate Programs in Accounting.

D. Accounting Capstone (3 semester credit hours):

ACC	6993	Integrative Seminar in Accounting
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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 78 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 12 semester credit hours chosen from Ph.D. level courses and 6 hours of directed electives.

A. Ph.D. level courses (12 semester credit hours chosen from the following):

ACC	7013	Seminar in Empirical Research in Accounting
ACC	7023	Seminar in Behavioral Research in Accounting
ACC	7053	Current Topics in Accounting Research
ACC	7113	Seminar in Financial Accounting Theory
ACC	7123	Seminar in Managerial Accounting Theory

B. Directed Electives (6 semester credit hours):

ACC	7043	Archival-Based Research Methods in Accounting
Graduate-level course in major area 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.)

5513 Fundamentals of Information Assurance

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course examines the principle areas of information assurance. Topics will include protecting networks, intrusion detection, digital forensics, and supervisory control and data acquisition. Application to business environments will be emphasized. (Same as IS 5513. Credit cannot be earned for both ACC 5513 and IS 5513.)

5523 Fundamentals of Cyber Forensics

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course examines cyber forensics and includes hands-on projects using current industry technologies. Methods for retrieving data from disk drives and memory will be discussed. Retrieving data from mobile devices such as cell phones and PDA's will be included. (Same as IS 5523. Credit cannot be earned for both ACC 5523 and IS 5523.)

- 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.
- 5823 Governmental and Not-for-Profit Accounting**
(3-0) 3 hours credit. Prerequisite: ACC 3023 or an equivalent.
A study of accounting principles and practices of state and local governments and not-for-profit organizations.
- 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.
- 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.
- 5873 Budgeting and Forecasting**
(3-0) 3 hours credit. Prerequisite: ACC 3023 or an equivalent.
Examines the accountant's role in budgeting and forecasting. Study of advanced forecasting techniques and applications of microcomputers and forecasting.
- 5883 Fraud Examination and Forensic Accounting**
(3-0) 3 hours credit. Prerequisite: ACC 5813 or an equivalent.
An in-depth exposure to the forensic accounting process and related audit topics, including identification of fraud risk factors and development of fraud detection programs and the use of accounting work done for litigation purposes.
- 5913 Corporate Valuation**
(3-0) 3 hours credit. Prerequisites: ACC 3033 and 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. (Same as FIN 5813. Credit cannot be earned for both ACC 5913 and FIN 5813.)
- 5923 Systems Auditing**
(3-0) 3 hours credit. Prerequisite: ACC 5813 or an equivalent.
Addresses special problems in auditing information technology. Introduces the concepts and principles of auditing accounting information systems including the control environment, general and application controls, and controls in a real-time IT environment. Provides an understanding of the basics of IT audit planning, control assessment, evidence gathering and evaluation, and communication of audit findings. Enables students to become familiar with the IT auditing profession, professional associations, IT audit certification, and IT audit resources available online. Examines the role of IT assurance, especially as it relates to electronic commerce ("e-commerce"), and the likely future development path of Web-based transaction processing and information reporting.
- 5943 Financial Statement Analysis**
(3-0) 3 hours credit. Prerequisites: ACC 3033 and 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. (Same as FIN 5943. Credit cannot be earned for both ACC 5943 and FIN 5943.)
- 6003 Managerial Accounting Theory**
(3-0) 3 hours credit. Prerequisite: ACC 3023 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, distribution, and dissolution.

6203 Seminar in International Accounting

(3-0) 3 hours credit. Prerequisite: ACC 3023 or an equivalent or approval of the instructor.

An analysis of the issues involved in accounting for multinational corporations, including historical and cultural influences on accounting standards and practice in financial reporting, management accounting, and audit/assurance. The course includes an overview of International Financial Accounting Standards (IFRS) and a comparison of IFRS to U.S. GAAP.

6703 Introduction to Data Mining

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

This course introduces the fundamental data mining concepts and techniques that are applicable to business research. The course covers basic skills required to assemble analyses for both pattern discovery and predictive modeling. It provides extensive hands-on instruction using data mining software. This course is open to all graduate students. (Same as IS 6703. Credit cannot be earned for both ACC 6703 and IS 6703.)

6763 Legal and Tax Strategies for Healthcare Organizations

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

Overview of taxation and related legal issues affecting the healthcare industry. Topics include tax-exempt organizations, community benefit standards, choice of organizational form, and tax planning strategies for healthcare organizations and professionals.

6773 Seminar in Medicare Regulation

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

Seminar in Medicare covered services, payment systems and compliance for healthcare providers. Emphasis is on understanding the role of Medicare in the American healthcare system, and developing the technical skills to identify and research problems in Medicare payments. Topics include Medicare administration and covered services, Part A hospital insurance benefits, Part B supplementary medical insurance benefits, Part C Medicare Advantage benefits, Part D prescription drug benefits, exclusions from coverage, provider payment rules, fraud & abuse, recovery audits, physician self-referral, anti-dumping rules, claims & appeals, and managed care plans. Includes practical experience using online research software, a comprehensive Medicare hospital cost report, and professional cost reporting software.

6783 Accounting for Healthcare Organizations

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

A seminar on financial and managerial accounting in for-profit and nonprofit healthcare organizations. Accounting issues related to strategic decision-making in health service production, financing, and investment will be emphasized throughout the course. Topics include the healthcare accounting and financial environment, revenue and expense recognition, balance sheet valuations, ratio analysis, cost accounting, performance measurement, variance analysis, physician compensation and practice valuation, tax-exemption issues, mergers, and disclosure requirements. Special attention is given to the financial implications of third-party payment systems and accounting analyses for physician practices. Includes practical experience using actual healthcare case materials.

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. (Credit cannot be earned for both ACC 6943 and ACC 6823.)

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.

6993 Integrative Seminar in Accounting

(3-0) 3 hours credit. Prerequisites: Completion of at least 18 semester credit hours of graduate coursework that applies to the MACY degree and approval of the Graduate Advisor of Record.

A focus on the integration of financial accounting, auditing, managerial accounting and systems in assessing their relationships individually and collectively to business decision-making. Emphasizes the use of case studies and consideration of current business and accounting issues to demonstrate the link between various functional areas of accounting.

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.

7043 Archival-Based Research Methods in Accounting

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

Examination of quasi-experimental research designs and methods as used in archival-based accounting research. Provides students the opportunity to develop a foundation for performing research related to Ph.D. seminar project, academic research and scholarly papers. Includes partial or complete replications of published archival-based research papers.

7053 Current Topics in Accounting Research

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

Seminar in current accounting research topics. Topics will vary. May be repeated for credit, but not more than 6 hours may be applied to the Doctoral degree.

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.

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 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

Mission Statement

The mission of the Department of Economics at The University of Texas at San Antonio is to offer courses and degree programs at both the undergraduate and graduate levels that provide students with the opportunity to gain the necessary theoretical and quantitative tools in economics such that they can understand and apply economics in their daily lives, seek advanced degrees in economics, pursue careers in the global marketplace, and engage in public policy-making. It is also the mission of the department to provide an environment for its faculty and students to engage in research that will further the understanding of economics and enhance the reputation of the Department, the College of Business, and the University.

Master of Business Administration Degree – Business Economics Concentration

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

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 24 semester credit hours of courses containing the M.B.A. Core 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	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, technological change, and labor organizations and collective bargaining. (Formerly ECO 6313. Credit cannot be earned for both ECO 6523 and ECO 6313.)

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.

7303 Applied Econometrics

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

Advanced topics in econometrics and their applications. Topics include panel data, discrete and limited dependent variable, nonlinear and dynamic models.

DEPARTMENT OF FINANCE

All graduate programs in Finance are accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines.

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 24 semester credit hours of courses containing the M.B.A. Core 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 24 semester credit hours of courses containing the M.B.A. Core 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 Construction Science and Management

The Master of Science in Construction Science and Management (M.S.C.S.M.) is designed to offer the opportunity for intensive education in business administration and real estate finance and development to qualified graduate students.

Program Admission Requirements. For admission to the Master of Science in Construction Science and Management 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 construction science and management 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.C.S.M. 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 non-construction science and management undergraduate degrees may be required to take additional undergraduate and graduate courses for removal of deficiencies, as determined by the Graduate Program Committee in Construction Science and Management. Such courses do not apply toward the degree.

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

A. 15 semester credit hours of foundations of knowledge courses:

ACC	5023	Accounting Analysis for Decision Making
FIN	5023	Financial Management
MGT	5043	Management and Behavior in Organizations
MKT	5023	Marketing Management
MS	5023	Decision Analysis and Production Management

B. 15 semester credit hours of required courses:

CSM	5633	Advanced Construction Management
FIN	5413	Real Estate Finance
FIN	5433	Real Estate Investment
FIN	5453	Real Estate Development
FIN	6313	Modeling of Financial Decision Making

C. 3 semester credit hours of elective coursework from the following list of courses, as approved by the Graduate Advisor of Record:

ARC	5303	International Practice
CSM	5133	Construction Practice in a Global Setting
CSM	5413	Advanced Topics in Construction Systems
MOT	5243	Essentials of Project and Program Management

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

Degree Options. Students seeking the M.S.F. degree may elect one of two options to complete the required 33 semester credit hours; M.S.F. General Option, or M.S.F. Real Estate Finance Concentration.

Master of Science Degree in Finance – General Option

Under M.S.F. General Option, students are required to complete 6 hours of M.S.F. foundations of knowledge courses, 9 hours of finance courses and 18 hours of elective courses as outlined below.

A. 6 semester credit hours of foundations of knowledge courses:

ACC	5023	Accounting Analysis for Decision Making
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

C. 18 semester credit hours of electives, at least 15 of which must be from the set of courses shown below. The Graduate Advisor in Finance must approve any electives chosen outside this set. The electives include:

ECO	5023	Managerial Economics
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	5723	Fixed Income Analysis
FIN	5733	Banking and the Financial Services Industry
FIN	5813	Corporate Valuation
FIN	5833	International Financial Management
FIN	5853	Entrepreneurial Financial Management
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.

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 6 semester credit hours containing the M.S.F. foundations of knowledge courses, the 21 semester credit hours of required courses, and 6 semester credit hours of electives.

- A. 6 semester credit hours of foundations of knowledge courses:

ACC	5023	Accounting Analysis for Decision Making
MS	5023	Decision Analysis and Production Management

- B. 21 semester credit hours of required courses:

FIN	5023	Financial Management
FIN	5413	Real Estate Finance
FIN	5433	Real Estate Investment
FIN	5453	Real Estate Development
FIN	5633	Investment Theory and Problems
FIN	6313	Modeling of Financial Decision Making
MOT	5243	Essentials of Project and Program Management

- C. 6 semester credit hours of electives from the following set of courses or as approved by the advisor:

ECO	5023	Managerial Economics
FIN	5033	Cases in Financial Management
FIN	5713	Financial Markets
FIN	5723	Fixed Income Analysis
FIN	5733	Banking and the Financial Services Industry
FIN	5813	Corporate Valuation
FIN	5833	International Financial Management
FIN	5853	Entrepreneurial Financial Management
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.

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 78 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:

A. 12 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

B. 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 discounted cash flow techniques, financial forecasting, working capital management, external financing, capital budgeting.

5013 Foundations of Finance for Entrepreneurs

(3-0) 3 hours credit.

The course develops strategies for managing the growth of a company through various phases of its life cycle. Topics include forecasting financial requirements, alternative sources of financing, management of operations and capital investment. Credit for FIN 5013 cannot be applied toward degree programs that require FIN 5023.

5023 Financial Management

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

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, corporate financial policy, and other corporate financial management topics.

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, risk management, 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 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.

5723 Fixed Income Analysis

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

Develops a framework for the analysis of fixed income securities, valuation and risk-return characteristics of these instruments, and trading and portfolio strategies. Various data sources and financial software used to integrate theoretical concepts with practical applications.

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. (Same as ACC 5913. Credit cannot be earned for both FIN 5813 and ACC 5913.)

5823 Corporate Restructuring

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

Evaluation of corporate restructurings including mergers, acquisitions, divestitures, leveraged buyouts and recapitalizations are covered. Topics include ethics, strategy, due diligence, valuation, synergies, leverage, liquidity, control, accounting, deal structuring, post-merger integration and legal/regulatory considerations.

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 Financial Management

(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. (Formerly titled "Entrepreneurial Business Finance.")

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, project future performance, and valuation of the firm. Topics include hidden assets and liabilities, earnings quality, liquidity and cash flows. (Same as ACC 5943. Credit cannot be earned for both FIN 5943 and ACC 5943.)

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 encountered 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.

Theoretical concepts of asset pricing are presented, techniques for testing various hypotheses regarding asset pricing models, option pricing models, and fixed income models are examined. Market structure issues using event studies and time series applications are developed.

7053 Topics in Financial Research

3 hours credit. Prerequisite: Consent of instructor.

This is a directed research course where the topics will vary. The student will undertake research under the instructor's supervision. Topics often include empirical analysis. The course may be repeated for up to 6 semester credit hours when topics vary.

7063 Advanced Research in Finance

(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, advanced topics in real estate finance, and advanced topics for conducting empirical research in 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.

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

All graduate programs in Information Systems and Technology Management are accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines.

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 24 semester credit hours of courses containing the M.B.A. Core 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 24 semester credit hours of courses containing the M.B.A. Core 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 24 semester credit hours of courses that constitute the M.B.A. Core 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.

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 24 semester credit hours of the courses that constitute the M.B.A. Core 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 Program 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. 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).

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	6203	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	Introduction to Data Mining
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 6203 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. 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).

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

A. 15 semester credit hours of required courses:

IS	5143	Information Technology
IS	5203	Telecommunication Systems
IS	6303	Introduction to Voice and Data Security
MGT	5043	Management and Behavior in Organizations
MOT	6203	Strategic Management of Technology
		or
IS	6813	Strategic Management of Information Technology

B. All candidates for the degree must complete an additional 18 semester credit hours of elective courses:

1. 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 6203 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 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 as well as at Southwest Research Institute.

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 Program Committee evaluates each applicant individually, based on a combination of:

- prior academic achievement
- Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) scores

- 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 18 semester credit hours:

MOT	5053	Technology Commercialization
MOT	5163	Management of Technology
MOT	5223	Management of Professional Personnel
MOT	5243	Essentials of Project and Program Management
MOT	5313	Emerging Technologies
MOT	6923	Directed Research in Management of Technology

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

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

Option 1: General M.S. MOT Nonreport Option. Under Option 1, students are required to complete the 18 semester credit hours listed above, 12 semester credit hours of electives as approved by the MOT Graduate Program Committee, and the capstone course MOT 6203 Strategic Management of Technology.

Option 2: General M.S. MOT Report Option. Under Option 2, students are required to complete the 18 semester credit hours listed above, 12 semester credit hours of electives as approved by the MOT Graduate Program Committee, and the capstone experience MOT 6933 Management of Technology Professional Report.

D. Candidates must pass a comprehensive examination administered by the MOT Graduate Program 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 78 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:

- A. 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

B. 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 or the Master of Science degree in Information Technology.

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. Credit for this course cannot be counted toward the Master of Science degree in Information Technology.

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. Credit for this course cannot be counted toward the Master of Science degree in Information Technology.

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. Credit for this course cannot be counted toward the Master of Science degree in Information Technology.

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 object-oriented programming language.

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.

5513 Fundamentals of Information Assurance

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course examines the principle areas of information assurance. Topics will include protecting networks, intrusion detection, digital forensics, and supervisory control and data acquisition. Application to business environments will be emphasized. Credit for this course cannot be counted toward the Master of Science degree in Information Technology. (Same as ACC 5513. Credit cannot be earned for both IS 5513 and ACC 5513.)

5523 Fundamentals of Cyber Forensics

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course examines cyber forensics and includes hands-on projects using current industry technologies. Methods for retrieving data from disk drives and memory will be discussed. Retrieving data from mobile devices such as cell phones and PDA's will be included. Credit for this course cannot be counted toward the Master of Science degree in Information Technology. (Same as ACC 5523. Credit cannot be earned for both IS 5523 and ACC 5523.)

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 forensic 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 emphasis 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 Introduction to Data Mining**
(3-0) 3 hours credit.
This course introduces the fundamental data mining concepts and techniques that are applicable to business research. The course covers basic skills required to assemble analyses for both pattern discovery and predictive modeling. It provides extensive hands-on instruction using data mining software. This course is open to all graduate students. (Same as ACC 6703. Credit cannot be earned for both IS 6703 and ACC 6703.) (Formerly titled “Advanced Business Information Systems.”)
- 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. (Same as MOT 5203 and MOT 6203. Credit can be earned for only one of the following: IS 6813, MOT 5203, or MOT 6203.)

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 diverse 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 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 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.

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)**

5053 Technology Commercialization

(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. (Formerly titled "Building Enterprise Equity.")

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.

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, communication and conflict within and among professional groups, and implications for leadership.

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: 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 on the emergence of technology from basic research to implementation. Seminar format, case-study preparation, presentation, and cooperative learning are defining characteristics of this course.

5323 Biotechnology Industry

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

5333 Technological Drivers of Globalization

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

A study of technological factors contributing to the globalization of business, economic, political and social systems. Emphasis is on identifying positive as well as negative consequences of technology-driven globalization and studying possible disruptions to globalization caused by economic or resource limitations.

5343 Financial Aspects of Management of Technology

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

Examines the financial impacts on the enterprise through value creating ideas, goods, and services. The course presents a financial management view of enterprise operation, considering risk and growth scenarios, capital and cash needs, and means of financing innovation, development, and marketing opportunities.

6203 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. (Formerly MOT 5203. Same as IS 6813. Credit can be earned for only one of the following: MOT 6203, MOT 5203, or IS 6813.)

6923 Directed Research in Management of Technology

(3-0) 3 hours credit. Prerequisite: Completion of 15 semester credit hours of required Management of Technology (MOT) courses or consent of instructor.

A directed research course in which students complete a faculty directed research project that addresses a contemporary management of technology issue or problem. Students will also develop an appreciation and understanding of contemporary management of technology research as published in leading management of technology journals. This course includes a comprehensive examination that addresses the learning goals of the MOT program.

6933 Management of Technology Professional Report

3 hours credit. Prerequisites: MOT 6923 and 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 the course is either “CR” (satisfactory performance) or “NC” (unsatisfactory performance).

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.

DEPARTMENT OF MANAGEMENT

All graduate programs in Management are accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines.

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 78 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:

- A. MGT 7013 Seminar in Organizational Behavior
 MGT 7023 Seminar in Organization Theory
 MGT 7033 Seminar in Strategic Human Resources
 MGT 7043 Foundations of Strategy
- B. 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.

The course focuses on factors affecting individual and group behavior in organizations. It includes organizational behavior topics such as motivation, perception, job attitudes, job design, leadership, and individual differences. It also includes organizational theory topics such as organizational structure, design, culture, and environmental influences.

5053 Advanced 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 5043 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 5043, 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 5043, 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.
- 5253 Ethics and Globalization**
(3-0) 3 hours credit.
This course explores the differing standards of permissible behavior of companies attempting to remain competitive in a global marketplace. How leaders make responsible decisions in conflicting environments is examined through interactive learning experiences that include group discussions, group projects, self-directed evaluations and problem-solving exercises. Students will have the opportunity to gain an understanding of the strengths and weaknesses of their own personal values and beliefs as well as the importance of accountability for responsible leadership. In addition, students will be provided with foundations for ethical reasoning laying the groundwork for responsible decision-making.
- 5623 Employee Relations/Negotiations**
(3-0) 3 hours credit. Prerequisite: MGT 5043 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 5043, 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 M.B.A. Core 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 5043 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 5043 or an equivalent or consent of instructor.

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: International Management, Knowledge Management, Ethics, or Strategic Management of Human Capital among others.

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.

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 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 a Master's 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.

DEPARTMENT INFORMATION

The disciplines of Management Science and Statistics are integral to modern decision-making processes. These interdisciplinary fields emphasize the use of quantitative methods and computers for analyzing, understanding, visualizing, and interpreting data. Management Science seeks to provide a rational basis for decision analysis across a broad spectrum of business functions such as production/operations, marketing, finance, human resources, project management, logistics, and supply chain management. Statistical methods provide analytical tools for research in high-technology and biomedical industries, insurance, and government agencies. For students choosing to obtain a Master of Business Administration degree, the Department of Management Science and Statistics offers a concentration in Management Science. The Department also offers a Master of Science degree in Applied Statistics and a Doctor of Philosophy degree in Applied Statistics.

Master of Business Administration Degree – Management Science Concentration

The Master of Business Administration (M.B.A.) degree with a concentration in Management Science is accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conforms to recommended guidelines.

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 24 semester credit hours of courses containing the M.B.A. Core and 12 semester credit hours of electives from the following:

MS	5303	Topics in Decision Support Systems
MS	5323	Statistical Methods for Business Analysis
MS	5343	Logistics Systems Management
MS	5373	Simulation Analysis of Business Systems
MS	5393	Topics in Production Operations Management
MS	5413	Integrated Global Supply Chain Management
MS	5423	Service Management and Operations
MS	5433	Effective Project Management
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 Applied Statistics

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

Program Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, a B.A. or B.S. in statistics, mathematics, engineering, business, or a closely related field is highly recommended as preparation. In particular, three semesters of calculus and a course in matrix theory/linear algebra or their equivalents are required for unconditional admission. A course in probability and/or statistics is preferred but not required. 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 33 semester credit hours as specified below:

- A. All candidates for the Master of Science in Applied Statistics must complete the following 15 semester credit hours of coursework:

STA	5093	Introduction to Statistical Inference
STA	5103	Applied Statistics
STA	5133	Advanced Programming and Data Management in SAS
STA	5503	Mathematical Statistics I
STA	5513	Mathematical Statistics II

- B. A candidate for the Master of Science degree in Applied Statistics must complete 9 semester credit hours of coursework chosen from one of the following focus areas:

Biostatistics

STA	5903	Survival Analysis
STA	6133	Simulation and Statistical Computing
STA	6813	Multivariate Analysis
STA	6833	Design and Analysis of Experiments
STA	6853	Categorical Data Analysis
STA	6913	Bioinformatics and Data Mining I: Microarray Data Analysis

Industrial Statistics

STA	5803	Process Control and Acceptance Sampling
STA	6013	Regression Analysis
STA	6113	Applied Bayesian Statistics
STA	6133	Simulation and Statistical Computing
STA	6833	Design and Analysis of Experiments
STA	6843	Response Surface Methodology

Management Science

MS	5023	Decision Analysis and Production Management
MS	5453	Management and Control of Quality
MS	5463	Lean Operations and Six Sigma
MS	5483	Operations Research Methods in Statistics
STA	6013	Regression Analysis
STA	6133	Simulation and Statistical Computing

Financial Modeling

ECO	6103	Econometrics and Business Forecasting
FIN	6313	Modeling of Financial Decision Making
STA	5253	Time Series Analysis and Applications
STA	6013	Regression Analysis
STA	6113	Applied Bayesian Statistics
STA	6133	Simulation and Statistical Computing

General

Any 9 hours of 5000/6000-level courses in Statistics or other disciplines as approved by the Graduate Advisor.

- C. A candidate for the Master of Science degree in Applied Statistics must complete 9 semester credit hours of graduate-level courses in Statistics, Engineering, Biology, or other disciplines as approved by the Graduate Advisor.
- D. Each candidate for the degree is required to pass a comprehensive examination in Statistics that will cover material in the following courses: STA 5093, STA 5103, STA 5503, and STA 5513.

Doctor of Philosophy Degree in Applied Statistics

In this age of advanced technology, there is an increasing demand for individuals with 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 Admission Requirements. In addition to satisfying the University-wide graduate admission requirements, a B.A., B.S., M.A. or M.S. in mathematics, statistics, or a closely related field is required. Students who have not taken mathematical statistics courses at the undergraduate level may be required to complete the equivalent courses in the appropriate background areas before taking graduate courses. The admission requirements consist of:

- A cumulative grade point average of 3.3 or higher in the last 60 hours of coursework.
- 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 vita and a statement of 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 87 semester credit hours of graduate coursework as specified below:

A. Foundation Courses

All candidates entering the program with a bachelor's degree must complete the following 18 semester credit hours of coursework:

STA	5093	Introduction to Statistical Inference
STA	5103	Applied Statistics
STA	5133	Advanced Programming and Data Management in SAS
STA	5503	Mathematical Statistics I
STA	5513	Mathematical Statistics II
STA	6023	Mathematical Methods in Statistics

B. All candidates entering the program with a bachelor's degree must complete 12 semester credit hours of 5000/6000-level Statistics courses approved by the Graduate Advisor.

C. Advanced Courses

All candidates must complete the following 12 semester credit hours of advanced coursework:

STA	6133	Simulation and Statistical Computing
STA	6991	Statistical Consulting (to be taken three semesters)
STA	7503	Advanced Inference I
STA	7513	Advanced Inference II

D. All candidates for the Ph.D. degree in Applied Statistics must complete 9 semester credit hours of approved graduate courses with numbers 6000 or higher within the Department of Management Science and Statistics.

E. All candidates for the Ph.D. degree 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 The University of Texas at San Antonio.

F. All candidates for the Ph.D. in Applied Statistics must complete a minimum of 15 semester credit hours of Doctoral Research.

G. All candidates for the Ph.D. in Applied Statistics must complete a minimum of 15 semester credit hours of Doctoral Dissertation.

All students in the program will be required to complete a degree plan specifying the courses they will complete. This degree plan must be approved by the Doctoral Studies Committee before the end of the second semester of enrollment.

Applicants with a master's degree in statistics or a related field may apply up to 30 hours of previously earned graduate credits toward the 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 foundation requirements of the degree.

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. Students admitted with a bachelor's degree must pass the Master's comprehensive examination. Those who do not pass this examination at the Ph.D. level may qualify for the M.S. degree. All candidates for the Ph.D. degree must pass an advanced written qualifying examination and an oral comprehensive examination administered by the graduate faculty. 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 the written qualifying examination 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 1023, 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, nonparametric 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 Topics in 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 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 Topics in 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.
- 5413 Integrated Global Supply Chain Management**
(3-0) 3 hours credit.
Focuses on effective supply chain strategies for organizations that operate globally with emphasis on how to plan and integrate supply chain components into a coordinated system. Specifically, the course seeks to integrate different perspectives from the practices of marketing, logistics, and operations management. The course will introduce key tactics such as risk pooling and inventory placement, integrated planning, and information sharing. One of the key objectives is to understand the relationship between suppliers and customers.
- 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, other topics include service encounters, service design and development, service productivity, and globalization of services. Tools and techniques for management service operations are also emphasized.
- 5433 Effective Project Management**
(3-0) 3 hours credit.
Approaches project management from the perspective that the material is applicable to all disciplines and project types. It not only emphasizes individual project execution, but also provides a strategic perspective. It integrates the critical PMBoK elements in the context of cases and projects. The course examines the traditional concepts and techniques of project management for long-term development programs and short-term projects as well as introducing the innovative adaptive and extreme concepts.
- 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 programming 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.

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.

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

(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 Applied Statistics.

5093 Introduction to Statistical Inference

(3-0) 3 hours credit. Prerequisite: Admission to the M.S. program or consent of instructor.

Introduction to experiments and sampling; probability, random variables, and distributions; standard discrete and continuous models; sampling distributions; maximum likelihood and moment estimation; confidence intervals and hypothesis tests for one- and two-sample means, proportions, and variances; large sample and bootstrap methods; goodness-of-fit and nonparametric tests. Use of R for simulation and inference.

5103 Applied Statistics

(3-0) 3 hours credit. Prerequisite: STA 5093 or consent of instructor.

Simple linear regression, correlation, multiple regression, model selection, one-, and two-way analysis of variance, fixed-, random- and mixed-effects models, multiple comparisons, factorial experiments, and logistic regression. Use of statistical packages such as SAS or JMP for data analysis.

5133 Advanced Programming and Data Management in SAS

(3-0) 3 hours credit. Prerequisite: An introductory course in computer programming or consent of instructor.

Essential SAS programming concepts with a focus on data management and the preparation of data for statistical analysis: reading raw data from different sources, creating data files in various formats, creating and modifying SAS datasets, SAS libraries, formats, character and numeric functions, combining datasets, summarizing and displaying data, arrays and macros. Efficient programming techniques are stressed. (Formerly titled "Data Analysis with Statistical Software.")

5253 Time Series Analysis and Applications

(3-0) 3 hours credit. Prerequisite: STA 5513 or consent of instructor.

Examples and goals of time series analysis, autocovariance function, stationarity, linear processes, autoregressive and moving average (ARMA) processes, spectral analysis, the periodogram, linear filters, regression models with ARMA errors, forecasting in times series models, estimation by maximum likelihood and least squares, diagnostics, model selection, autoregressive integrated moving average (ARIMA) and other nonstationary processes.

5313 Theory of Sample Surveys with Applications

(3-0) 3 hours credit. Prerequisite: STA 5093 or consent of instructor.

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 5093 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. Prerequisite: Admission to the Statistics graduate program or consent of instructor.

Axioms of probability, counting rules, univariate random variables, multivariate random variables, joint, marginal, and conditional probability distributions, mathematical expectation, variable transformation, moment generating function, commonly used probability distributions, sampling distributions, laws of large numbers and the central limit theorem.

5513 Mathematical Statistics II

(3-0) 3 hours credit. Prerequisite: STA 5503 or consent of instructor.

Data reduction, sufficient and complete statistics, unbiased estimation, maximum likelihood estimation, method of moments, best unbiased estimator, Fisher information, Cramer-Rao lower bound, hypothesis testing, likelihood ratio test, Neyman-Pearson lemma and uniformly most powerful test, and interval estimation.

5803 Process Control and Acceptance Sampling

(3-0) 3 hours credit. Prerequisite: STA 5093 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.

5903 Survival Analysis

(3-0) 3 hours credit. Prerequisite: STA 5093 or consent of instructor.

This course introduces both parametric and nonparametric methods for analyzing survival data. Topics include Kaplan-Meier estimator, inference based on standard lifetime distributions, regression approach to survival analysis including the Cox 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.

6013 Regression Analysis

(3-0) 3 hours credit. Prerequisite: STA 5103 or consent of instructor.

Model selection methods, model validation, diagnostics, outlier detection, autocorrelated data, multicollinearity, cross validation, transformation of data, and generalized linear regression models.

6023 Mathematical Methods in Statistics

(3-0) 3 hours credit. Prerequisite: STA 5103 or consent of instructor.

Elements of set theory, systems of linear equations, matrix algebra, quadratic forms, mean and variance of random vectors, the multivariate normal distribution, vector spaces and linear independence, orthogonal projections, linear transformations, eigenvalues and eigenvectors, matrix factorizations, little o and big O notations, convex functions, Jensen's inequality, multivariate functions, gradient vector and Hessian matrix, extremes of multivariate functions, Lagrange multipliers, and Taylor series expansions.

6113 Applied Bayesian Statistics

(3-0) 3 hours credit. Prerequisite: STA 5513 or consent of instructor.

Probability and uncertainty, conditional probability and Bayes' Rule, single parameter and multiple parameter Bayesian analysis, posterior analysis for commonly used distributions, prior distribution elicitation, Bayesian methods in linear models, Bayesian computation including Markov chain Monte Carlo (MCMC) simulation, and applications.

6133 Simulation and Statistical Computing

(3-0) 3 hours credit. Prerequisite: STA 5513 or consent of instructor.

Random variable generation, accept-reject methods, simulation from multivariate distributions, Markov chain Monte Carlo simulation, numerical quadrature, Monte Carlo integration, importance sampling, Laplace approximation, methods for variance reduction, bootstrap and jackknife, deterministic methods for function optimization, and EM algorithm.

6233 Advanced Statistical Programming Using SAS Software

(3-0) 3 hours credit. Prerequisites: STA 5103 and STA 5133.

Methods for analyzing continuous and categorical data, using Base SAS, SAS/Graph and SAS/STAT software modules. Applications are drawn from regression analysis, analysis of variance, categorical data analysis, survival analysis multivariate methods, simulation and resampling. Implementation of methods, efficient programming, and interpretation of results are the focus of a written project or oral presentation.

6713 Linear Models

(3-0) 3 hours credit. Prerequisite: STA 5103 or consent of instructor.

Multivariate normal distribution; distribution of quadratic forms; Gauss Markov Theorem; theory for the full rank and less than full rank models; generalized least squares; estimability and testable hypotheses; general linear hypothesis; linear mixed models and variance components; generalized linear models. (Formerly STA 5713. Credit can be earned for only one of the following: STA 5713, STA 6713, or STA 7723.)

- 6813 Multivariate Analysis**
(3-0) 3 hours credit. Prerequisite: STA 5093 or consent of instructor.
Multivariate normal distribution; estimation of mean vector and covariance matrix; Hotelling's T²; principal components, factor analysis, MANOVA, multivariate regression; cluster analysis, discriminant analysis; Wishart distribution; and tests concerning covariance matrices.
- 6833 Design and Analysis of Experiments**
(3-0) 3 hours credit. Prerequisite: STA 5103 or consent of instructor.
Introduction to experimental design and data analysis in scientific and engineering settings. Topics include one- and two-factor experiments, randomized block designs, two- and three-level factorial and fractional factorial designs, nested and split-plot designs, and optimal designs. Use of statistical software such as SAS for data analysis. (Formerly STA 5833. Credit cannot be earned for both STA 6833 and STA 5833.)
- 6843 Response Surface Methodology**
(3-0) 3 hours credit. Prerequisite: STA 6833 or consent of instructor.
Factorial designs, first and second order models, process improvement with steepest ascent, experimental designs for fitting response surfaces, use of model diagnostics for finding optimum operating conditions, and robust parameter designs.
- 6853 Categorical Data Analysis**
(3-0) 3 hours credit. Prerequisite: STA 5093 or consent of instructor.
Types of categorical data, analysis of cross-classified tables, test of independence, measures of association, logit models and analogies with regression, multinomial logit models, log-linear models for two- and multi-dimensional tables, specialized methods for ordinal data, and models for matched pairs data, delta method and large sample tests. Use of statistical packages such as SAS for data analysis.
- 6863 Spatial Statistics**
(3-0) 3 hours credit. Prerequisite: STA 5103 or consent of instructor.
Problems dealing with spatial statistics, random fields, Gaussian random fields, covariograms and variograms, stationarity and isotropy, covariogram/variogram estimation, spatial prediction (kriging), statistical properties of kriging predictors, cross validation, simulation of random fields, models for lattice/areal data.
- 6913 Bioinformatics and Data Mining I: Microarray Data Analysis**
(3-0) 3 hours credit. Prerequisite: STA 5103 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. Restricted to students who have completed two semesters in the Master's or Doctoral programs.

The principles dealing with the basic art and concepts of consulting in statistics. This course discusses the roles and responsibilities of applied statisticians, relationship between clients and consultants, effective information gathering and report writing. 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.

The course will focus on the applications of statistical methods in business. Topics include basic probability theory, models for discrete and continuous data, sampling distributions, confidence intervals for means and proportions, hypothesis tests for means, proportions, and variances, goodness-of-fit tests, power of tests and sample size determination, and nonparametric statistical techniques. Emphasis will be placed on understanding the underlying assumptions and limitations of the different techniques. Statistical computer software such as SPSS or SAS 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 Applied 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 Applied 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 Applied 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 Applied Statistics without consent of the instructor and prior approval from the Graduate Advisor of Record. (Credit cannot be earned for both STA 7083 and STA 7043.)

7113 Bayesian Statistics

(3-0) 3 hours credit. Prerequisite: STA 6113 or consent of instructor.

Topics include multiple parameter Bayesian analysis, informative and objective Bayesian methods, Bayesian and frequentist interface, Bayesian variable selection and model averaging, 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 15 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 15 hours may be applied toward the Doctoral degree.

7503 Advanced Inference I

(3-0) 3 hours credit. Prerequisites: STA 5503 and STA 5513 or equivalent and Doctoral standing.

Brief introduction to measure and Lebesgue integration, location-scale families of distributions, exponential families of distributions, sufficiency, completeness, ancillarity, Fisher information, model identifiability, principles of estimation, best unbiased estimation, variance lower bounds, maximum likelihood estimation, and small sample properties of estimators.

7513 Advanced Inference II

(3-0) 3 hours credit. Prerequisite: STA 7503.

Different forms of stochastic convergence, laws of large numbers, central limit theorems, multivariate delta method, asymptotic properties of maximum likelihood estimators, tests of hypotheses, Neyman-Pearson theory, uniformly most powerful tests, unbiased tests, monotone likelihood ratio families, likelihood ratio tests, Wald and Rao/Score tests, asymptotic properties of tests, tests of linear hypothesis, Bonferroni and Scheffe multiple tests, confidence regions, duality between confidence regions and tests of hypotheses.

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 5103 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

All graduate programs in Marketing are accredited by AACSB International—The Association to Advance Collegiate Schools of Business—and conform to recommended guidelines.

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 24 semester credit hours of courses containing the M.B.A. Core 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 of a 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 24 semester credit hours of courses containing the M.B.A. Core 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 a Destination Marketing Organization
MKT 5333 Economics of Tourism and Sustainable Development
MKT 6933 Internship in a Destination Marketing Organization
MKT 6963 Independent Study in Tourism
MKT 6973 Special Problems

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

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 Marketing. See page 78 of this catalog for a detailed description of the general requirements for the Doctoral degree. The Doctoral Studies Committee of the Department of Marketing will advise students admitted to the program who pursue a Ph.D. in Business Administration with an emphasis in Marketing.

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

- A. MKT 7013 Seminar in Marketing Theory
MKT 7023 Behavioral Seminar I
MKT 7033 Behavioral Seminar II
MKT 7043 Seminar in Experimental Design

- B. Two directed electives (6 semester credit hours) as approved by the Doctoral Studies Committee

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 and ECO 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 Web site, visitor guides, public relations and film commissions.
- 5323 Managing a Destination Marketing Organization**
 (3-0) 3 hours credit.
 Focus on the management of a destination marketing organization in a highly competitive environment. Includes examination of strategies for managing stakeholders and advisory boards, role in developing the destination, protecting share of hotel occupancy taxes, funding alternatives, accountability to governing authorities, strategic planning and implementation process, managing public policy issues, and effective communication of the value of tourism. (Formerly titled "Managing Destination Public Policy Issues.")

5333 Economics of Tourism and Sustainable Development

(3-0) 3 hours credit.

Examines the macroeconomic effect of tourism on a destination and the microeconomic aspects of sustainable tourism. Students are introduced to the theory and research methods involved in conducting economic impact studies, feasibility studies, and forecasting visitor arrivals.

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 the marketing mix in international markets.

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 12 hours of M.B.A. Core or elective courses in the concentration. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record.

The supervised full- or part-time internship will be in either a domestic or international destination marketing organization that is approved by 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.

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).

6963 Independent Study in Tourism

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 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.

7013 Seminar in Marketing Theory

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

Historical and philosophical perspective on the development of scientific marketing thought, the role of theory in marketing, and research methods in marketing.

7023 Behavioral Seminar I

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

Examination of the processes underlying consumer behavior from the perspective of social and cognitive psychology. Topics will include judgment and decision making, information-processing biases, consumer motivations and values, memory and knowledge, and mood and affect.

7033 Behavioral Seminar II

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

Examination of the processes underlying consumer behavior from the interdisciplinary perspectives of psychology, sociology, and anthropology. Topics will include attitudes and persuasion, cross-cultural research, socialization, individual difference variables, and group influences on individual behavior.

7043 Seminar in Experimental Design

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

Introduction to methodological issues that arise in experimental and quasi-experimental research. Topics of emphasis include data collection and measurement, reliability and validity, experimental design, and data analysis.

7053 Special Topics in Research Methods

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

In-depth examination of research methods in marketing research (survey research, qualitative research methods, etc.). The course may be repeated for credit when topics vary.

7063 Special Topics in Marketing

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

In-depth examination of current topics in marketing research (cross-cultural and international marketing, pricing, etc.). The course may be repeated for credit when topics vary.

7073 Cross-Cultural Consumer Research

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

Examination of cross-cultural research from disciplines such as international business, psychology, sociology, and consumer behavior, with a focus on understanding current theoretical and methodological issues, and their marketing and consumer implications.

7083 Consumer Judgment and Decision Making

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

In-depth examination of the judgment, decision making, and choice aspects of consumer behavior, with a focus on understanding what people actually do (descriptive view) versus what they rationally ought to do (normative view).

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.

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COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

The College of Education and Human Development offers the following graduate degrees: Master of Arts degree in Adult Learning and Teaching, Master of Arts degree in Bicultural-Bilingual Studies, Master of Arts degree in Counseling, Master of Arts degree in Education, Master of Arts degree in School Psychology, Master of Arts degree in Teaching English as a Second Language, Master of Education degree in Educational Leadership and Policy Studies, Master of Science degree in Health and Kinesiology, Doctor of Education degree in Educational Leadership, Doctor of Philosophy degree in Counselor Education and Supervision, Doctor of Philosophy degree in Interdisciplinary Learning and Teaching, and Doctor of Philosophy degree in Culture, Literacy and Language.

DEPARTMENT OF BICULTURAL-BILINGUAL STUDIES

The Department of Bicultural-Bilingual Studies offers graduate certificates in Bilingual Reading Specialist and Teaching English as a Second Language (CertTESL), and three graduate degrees: the Master of Arts degree in Bicultural-Bilingual Studies, the Master of Arts degree in Teaching English as a Second Language (TESL), and the Doctor of Philosophy degree in Culture, Literacy and Language.

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 and Bicultural Studies.

Program Admission Requirements. The Department 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 UTSA Testing Services or from the Educational Testing Service (www.ets.org/gre/). 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 concentration in Bicultural Studies are required to give evidence of second language learning experiences acceptable to the department'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	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):

ESL	5013	Foundations of Second Language Acquisition
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Bilingual Teaching Methodology (6 hours from the following):

BBL	5033	Bilingual Content Instruction
BBL	5063	Biliteracy in Bilingual Classrooms
BBL	5143	Communication and Critical Pedagogy in Bilingual Classrooms
BBL	5193	Multicultural Literature for Children

Research and Assessment (6 hours):

BBL	5053	Assessment in Bilingual and ESL Programs
BBL	6043	Bilingual Education Research

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 (6–9 hours from the following):

3–6 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

and 3–6 hours from the following:

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

Linguistics and Second Language Studies (3–6 hours):

ESL 5013 Foundations of Second Language Acquisition

and the following if 6 hours are selected:

ESL 5003 Linguistics for Second Language and Bilingual Specialists

Bilingual Teaching Methodology (6 hours from the following):

BBL 5033 Bilingual Content Instruction

BBL 5063 Biliteracy in Bilingual Classrooms

BBL 5143 Communication and Critical Pedagogy 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 ESL Programs

BBL 6043 Bilingual Education Research

and 3 hours from the following:

BBL 6003 Research Design and Inquiry in Bicultural-Bilingual Studies

BBL 6063 Research Methods in Bilingual and Second Language Studies

BBL 6073 Ethnographic Research Methods in Bicultural-Bilingual Settings

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

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	5133	Latino Biculturalism in the United States
BBL	6033	Topics in Bicultural Studies (Consult the program advisor.)
BBL	6093	Chicana/Latina Feminist Methodologies
BBL	6223	Anthropology and Education in Multicultural Contexts

Historical Foundations (3 hours from the following):

BBL	6103	Chicana/o Historical Thought
HIS	5263	History of the Spanish Borderlands
HIS	5313	South Texas: Rural and Urban
HIS	5323	The U.S.–Mexico Border
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
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):

BBL	6003	Research Design and Inquiry in Bicultural-Bilingual Studies
BBL	6073	Ethnographic Research Methods in Bicultural-Bilingual Settings

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.

Master of Arts Degree in Teaching English as a Second Language

The Master of Arts degree in Teaching English as a Second Language (TESL) is designed for students interested in teaching English as a Second or Foreign Language (ESL/EFL) 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/educational linguistics, second language acquisition theory, and ESL/EFL program implementation.

Program Admission Requirements. The Department 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 UTSA Testing Services or from the Educational Testing Service (www.ets.org/gre/). The institution code for The University of Texas at San Antonio is 6919 for the GRE. International students must have a minimum score of 79 on the TOEFL Internet-based Test (iBT), 550 on the TOEFL Paper-based Test (PBT), or 6.5 on the IELTS. See Chapter 1 of this catalog for information on exemptions from this requirement.

Candidates for a degree are required to give evidence of second language learning experiences acceptable to the Graduate Program Committee.

Degree Requirements. Degree candidates are required to successfully complete a 36-semester-credit-hour program. Upon completion of at least 30 semester credit hours of coursework, the candidate is required to pass a comprehensive examination.

Students must take at least 21 semester credit hours of English as a Second Language courses and 9 hours of Bicultural-Bilingual studies courses. An internship is required; students who can document relevant teaching experience may petition to substitute an elective for the internship. The Master's degree is offered under two options: thesis and nonthesis.

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):

BBL	5123	Sociolinguistics and Education
ESL	5003	Linguistics for Second Language and Bilingual Specialists
ESL	5013	Foundations of Second Language Acquisition

Classroom Practice and Program Designs (12 hours from the following):

9 hours from the following:

BBL	5053	Assessment in Bilingual and ESL Programs
ESL	6943	Internship in English as a Second Language
ESL	5053	Approaches to Second Language Instruction or
ESL	5063	Language and Content-Area Instruction

and 3 hours from the following:

ESL	5033	Second Language Reading and Writing
ESL	5043	Listening and Speaking in Second Language Programs
ESL	5073	Computer Assisted Language Learning
ESL	5083	Pedagogical Grammar
ESL	6043	Family and Adult Literacy in Language Minority Communities
ESL	6053	Program and Syllabus Design
ESL	6063	Advanced Second Language Literacy

Research (6 hours from the following):

BBL	6063	Research Methods in Bilingual and Second Language Studies or
BBL	6073	Ethnographic Research Methods in Bicultural-Bilingual Settings
ESL	6013	Second Language Acquisition Research

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	6103	Chicana/o Historical Thought
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 which must be approved by the student's advisor and 3 hours of which must carry an ESL prefix.

Doctor of Philosophy Degree in Culture, Literacy and Language

The Department 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 2, General Academic Regulations, and Chapter 5, 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 (CLL) 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 Studies Committee.
2. A portfolio consisting of the following items will be evaluated by the Doctoral Studies Committee, comprised of members selected from the graduate faculty of the Department of Bicultural-Bilingual Studies:
 - a. A master's degree transcript documenting a grade point average of 3.5 or better in an approved master's degree program.
 - b. Graduate Record Examination (GRE) scores for exam taken within the last five (5) years.
 - c. Advanced proficiency in a language other than English to be demonstrated by examination or approved coursework.
 - d. For students whose master's degree is from a non-English speaking university, submission of a Test of English as a Foreign Language (TOEFL) score of no less than 550 on the Paper-based Test (PBT), 79 on the Internet-based Test (iBT), or 6.5 on IELTS.
 - e. 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.
 - f. Statement of Purpose: A description of research interests, reasons for seeking doctoral study, and connections between the applicant's interests/professional goals and the program in Culture, Literacy and Language (limit of five pages).
 - g. Academic writing: A sample of academic writing such as a paper written for a course, a master's thesis or a scholarly publication.

Degree Requirements. The Doctoral degree requires a minimum of 60 semester credit hours beyond the Master's degree. The CLL foundational curriculum consists of 24 semester credit hours of required coursework (foundation, core and designated electives). A minimum of 12 semester credit hours in research methods and 15 semester credit hours in doctoral research must be completed. The remaining 9 semester credit hours consist of elective courses selected with advisor's approval.

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 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 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 7033 Seminar in Discourse Analysis
 BBL 7113 Seminar in Cultural Studies Research
 BBL 7203 Seminar in Mexican American and Latina/o Biculturalism
 BBL 7223 Seminar in Biliteracy and Second Language Literacy
 BBL 7233 Seminar in Second Language Learning & Multilingualism
 BBL 7243 Seminar in Applied Linguistics
 BBL 7253 Seminar in Mexican American & Latina/o Issues in Education

Other Designated Electives

BBL 5043 Ethnography of Communication
 BBL 5123 Sociolinguistics and Education
 BBL 6073 Ethnographic Research Methods in Bicultural-Bilingual Settings
 BBL 6093 Chicana/Latina Feminist Methodologies
 BBL 6223 Anthropology and Education in Multicultural Contexts
 BBL 6233 Advanced Topics in Language Policy
 BBL 7083 Technology for Qualitative Research
 ESL 5073 Computer Assisted Language Learning
 ESL 6013 Second Language Acquisition Research

E. Free Electives (9 semester credit hours required). Students will select additional graduate-level courses within the University in order to complete a coherent emphasis area. Selection must be made with the approval of their academic advisor and the Doctoral Program Coordinator (Graduate Advisor of Record). 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 Studies Committee and must be submitted to the Dean of the Graduate School through the Dean of the College for final approval.

Qualifying Examination. Students, in consultation with their Academic Advisor, will submit the names of three faculty members representing the areas of culture, literacy and language to the Doctoral Studies Committee for approval. The approved Qualifying Examination Committee will design, administer, and evaluate a two-part (written and oral) examination. The written portion of the examination covers the areas completed in all foundation, core and designated elective courses and cannot be taken until after the completion of 36 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. 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.

Dissertation Proposal. In preparation for the dissertation research, the student will identify a Dissertation Chair. 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 their Dissertation Chair must be approved by the Doctoral Studies Committee and Graduate School prior to the proposal defense. The approved Dissertation Committee will guide and critique the student's dissertation proposal. Upon successful completion of the Qualifying Examination, the student is eligible to defend their dissertation proposal. Upon successful defense of the proposal, the student must secure UTSA Institutional Review Board (IRB) approval for the dissertation research prior to conducting the study.

Advancement to Candidacy. Advancement to candidacy will require a student to complete all University and program requirements:

- Have an approved program of study
- Pass written and oral qualifying examinations
- Select a supervising professor and Dissertation Committee
- Successfully defend a dissertation proposal before the Dissertation Committee
- Secure approval of appropriate human subject research forms

Dissertation and Final Oral Examination. Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation. The Doctoral dissertation must make a substantial contribution to a field within culture, literacy and language. The Dissertation Committee must unanimously approve the completed dissertation. The dissertation shall 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.

Graduate Certificate in Bilingual Reading Specialist

The Bilingual Reading Specialist certificate is a 15-semester-credit-hour graduate certificate program for those who wish to become bilingual reading specialists as well as for educators who wish to obtain increased knowledge of reading instruction and literacy development in bilingual contexts.

The Bilingual Reading Specialist certificate offers specialized training for those who possess a valid teaching license and wish to become better prepared to provide appropriate reading instruction to students in bilingual programs in public schools. The program is available to students who have been admitted as special graduate students and seek the certificate independent of a degree, as well as graduate students pursuing an M.A. degree in Bicultural-Bilingual Studies with concentration in Bicultural-Bilingual Education.

Certificate Program Requirements. The Bilingual Reading Specialist Certificate requires successful completion of the following five graduate courses:

BBL	5053	Assessment in Bilingual and ESL Programs
BBL	5063	Biliteracy in Bilingual Classrooms
BBL	5173	Sociocultural Issues and the Teaching of Reading
BBL	5193	Multicultural Literature for Children
ESL	5033	Second Language Reading and Writing

Linkages with other UTSA programs. Students who complete the Bilingual Reading Specialist certificate program may choose to complete an additional 12 graduate hours in Curriculum and Instruction to meet the state certification requirements for the Reading Specialist certification and subsequent Master Reading Teacher certification. This option would be in consultation with the literacy education faculty in the Department of Interdisciplinary Learning and Teaching.

Graduate Certificate in Teaching English as a Second Language

The Graduate Certificate in Teaching English as a Second Language (CertTESL) is a gateway to the English language teaching profession. It provides students with the specialized training needed to begin a career in English language teaching in the U.S. or abroad, explore a career change, add specialized training to current professional skills, or teach English in retirement. No prior training in language teaching or linguistics is required.

Practical, hands-on courses offer a general foundation in methods, techniques, and strategies for teaching English language learners of all ages. The program places a special emphasis on teaching English in multilingual settings, preparing students to offer socially responsible and linguistically appropriate lessons to help English language learners develop strong intercultural communication skills.

Note: This is a non-degree-seeking program. Admission to the certificate program does not imply admission to any degree program. The certificate in TESL is not equivalent to K–12 teacher certification in ESL or bilingual education in Texas, although some courses may overlap.

Certificate Program Requirements. The CertTESL consists of 15 semester credit hours (five graduate courses). All students take ESL 5013, ESL 5043, and ESL 6943. Teaching methods and literacy courses are selected in consultation with a student's advisor, based on career objectives.

A. Core (3 semester credit hours):

ESL	5013	Foundations in Second Language Acquisition
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B. Language Skills (6 semester hours):

ESL	5043	Listening and Speaking in Second Language Programs
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and 3 hours in literacy 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

C. Teaching Methods (3 semester credit hours from the following):

ESL	5053	Approaches to Second Language Instruction
ESL	5063	Language and Content-Area Instruction
ESL	5073	Computer Assisted Language Learning
ESL	5083	Pedagogical Grammar

D. Practicum (3 semester credit hours):

ESL 6943 Internship in English as a Second Language

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, including the principles of critical race theory.

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, social-cognitive, 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 ESL Programs

(3-0) 3 hours credit.

Critical review of research in the areas of testing linguistically diverse students and the sociocultural dimensions of standardized testing, academic achievement, and accountability. Study of process for assessing language proficiency and content-area knowledge in bilingual and English as a Second Language programs. Critical evaluations of standardized tests of language proficiency and literacy, and development of alternative and authentic language, literacy and content-area assessment techniques. (Formerly titled "Assessment in Bilingual and Second Language Studies.")

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.

- 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, in particular, sociocultural theories (e.g., Vygotskian 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 and Critical Pedagogy in Bilingual Classrooms**
(3-0) 3 hours credit.
Emphasis on oral and written communicative strategies for achieving full interaction among students and parents in bilingual settings. Focus is on critical pedagogical approaches needed to conduct instruction in two languages. Offered in Spanish. (Formerly titled "Communication in Bilingual Classrooms.")
- 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 9 semester hours of degree program or permission of instructor. Familiarizes students with various research approaches and methodologies used in bicultural-bilingual studies including 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.

6063 Research Methods in Bilingual and Second Language Studies

(3-0) 3 hours credit. Prerequisite: Completion of 6 semester hours of degree program or permission of instructor. Familiarizes students with selected methodologies for investigating issues related to bilingualism, biculturalism, and second language learning. Topics may include ethnographic, discourse analytic, case study, introspective, elicitation, and experimental and quasi-experimental research designs. It places emphasis on information retrieval and library research, literature review, critical reading, and research writing.

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 or instructor approval. 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.

6103 Chicana/o Historical Thought

(3-0) 3 hours credit. This seminar is a critical examination of the historical experiences of Chicanas and Chicanos. The course is grounded in an analysis of the field of Chicana/o historical writing and within Chicana/o Studies from its inception to the present.

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.

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 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 "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.

Required in the first year of doctoral work. 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. Emphasis on the development of scholarly writing. Students will 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.

7023 Qualitative Research Methods for Culture, Literacy and Language

(3-0) 3 hours credit. Prerequisite: An introductory course in statistics.

Research design for qualitative 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 culture, literacy and language.

7033 Seminar in Discourse Analysis

(3-0) 3 hours credit. Prerequisites: BBL 5123 or an equivalent, and BBL 7023.

Field research methods in linguistically diverse communities, with particular attention to discourse analytic approaches. Emphasis on collection, reduction, and analysis of language data. Special attention to procedures and discourse analytic techniques commonly used to examine language in use, in multilingual contexts. Consideration of ethical issues in research in minority communities. May be repeated for credit when topics vary. (Formerly titled "Research in the Speech Community.")

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.

7083 Technology for Qualitative Research

(3-0) 3 hours credit.

Exploration of the effective use of technology to facilitate data collection, organization, and analysis. Emphasis on application of theoretically-based methodologies for handling and analyzing qualitative data through the use of qualitative research software. Course also includes attention to other hardware or software relevant to the collection, organization and analysis of qualitative data, such as digital audio and video recording equipment and transcribing software and bibliographic software. Most effective for graduate students who have completed a qualitative methodology course and who have already begun the collection of qualitative research data.

7113 Seminar in Cultural Studies Research

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

Interdisciplinary study of anthropological and humanistic conceptions of all forms of cultural production in relation to social and historical structures. Topics may include: a range of society's arts, beliefs, institutions, and communicative practices in relation to social and historical structures. May be repeated for credit when topics vary.

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 Mexican American and Latina/o 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. (Formerly titled "Seminar in Latino Biculturalism.")

7213 Ethnological Theory

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

Study of the relations of theory and ethnography in sociocultural anthropology. Examines cultural theory, ethnography, comparison, history, and the current controversies that illustrate various theoretical perspectives. Particular emphasis on multicultural and multilingual contexts.

- 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 Learning & Multilingualism**
(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. (Formerly titled “Seminar in Second Language Acquisition and Bilingualism.”)
- 7243 Seminar in Applied Linguistics**
(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. (Formerly titled “Seminar in Language and Language Use.”)
- 7253 Seminar in Mexican American & Latina/o 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. (Formerly titled “Seminar in Latino Issues in Education.”)
- 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 teaching in 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. Particular focus on second language learners with emergent and beginning levels of proficiency.

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 for teaching English as a Second/Foreign language to students from beginning to more advanced stages of English proficiency. Survey of approaches and methods used in the field with a particular focus on communicative language teaching. Critical evaluation of existing curricular materials. Emphasis on the planning and delivery of effective ESL/EFL lessons.

5063 Language and Content-Area Instruction

(3-0) 3 hours credit.

Theoretical and practical approaches to the integration of language teaching with content-area instruction. Emphasis on research-based methods for developing oral language and literacy for academic purposes in school settings, and on the planning and delivery of effective sheltered content-area instruction.

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 including BBL 6063 and ESL 5013, 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.

Topics may include English for Special Purposes, second language acquisition and discourse analysis, intercultural pragmatics, interactional approaches to second language acquisition, and second language learning in adulthood. 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. Particular focus on second language learners with advanced levels of proficiency.

6941-3 Internship in English as a Second Language

1 to 3 hours credit. Prerequisites: 12 semester credit hours of coursework in ESL and recommendation by advisor.

Supervised experience in teaching English as a Second Language. Required for students with little to no teaching experience in ESL. 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 department'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

Master of Arts Degree in Counseling

The Department of Counseling offers the Master of Arts (M.A.) degree in Counseling with programs in Community Counseling and School Counseling. Additional coursework can be taken in addictions counseling, couple and family counseling, multicultural counseling, and sports psychology. Students may earn credit toward a state license and/or certification to practice in either community or school settings (Licensed Professional Counselor and/or Certified School Counselor). The Community and School Counseling Programs are accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP).

Program Admission Requirements

1. Application for admission is conducted through the Graduate School. Applicants must hold a 3.0 grade point average (GPA) during the last 60 hours of their undergraduate studies to be eligible for admission to the counseling program. Admission to the program is competitive. Competitive applicants often exceed minimum requirements.
2. Applicants without adequate coursework preparation in education, psychology, sociology or a related field may be required to take COU 3103 Helping Skills and, at the discretion of the admissions committee, to complete up to 15 additional hours of preparatory courses as a condition of admission. Contact the Graduate Advisor of Record for the M.A. in Counseling for more information.
3. Three Applicant Rating Forms and a two-page narrative statement are required (see current requirements, forms, and directions available on the UTSA Graduate School Web site: www.graduateschool.utsa.edu). 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 petition the Graduate School for re-examination.

Community Counseling Program

A. 39 semester credit hours of required courses:

COU	5203	Introduction to 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	5283	Counseling in a Multicultural Setting
COU	5393	Development of Counseling Skills
COU	5683	Practicum in Counseling
COU	5713	Community Counseling Internship I
COU	5723	Community Counseling Internship II
COU	6153	Career Development and Choice
EDP	5033	Human Development Across the Life Span
EDU	5003	Research Methods

B. 9 semester credit hours of elective courses for the Community Counseling program:

Option 1. Thesis Option: 6 hours of thesis, plus a 3-hour research methods or statistics course to be approved by the Thesis Committee Chair (total of 48 semester credit hours).

Option 2. Nonthesis Option: 9 hours of electives (total of 48 semester credit hours).

School Counseling Program

A. 48 semester credit hours of required courses:

COU	5103	Introduction to School 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
COU	5283	Counseling in a Multicultural Setting
COU	5393	Development of Counseling Skills
COU	5683	Practicum in Counseling
COU	5793	School Counseling Internship I
COU	5803	School Counseling Internship II
COU	5813	School Counseling Internship III
COU	6003	Consultation and Program Evaluation
COU	6153	Career Development and Choice
EDP	5033	Human Development Across the Life Span
EDU	5003	Research Methods

B. School Counseling Thesis Option: Requires 9 semester credit hours beyond the 48 hours applied to the degree (6 hours of thesis, plus a 3-hour research methods or statistics course to be approved by the Thesis Committee Chair).

Standards and Procedures

As a degree requirement, students must comply with the following Departmental fitness to practice policies (see Fitness to Practice Policy in the Master's Counseling Program Handbook):

- maintain scholastic performance meeting or exceeding department standards;
- demonstrate the ability to apply counseling skills;
- demonstrate emotional and mental fitness;
- conform to professional ethical codes and standards.

Counseling faculty evaluate all students according to these standards in classes, in advising and counseling settings, in conversations, and in correspondence. Students will appropriately respond to feedback and evaluations. Conformance with standards must be demonstrated by students. Only students who meet program standards will be allowed to continue in the program. Refer to the Master's Counseling Program 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. Students must earn a grade of "B" or better in all clinical courses (COU 5393, COU 5683, COU 5713, COU 5723, COU 5793, COU 5803, and COU 5813). Students who earn a "C" or lower in a clinical course must retake that course and earn a grade of "B" or better before progressing in the clinical course sequence.

A minimum of a 3.0 grade point average will be required for graduation. Students who obtain more than two grades of "C" will be placed on academic probation and may be required to complete 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. This degree program is nationally accredited through the Council for Accreditation of Counseling and Related Educational Programs (CACREP). Program graduates will have opportunities to acquire: (a) advanced theoretical knowledge, (b) advanced clinical skills, (c) research skills and (d) advanced clinical supervision skills deemed necessary by core Department faculty to work in academic counselor education departments and in school and community

practice. 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 opportunities for:

- Research
- Scholarly writing
- Clinical supervision with practicum students
- Supervised co-teaching experiences
- Advanced clinical competencies
- Advanced multicultural competencies

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 and rank order selection by 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 (37 semester credit hours):

- | | | |
|-----|------|-------------------------------------|
| 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
COU	7383	Advanced Practicum in Multicultural Counseling
COU	7413	Internship I
COU	7513	Internship II
COU	7583	Supervision of Counseling
COU	7593	Practicum in Counseling Supervision
COU	7893	Advanced Research in Counseling and Development

C. Research courses (12 semester credit hours):

COU	6893	Foundations of Research in Counseling and Development
COU	7103	Qualitative Research Methods in Counseling and Development
EDU	7043	Educational Research Statistics: Descriptive and Comparative
EDU	7063	Inferential Statistics

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

As a degree requirement, students must comply with the following Departmental fitness to practice policies (see Fitness to Practice Policy in the Counseling Doctoral Program Handbook):

- maintain scholastic performance meeting or exceeding department standards;
- demonstrate the ability to apply counseling skills;
- demonstrate emotional and mental fitness;
- conform to professional ethical codes and standards.

Counseling faculty evaluate all students according to these standards in classes, in advising and counseling settings, in conversations, and in correspondence. Students will appropriately respond to feedback and evaluations. Only students who meet program standards will be allowed to continue in the program. Refer to the Counseling Doctoral Program Handbook for a detailed outline of the due process procedures related to this policy.

Students must earn a grade of “B” or better in all courses. Students who earn a “C” or lower in a clinical course (COU 7313, COU 7383, COU 7413, and COU 7513) or clinical supervision course (COU 7583 and COU 7593) must retake that course and earn a grade of “B” or better before progressing in any clinical and clinical supervision course sequence. Students must complete the general doctoral core courses except internship before taking their doctoral qualifying examinations (see Counseling Doctoral Program Handbook for additional details and procedures). Before beginning their doctoral dissertation or data collection, students must successfully complete their doctoral qualifying examination, secure UTSA Institutional Review Board approval, complete all University, College, and Department requirements, and receive dissertation chair approval.

A minimum of a 3.0 grade point average and a successful dissertation defense are required for graduation.

COURSE DESCRIPTIONS COUNSELING (COU)

5103 Introduction to School Counseling

(3-0) 3 hours credit.

Orients students to UTSA's Counseling Program, the school counseling profession, and the roles of professional school counselors. Investigates the legal and ethical aspects of school counseling. Examines planning, designing, implementing, and evaluating a comprehensive and developmental guidance and counseling program that includes students, teachers, administrators, parents, and community members. Examines state and national counseling program models and required competencies.

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.

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.

5213 Counseling Theories

(3-0) 3 hours credit.

Major counseling theories and techniques are presented. Students investigate affective, behavioral, and cognitive psychotherapeutic strategies.

5223 Psychological Assessment for Counselors

(3-0) 3 hours credit. Prerequisite: COU 5243.

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.

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.

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.

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.

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.

5393 Development of Counseling Skills

(3-0) 3 hours credit. Prerequisites: COU 5103 or COU 5203, and COU 5213.

As the foundational course in the department's sequence of experiential clinical courses, Development of Counseling Skills offers students the opportunity to master basic skills of professional counseling.

5613 Substance Abuse and 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.

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 nonprofessional 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: COU 5103 or COU 5203; and COU 5213, COU 5233, COU 5283, and COU 5393.

Students must submit an application, verifying prerequisite course completion, the semester before enrolling in Practicum in Counseling. As the second course in the department's clinical training sequence, Practicum in Counseling provides students with an initial opportunity to transition knowledge and skills gained in prior coursework into professional practice settings.

5713 Community Counseling Internship I

3 hours credit. Prerequisites: COU 5223, COU 5243, COU 5683, and EDP 5033.

Students must submit an application, verifying prerequisite course completion, the semester before enrolling in Community Counseling Internship I. As the third course in the clinical training sequence, Internship I reflects the comprehensive work experience of a professional counselor in community settings. Students are expected to continue demonstration of skills acquired during the Practicum in Counseling.

5723 Community Counseling Internship II

3 hours credit. Prerequisite: COU 5713.

Students must submit an application, verifying prerequisite course completion, the semester before enrolling in Community Counseling Internship II. Internship II is the final course of the clinical training sequence. Extensive supervised fieldwork in a UTSA-approved community counseling setting. This course is part of a sequential learning experience intended to expand upon the skills and knowledge gained in Internship I.

5793 School Counseling Internship I

3 hours credit. Prerequisites: COU 5253 and COU 5683.

Students must submit an application, verifying prerequisite course completion, the semester before enrolling in School Counseling Internship I. As the third course in the clinical training sequence, Internship I reflects the comprehensive work experience of a professional counselor in school settings. Students are expected to continue demonstration of skills acquired during the Practicum in Counseling.

5803 School Counseling Internship II

3 hours credit. Prerequisite: COU 5793.

Students must submit an application, verifying prerequisite course completion, the semester before enrolling in School Counseling Internship II. As the fourth course in the clinical training sequence, Internship II reflects the comprehensive work experience of a professional counselor in school settings. Students are expected to continue demonstration of skills acquired during the School Counseling Internship I.

5813 School Counseling Internship III

3 hours credit. Prerequisite: COU 5803.

Students must submit an application, verifying prerequisite course completion, the semester before enrolling in School Counseling Internship III. As the fifth course in the clinical training sequence, Internship III reflects the comprehensive work experience of a professional counselor in school settings. Students are expected to continue demonstration of skills acquired during the School Counseling Internship II.

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. (May be taken concurrently with COU 5793 School Counseling Internship I.)

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 sports. 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.)

6073 Research Colloquium

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

- 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. (Same as KAH 6203. Credit cannot be earned for both COU 6203 and KAH 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, 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.
This course addresses current pressing topics within the marriage and family counseling literature. These topics may range from family, couple, and child assessment, contemporary or changing treatment interventions, and legal and ethical issues faced by counselors in marriage and family practitioners.
- 6543 Marriage and Family Practice**
(3-0) 3 hours credit. Prerequisite: COU 6523.
This course provides a clinical marriage and family practice component. It is a skills development course that provides an opportunity for students to become proficient in specific marriage and family 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. Prerequisite: Doctoral status or consent of instructor.
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.
- 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 in a counseling-related topic 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 Issues**
(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 Issue 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.
- 7103 Qualitative Research Methods in Counseling and Development**
(3-0) 3 hours credit. Prerequisite: COU 6893 or consent of instructor.
Explores qualitative research traditions and approaches in counseling and development, including grounded theory, phenomenology, case study, and ethnography. Describes the stages of qualitative research, from reviewing the relevant research literature and stating the research problem to specifying appropriate procedures for data collection and analysis. Students produce an original proposal for conducting qualitative research in counseling and development as a major component of the course. (Formerly COU 6053. Credit can be earned for only one of the following: COU 7103, COU 6053, or AHE 6053.)
- 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 the 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.

7771-3 Independent Study

1 to 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 Advanced Research in Counseling and Development

(3-0) 3 hours credit. Prerequisites: COU 6323, COU 7103, 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 appropriate qualitative, quantitative, or multi-method approaches. Emphasis on dissertation data collection, analysis, and presentation. (Formerly titled "Research in Counseling.")

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.

7991,3,6 Dissertation

1, 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.

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 (1) at least two years teaching experience or a satisfactory letter of endorsement from a person who holds administrator certification and who has immediately supervised and evaluated the applicant and (2) engaged 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 (GPA) 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 Courses (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 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	6123	Program Planning and Evaluation in Higher Education and Student Affairs
HSA	6143	Administration of Student Services in Higher Education
HSA	6503	The Community College
HSA	6943	Internship in Higher Education

- C. Comprehensive Examination: A comprehensive examination is required as described separately in this catalog (see Chapter 4, Master's Degree Regulations).

Graduate Certificate in Higher Education Administration

The Graduate Certificate in Higher Education Administration is a 15-semester-credit-hour program available to students who have been admitted as special students and seek the certificate independent of a degree as well as master's degree students who are not matriculating through the M.Ed. in Educational Leadership and Policy Studies (Higher Education Administration concentration).

The Graduate Certificate in Higher Education Administration will provide an opportunity for higher education professionals working or seeking to work in the myriad of higher education institutions in the region to develop their knowledge and skills in higher education administration. With a large and expanding four-year university and community college student population, this certificate program will enhance the professional preparation and development opportunities for current and prospective higher education administrators.

To meet the curricular requirements for the Graduate Certificate in Higher Education Administration, students must complete 15 semester credit hours to be chosen from the following list of courses:

EDL	5303	Human Relations in Educational Administration
HSA	5103	College Student Development
HSA	5203	Multicultural Issues in Higher Education
HSA	6003	Higher Education Law
HSA	6123	Program Planning and Evaluation in Higher Education and Student Affairs
HSA	6303	Seminar in Governance in Higher Education
HSA	6503	The Community College

Students seeking admission to the certificate program who are not enrolled in a graduate degree program will be required to apply to the Graduate School as special graduate students and indicate that they are seeking admission to the Graduate Certificate Program in Higher Education Administration. Because admission to the M.Ed. in Educational Leadership and Policy Studies (Higher Education Administration concentration) requires one year of experience in student affairs or a related field, this requirement will be extended to those seeking admission to the certificate program. All other requirements for admission as a special graduate student described in Chapter 1, Admission, of this catalog are applicable.

All other requirements for certificate programs described in Chapter 3, Certificate Programs, of this catalog apply to this program.

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 either K–12 leadership or higher education administration.

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 the verbal, quantitative, and analytical writing sections of the Graduate Record Examination (GRE);
- 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 (e.g., teaching, administration, curriculum development in elementary, secondary, postsecondary, governmental, or private industry settings);
- three letters of recommendation from those who have supervised the applicant in an academic, employment, or community service capacity; letters should comment on the applicant's intellectual ability, discipline, creativity, sensitivity to others, and cite examples of leadership and scholarly potential; at least one letter should come from a university professor familiar with the applicant's academic work; 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 may 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 K–12 or higher education administration emphasis and cognate requirements:

- D. Area of emphasis (9–12 hours). This emphasis area targets the development of knowledge and skills in K–12 leadership or higher education administration.

- E. 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. Not later than the completion of the required 51 semester credit hours, students must pass a written and oral qualifying examination. With advisor approval, students may take the qualifying examination after completing all coursework but the cognate support requirements. 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. (Credit cannot be earned for both EDL 6003 and C&I 6003.)
- 6013 Supervision: Teaching-Learning Process**
(3-0) 3 hours credit.
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. (Credit cannot be earned for both EDL 6013 and C&I 6013.)
- 6023 Supervision: Tools and Techniques**
(3-0) 3 hours credit.
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.

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 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.

7213 Foundations of Higher Education

(3-0) 3 hours credit. Prerequisite: Doctoral standing in higher education administration or consent of instructor.

This course examines the historical, social, and political context of American higher education. Central to this course is the history and evolution of contemporary post-secondary institutions and the complex relationship between American higher education and society. The increasingly diverse demographics of the United States and related implications for higher education will be considered.

7243 Diversity, Equity, and Access in Higher Education

(3-0) 3 hours credit. Prerequisite: Doctoral standing in higher education administration or consent of instructor.

This course will examine the individual and institutional factors that facilitate or hinder college access for traditional and nontraditional students. Theories and explanations that account for differences among diverse students in college preparation, enrollment, and persistence will be addressed.

- 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.
- 7333 Organizations and Systems in Higher Education**
(3-0) 3 hours credit. Prerequisite: Doctoral standing in higher education administration or consent of instructor.
This course examines how various higher education institutions are organized and governed. Emphasis is placed on an understanding of the unique role of different types of institutions within higher education, such as public, private, four-, and two-year. The role of women's and minority-serving institutions in serving diverse populations will also be considered.
- 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.)
- 7413 Policy and Politics in Higher Education**
(3-0) 3 hours credit. Prerequisite: Doctoral standing in higher education administration or consent of instructor.
This course explores the concepts of policy and politics in the scholarship of higher education along with the impact of these on the leadership and administration of higher education organizations. Students will examine the influence of national and state policy and politics on institutional and program development in higher education, and how these factors affect postsecondary opportunities for traditional and nontraditional students.
- 7423 Theoretical Frameworks in Higher Education**
(3-0) 3 hours credit. Prerequisite: Doctoral standing in higher education administration or consent of instructor.
This course examines various theories and their application to diverse aspects of higher education. Important paradigms, schools of thought, and general theories within the field of higher education will be emphasized. The influence of the study of race, gender, and class on theory development will also be considered.
- 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 Advanced Foundations of Education

(3-0) 3 hours credit.
Analysis of contemporary issues in the foundations of American education. Topics discussed include the structure of U.S. schooling and the historical, sociopolitical, philosophical, cultural, and ethical aspects of education. (Formerly titled "Contemporary Educational Philosophy.")

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 Educational 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**
(3-0) 3 hours credit. Prerequisite: Consent of instructor.
Examination of cultural and linguistic diversity from a variety of theoretical perspectives. Emphasis on historical, sociological, and sociopolitical principles and their application to teaching, learning and leadership in culturally and linguistically diverse educational settings.
- 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 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.)
- 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).

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 re-examination 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 EDUCATIONAL PSYCHOLOGY

Mission Statement

The mission of the Department of Educational Psychology is to promote the development and application of scientific knowledge. To do so, our faculty members are committed to: Producing high-quality, innovative research and scholarship; Providing effective and culturally inclusive instructional technologies to prepare practitioners and researchers to use the tools, resources, and strategies necessary to improve the educational experience of all learners; Preparing culturally competent scientist-practitioners and researchers to effectively contribute to the applied psychological development and well-being of children and adolescents; Providing responsive educational and psychological services to the local community, schools, and beyond; Engaging in participatory and leadership roles in local, national, and international institutions and organizations.

The Department of Educational Psychology faculty provide valuable support to other departments and program areas within the College of Education and Human Development and throughout the University by teaching courses based on foundational educational psychology concepts in areas such as learning, motivation, development, assessment, and research methods. At this time, the Department of Educational Psychology offers one graduate degree: the Master of Arts degree in School Psychology.

Master of Arts Degree in School Psychology

The Master of Arts (M.A.) degree in School Psychology includes advanced coursework and field-based experiences related to psychological assessment, counseling, consultation, learning, development, child psychopathology, research, statistics, and professional issues. Students will also complete a full-time internship in a school setting. The program is designed to provide the academic and practical training necessary to become a Licensed Specialist in School Psychology by the Texas State Board of Examiners of Psychologists. Graduates also will be eligible to apply for certification as a Nationally Certified School Psychologist, which is a nationally-recognized professional certification granted by the National Association of School Psychologists. Due to the clinical nature of this program and number of hours required, the degree does not have a Thesis option.

Program Admission Requirements. The M.A. in School Psychology is designed for students who aspire to practice psychology in educational settings. Admission to the program is based on the following criteria:

1. Applicants must provide official transcripts indicating a Bachelor's degree in Psychology, Special Education, Curriculum & Instruction, Sociology, or closely related field from a regionally accredited college or university in the United States, or show proof of equivalent training at a foreign institution.
2. Acceptance to the M.A. program is contingent on having a grade point average (GPA) 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 coursework taken (if applicable). If an applicant's GPA is between 2.70 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 2.70 are denied admission as degree-seeking students.
3. Applicants must submit an official score on the Graduate Record Examination (GRE; including the Verbal Reasoning, Quantitative Reasoning, and Analytical Writing tests). GRE scores cannot be more than five years old. Please note that there is not a cutoff score for the GRE; rather, GRE scores will be balanced with GPA and other criteria.
4. Applicants whose native language is not English must submit an official score on the Test of English as a Foreign Language (TOEFL). Minimum scores include a score of at least 500 on the TOEFL paper version, or a score of at least 61 on the TOEFL Internet version.
5. Applicants must provide two letters of recommendation from professional references. These letters should specifically address the applicant's academic and/or professional skills, and potential to succeed in a rigorous graduate program.
6. Applicants must prepare a Statement of Purpose (approximately 500 words) which outlines the applicant's (1) reasons for pursuing the M.A. degree in School Psychology, (2) experiences relevant to the field of psychology or education, and (3) career plans.
7. Applicants who lack appropriate academic background in psychology or a closely related field may be admitted conditionally, and specific coursework will be required to address areas of deficiency. The hours of coursework required will be determined on a case-by-case basis between the student and the student's advisor.

Interested persons should contact the Student Development Specialist for the School Psychology program or check the Web site for more information.

Degree Requirements. Candidates for the Master of Arts degree in School Psychology must earn a minimum of 66 semester credit hours. Students must pass a comprehensive written examination toward the end of their formal coursework. The examination may be repeated, but students must be registered for coursework at UTSA during the semester in which they take the exam. Thus, students who have finished all of their required coursework but have not passed the comprehensive examination must register for EDP 6961 during the semester in which they take the exam.

The following 66 semester credit hours of coursework are required for all students in the School Psychology program:

COU	5213	Counseling Theories
EDP	5003	Psychological Learning Theories
EDP	5033	Human Development Across the Life Span
EDP	5053	Psychosocial Contexts of Learning
EDP	5303	Principles and Techniques of Evaluation
EDP	6033	Legal, Ethical, and Professional Issues in School Psychology
EDP	6103	Methods and Techniques of Inquiry I
EDP	6203	Methods and Techniques of Inquiry II
EDP	6233	Mental Health Services in the Schools
EDP	6243	Assessment of Intelligence and Achievement
EDP	6263	Behavioral Assessment and Intervention
EDP	6293	Consultation in the Schools
EDP	6323	Advanced Psychological Assessment
EDP	6643	Child and Adolescent Psychopathology
EDP	6703	Clinical Neuropsychology
EDP	6733	Multicultural Assessment and Intervention
EDP	6833	Practicum in School Psychology (must be repeated for a total of 6 credit hours)
EDP	6943	Internship in School Psychology (must be repeated for a total of 6 credit hours)
SPE	5403	Exceptional Children and Youth in the Schools
SPE	5513	Curriculum and Instructional Applications for Children and Youth in Special Education

Standards and Procedures

In order to complete the M.A. in School Psychology 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, skills necessary to work effectively with persons and systems having diverse needs.
- Demonstrate professionalism in their interactions with others.
- Conform with the codes of ethics of relevant professional associations in psychology (e.g., National Association of School Psychologists, American Psychological Association) in addition to the ethical and legal regulations relevant to the practice of psychology in the State of Texas (e.g., Texas Administrative Code, Rules and Regulations of the Texas State Board of Examiners of Psychologists).

It is the duty of faculty members in the School Psychology program to evaluate all students according to these standards in all settings in which faculty members and students interact, including classes, practicum and internship sites, advising, and supervision. It is expected that students will respond to evaluations, formal or informal, in appropriate ways and will attempt to conform to professional standards as explained to them.

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 provide psychological services to others, that student will be removed from continuation in the program.

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 complete appropriate remedial work.

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 topics such as behaviorism, social cognitive theory, information processing, constructivism and motivation. Explores applications of learning principles in multiple contexts including classroom and virtual learning environments. Appropriate for students in all areas of graduate study.

5033 Human Development Across the Life Span

(3-0) 3 hours credit.

Provides comprehensive overview of relevant research and theoretical frameworks of human development across the life span. Topics include cognitive, social, emotional, and sociocultural development as it exists in various contexts including schools, communities and families. 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 cannot be earned for both EDP 5043 and 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 educational 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 assessment and evaluation, including classical test theory, principles of psychological and educational measurement (including methods of establishing evidence for reliability and validity), statistical and psychometric concepts, the development and selection of assessment instruments related to a range of psychological constructs, and techniques for interpreting and communicating evaluation results.

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 the study of human motivation from a variety of approaches including biopsychosocial and social-historical perspectives. Some of the goals of the course are to understand the evolution of various theories and the influence of factors such as culture, race, emotion, and physiology on human motivation. This course will synthesize research on motivation in an effort to understand why people do what they do.

6033 Legal, Ethical, and Professional Issues in School Psychology

(3-0) 3 hours credit. Prerequisite: Admission to the School Psychology program.

Review of historical foundations of school psychology; legal, ethical, and credentialing issues in school psychology; scholarly writing and library research skills; models of psychological service delivery; professional role and function of the school psychologist; professional standards and organizations in school psychology.

6103 Methods and Techniques of Inquiry I

(3-0) 3 hours credit.

Addresses fundamental concepts and tools of research applied to psychological and educational problems. Topics include: developing and critiquing research, defining and measuring variables, sampling methods, and techniques relating to experimental, nonexperimental, and single-subject designs. This course also introduces descriptive and inferential statistics, which covers content through the various t-tests.

6203 Methods and Techniques of Inquiry II

(3-0) 3 hours credit. Prerequisite: EDP 6103.

Building on concepts from Methods and Techniques of Inquiry I, this course includes research design topics relevant to applied research, such as progress monitoring and program evaluation. The majority of this course focuses on more advanced statistical methods used in data analysis. Statistical topics include: correlational analyses, factorial ANOVAs, factor analysis, and reliability analyses.

6233 Mental Health Services in the Schools

(3-0) 3 hours credit. Prerequisite: COU 5213.

This course will cover selected psychotherapeutic and comprehensive intervention approaches for treating childhood and adolescent emotional and behavioral disorders that interfere with learning. Topics include play therapy, solution-focused strategies, cognitive-behavioral techniques, group and individual therapies, case management, involvement of the family and other service providers, and crisis response. Emphasis will be placed on empirically-supported services within a school systemic framework.

6243 Assessment of Intelligence and Achievement

(3-0) 3 hours credit. Prerequisite: EDP 5303 or equivalent.

Examines educational and clinical applications of individual assessment; specific diagnostic measures of intelligence and academic achievement; supervised instruction in administration, scoring, and interpretation. Videotaping and direct observation of test administration is required for purposes of supervision and self-evaluation.

6263 Behavioral Assessment and Intervention

(3-0) 3 hours credit. Prerequisite: EDP 5303 or equivalent.

Examines behavioral learning theory and operant conditioning principles; overview of behavioral assessment strategies with an emphasis on the systematic observations of behavior and interviews; functional behavior assessment and applied behavior analysis as systematic assessment-intervention approaches to behavior modification; and specific behavior therapy approaches for use with children and adolescents.

6293 Consultation in the Schools

(3-0) 3 hours credit. Prerequisites: EDP 6103 and EDP 6203.

Examines the role of consultation within the practice of school psychology, major theoretical models of consultation, specific approaches to service delivery, and ethical issues related to consultation. This course also includes methods of evaluating consultation outcomes at the individual student level, in addition to methods of program evaluation. Requires the application of theoretical material to case studies.

6323 Advanced Psychological Assessment

(3-0) 3 hours credit. Prerequisites: EDP 5303 or equivalent, and EDP 6243.

Theory and application of specific instruments and techniques, including administration and scoring. Emphasis on analysis, interpretation, and integration of intelligence, achievement, emotional, behavioral, and personality assessment results for diagnostics as well as treatment planning. Casework is required.

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, and 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, EDP 5273, or EDP 5333.

Course addresses DSM classification to discuss major emotional and behavioral disorders experienced by nonadult 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.

6703 Clinical Neuropsychology

(3-0) 3 hours credit. Prerequisites: EDP 5303 or equivalent, and EDP 6243.

Review of brain-behavior relationships and biological substrates of behavior; physiological bases of neuropsychological constructs such as executive function, attention, perception, memory, learning, emotions, and behavior; review of selected neurobehavioral and genetic disorders in children, with emphasis on cognitive, behavioral, and emotional sequelae of these disorders. Includes coverage of relevant neuropsychological assessment methods.

6733 Multicultural Assessment and Intervention

(3-0) 3 hours credit. Prerequisites: COU 5243 or EDP 6643, and EDP 5303 or equivalent.

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.

6833 Practicum in School Psychology

3 hours credit. Prerequisites: Completion of Practicum Form indicating required coursework has been completed, and consent of instructor.

Supervised field-based experience in approved public school and mental health settings in school psychology. Supervision provided by on-site supervisors and university faculty. Emphasis is on orientation to school settings; learning the role of the school psychologist within the larger context; evaluation of psychological and academic difficulties; consultation with parents and teachers; and direct counseling interventions with students. May be repeated for up to 6 hours credit.

6943 Internship in School Psychology

3 hours credit. Prerequisites: Completion of Internship Form indicating required coursework has been completed, and consent of instructor.

Full-time, supervised field-based experience in approved professional employment settings in school psychology. Supervision provided by on-site supervisors and university faculty. Students will complete a minimum of 600 clock hours of clinical work per semester, during which they will integrate and apply knowledge gained through coursework and begin to develop a professional identity. Can be taken only when all other required coursework in the School Psychology program has been completed. May be repeated for up to 6 hours credit.

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 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 Issues

(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 Issues 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 HEALTH AND KINESIOLOGY

Master of Science Degree in Health and Kinesiology

The Master of Science degree in Health and Kinesiology is designed for students seeking advanced skills and professional development in Health and Kinesiology. The program is also designed for students who wish to pursue a research career in Health and Kinesiology or to continue their studies at the doctoral level at other universities. The Master of Science degree in Health and Kinesiology offers three specializations (Health Promotion, Exercise Science, and Sport Pedagogy/Psychology) with a thesis option (33 credit hours) or nonthesis option (36 credit hours):

- The Health Promotion Specialization provides advanced training in public health education and community health promotion.
- The Exercise Science Specialization provides advanced training to students who are interested in kinesiology-related research, and careers in therapeutic professions and wellness/fitness.
- The Sport Pedagogy/Psychology Specialization prepares future leaders in physical education and coaching.

Program Admission Requirements. Admission to the program is 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. Acceptance to the M.S. program is contingent on having a grade point average (GPA) 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.
3. Applicants whose undergraduate major was not in Kinesiology or Health may be required to take 6 undergraduate leveling hours, or more if prerequisites are required for taking graduate courses.
4. Applicants are required to submit two professional references to the Graduate Committee.
5. A professional résumé and Statement of Purpose are required of all applicants. The Statement of Purpose cannot be longer than one typed page.
6. Students who are admitted with leveling course requirements must take the following undergraduate courses: HTH 3503 Foundations of Health Theory (for Health Promotion Specialization) or KIN 2303 Cultural and Scientific Foundations (for Exercise Science and Sport Pedagogy/Psychology Specializations), and one additional course at the discretion of the student's faculty advisor.

Degree Requirements

Nonthesis option: Minimum 36 semester credit hours, including: 9 hours of core courses, 12 required specialization hours, 6 prescribed KAH elective hours, and 9 free elective hours.

Thesis option: Minimum 33 semester credit hours, including: 9 hours of core courses, 12 required specialization hours, 6 prescribed KAH elective hours, and 6 thesis hours.

A. Core Courses (9 semester credit hours required):

KAH	5003	Current Trends in Kinesiology and Health Education
KAH	5093	Statistics and Research in Health and Kinesiology
KAH	5123	Research in Health and Kinesiology

B. Specialization Courses (12 semester credit hours required):

Health Promotion Specialization

KAH	5063	Health Behaviors
KAH	5073	Essential Concepts in Health Promotion

KAH	5083	Epidemiology
KAH	5133	Health Program Planning, Implementation, and Evaluation

Exercise Science Specialization

KAH	5053	Principles of Exercise Physiology
KAH	5103	Biomechanics
KAH	5403	Cardiovascular Fitness
KAH	6203	Psychological Perspectives of Motor Learning and Control

Sport Pedagogy/Psychology Specialization

KAH	5173	Measurement and Evaluation in Physical Education
KAH	6013	The Role of Sport in Society
KAH	6033	Sport Psychology
KAH	6213	Motor Development

C. Prescribed KAH Electives (6 semester credit hours required, chosen from the following):

KAH	5023	Management of Kinesiology and Health Programs
KAH	5043	Child and Adolescent Health Promotion
KAH	5053	Principles of Exercise Physiology
KAH	5063	Health Behaviors
KAH	5073	Essential Concepts in Health Promotion
KAH	5083	Epidemiology
KAH	5103	Biomechanics
KAH	5113	Advanced Structural and Functional Anatomy
KAH	5133	Health Program Planning, Implementation, and Evaluation
KAH	5143	Ethics in Health Education
KAH	5153	Health Communication and Technology
KAH	5173	Measurement and Evaluation in Physical Education
KAH	5243	Learning and Teaching Styles in Physical Education
KAH	5253	Enhancing Behavior and Performance in the Physical Education Environment
KAH	5303	Community Health
KAH	5403	Cardiovascular Fitness
KAH	6013	The Role of Sport in Society
KAH	6023	Exercise Psychology
KAH	6033	Sport Psychology
KAH	6043	Applied Sport Psychology
KAH	6053	Nutrition in Health and Disease
KAH	6063	Obesity and Health
KAH	6203	Psychological Perspectives of Motor Learning and Control
KAH	6213	Motor Development
KAH	6953	Independent Study
KAH	6973	Special Problems

D. Free Electives. 9 semester credit hours (nonthesis option); 6 semester credit hours of KAH 6983 Master's Thesis (thesis option)

COURSE DESCRIPTIONS
KINESIOLOGY AND HEALTH PROMOTION
(KAH)

- 5003 Current Trends in Kinesiology and Health Education**
 (3-0) 3 hours credit.
 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 healthcare 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 Essential Concepts in 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. (Formerly titled "Health and Wellness/Health Promotion.")
- 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, healthcare, 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. Prerequisite: 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.

5173 Measurement and Evaluation in Physical Education

(3-0) 3 hours credit. Prerequisite: KIN 4113 or an equivalent.

Overview of measurement theory, item analysis, reliability and validity studies, and factor analysis of tests.

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.

- 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 more than one of the following: KAH 6013, 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 more than one of the following: KAH 6033, 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.
- 6063 Obesity and Health**
(3-0) 3 hours credit.
The spread of obesity has touched virtually every aspect of daily life at every corner of the world and led to unforeseen health and economic burdens at every population level. This seminar will address issues related to the obesity epidemic and explore effective prevention strategies for child, adult, and high-risk populations.
- 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 more than one of the following: KAH 6203, KAH 5203, or COU 6203.)

6213 Motor Development

(3-0) 3 hours credit. Prerequisite: KIN 3103 or an equivalent.

The study of motor, physical and neuromuscular development across the human life span (from prenatal periods to old age); stages of development, motor system and development of specific movement patterns.

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 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 KAH 6961 may not be counted in the semester credit hours required for 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

The Department of Interdisciplinary Learning and Teaching offers the following degrees: the Master of Arts in Education, the Master of Arts in Adult Learning and Teaching, and the Doctor of Philosophy in Interdisciplinary Learning and Teaching.

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 five fields of concentration:

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 of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Advanced Foundations of Education

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 of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Advanced Foundations of Education

- 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 of Curriculum and Instruction
EDP	5003	Psychological Learning Theories
EDU	5003	Research Methods
EDU	5103	Advanced Foundations of Education

- 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

Master of Arts Degree in Education – Curriculum and Instruction Concentration

This concentration creates a context that nurtures interdisciplinary learners who have an understanding of engagement in curriculum and instruction theory, research, practice, policy, and critical issues. The concepts of curricular innovation and teaching excellence are stressed in conjunction with expanded knowledge of content fields and applied research. Courses with these goals include:

C&I	5003	Theory of Curriculum and Instruction
C&I	5013	Curriculum, Instruction and Assessment
C&I	6103	Research in Action
C&I	6123	Critical Perspectives in Curriculum and Instruction
C&I	6673	Policy and Critical Issues in Teaching

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 earn an initial teacher certification in specified areas of public school programs. Students should see the graduate advisor for information about this option. C&I 5003 is part of the general core required of all students in the M.A. in Education, and C&I 5013 is required of all students in the C&I concentration. In addition, C&I 6103, C&I 6123, and C&I 6673 are required of all students in the C&I concentration not seeking initial certification.

Curriculum and Instruction concentration emphases include:

Curriculum and Instruction Specialist
 Curriculum Studies
 Environmental Education
 Mathematics Education
 Middle School Education
 Science Education
 Social Studies Education
 Teacher Leadership
 Teaching

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.

In addition to the core curriculum classes required for all students seeking a Master's degree, courses required for this concentration area are:

ECE	5133	Language and Discourse Development in Preschool–Primary Children
ECE	5503	Theoretical Foundations of Early Childhood and Elementary Education
ECE	6453	Assessment and Evaluation in Early Childhood and Elementary Education
ECE	6473	Seminar in Early Childhood and Elementary Education
		or
ECE	6653	Action Research in Childhood Settings

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	5313	Development of Instructional Technology
IST	5343	Instructional Design Theory
IST	5703	Technology and Learning Cultures

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 five specialized areas of study: teaching focus, research focus, Reading Specialist Certification, writing focus, and literature focus. 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. The writing and literature foci allow students to develop specialized knowledge in these areas. 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 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. Students who wish to obtain initial teacher certification in generic special education may complete the certification 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. 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.

Noncertification Option

In addition to the core curriculum courses required for all students seeking a Master's degree, the following courses are required for this concentration area (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 noncertification-seeking 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 noncertification-seeking students studying low incidence disabilities (12 semester credit 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

Certification Option

The certification track requires additional hours and has additional requirements for certification.

In addition to the core curriculum classes required for all students seeking a Master's degree, the following courses are required for initial certification in Special Education (27 semester credit hours):

C&I	6943	Instructional Internship in Teaching (repeated for a total of 6 hours)
SPE	5403	Exceptional Children and Youth in the Schools
SPE	5443	Conference and Consultative Skills in Special Education
SPE	5503	Applied Behavior Analysis for Classroom Teachers and Counselors
SPE	5523	Language Development and Cognitive Intervention for Individuals with Disabilities
SPE	5533	Assessment and Evaluation of Children and Youth with Disabilities
SPE	5633	Instruction and Educational Interventions for Individuals with High Incidence Disabilities
SPE	5643	Instruction and Educational Interventions for Individuals with Low Incidence Disabilities

There are no additional support courses required for students seeking initial certification.

Teacher Certification Concentrations within the Master of Arts Degree in Education

Students interested in acquiring teacher certification within the Master's degree can choose from among the following concentrations:

All-level Special Education
 EC–6 Generalist
 4–8 Math, Science
 Secondary Math, Science

Special admission requirements and state and programmatic requirements for these teacher certification concentrations apply in addition to the requirements for the graduate degree. Please contact the Coordinator of Graduate Certification Programs in the College of Education and Human Development for further information.

Master of Arts Degree in Adult Learning and Teaching

The Master of Arts degree in Adult Learning and Teaching (ALT) emphasizes a broad approach to learning about and teaching adult populations of a variety of age groups, life experiences, cultural backgrounds, and educational experiences. The two emphases in Adult Learning and Teaching are (1) College Teaching and (2) Adult Education and Human Resource Development. The degree focuses on post-secondary, workforce and human resource development, and adult continuing and basic educational contexts. College Teaching is targeted for those individuals interested in securing a community college or university instructor position at the local, national, or international level. Adult Education and Human Resource Development is targeted for those individuals interested in working with local, national, and international adult populations in a variety of contexts, including but not limited to, continuing education settings; training and development units in corporations, businesses, industries, and military installations; medical and social services, community agencies (e.g., care giving, adult learning centers); nonprofits; informal science centers; and school districts. The goal of ALT is to recruit, prepare, and retain well-qualified educators for college teaching, adult education, and human resource development contexts.

Program Admission Requirements. 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. Contact the Graduate Advisor of Record for the M.A. in Adult Learning and Teaching for more information.

Degree Requirements. The ALT degree has four required components: a core of common courses, a set of prescribed courses, elective courses, and a comprehensive examination.

The course of study for the Master of Arts degree in Adult Learning and Teaching consists of:

- A. Core courses required of all students seeking the Master of Arts degree in Adult Learning and Teaching (12 semester credit hours):

ALT	6203	The Student, Community, and Instructor in Adult Learning and Teaching
ALT	6343	Curriculum and Instruction in Adult Education and Human Resource Development
ALT	6603	Foundations and Contexts of Adult Education and Human Resource Development
EDU	5003	Research Methods

- B. Prescribed courses required of all students seeking the Master of Arts degree in Adult Learning and Teaching (9 semester credit hours):

ALT	6623	Assessment and Evaluation of Adult Education and Human Resource Development
ALT	6633	Multicultural Issues, Diversity, and Social Action in Adult Education and Human Resource Development
ALT	6943	Internship in Adult Learning and Teaching

- C. Elective courses (12 semester hours with thesis or 15 semester credit hours without thesis)

Note: According to SACS/COC Comprehensive Standard 3.7.1 of the *Principles of Accreditation*, a master's degree and a minimum of 18 graduate semester hours in the teaching discipline is required to teach at the undergraduate level.

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). Applicants for the Master of Arts degree in Adult Learning and Teaching may choose a thesis or nonthesis option. Some students may be required to take additional support work as determined by the Graduate Advisor of Record for the M.A. in Adult Learning and Teaching.

Comprehensive Examination. The ALT comprehensive examination committee 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.

Doctor of Philosophy Degree in Interdisciplinary Learning and Teaching

The Doctor of Philosophy in Interdisciplinary Learning and Teaching (ILT) is a degree program that examines learning and teaching from an interdisciplinary perspective; focusing on varied approaches to teaching and learning from within and across various disciplines. The foundations of the program are: how teaching and learning are addressed within disciplines, how they may intersect with one another, and how each discipline maintains its uniqueness while sharing commonalities with other disciplines.

The Doctoral program objectives include:

1. Preparation of researchers who examine the theories, philosophies and multiple paradigms that inform learning and teaching from an interdisciplinary perspective with respect to the varied ways of knowing, situated cognition, and sociocultural contexts, as well as curricular and instructional development;
2. Development of graduate leaders who seek ways to address educational and societal issues through multiple perspectives and will work to make major contributions to the improvement of education for ethnically and economically diverse populations across the human lifespan; and,
3. Preparation of educators to assume the roles of university and community college faculty members, public school teachers/leaders, and adult education and human resource development educators who address, analyze, evaluate and reform learning and teaching through interdisciplinary approaches in varied sociocultural contexts.

Program Admission Requirements. Admission to the Ph.D. program is limited, and therefore, competitive. Meeting recommended criteria does not ensure admission. Admission to the doctoral degree program occurs once per year in the Fall

Semester. The following factors for admission into the doctoral program will be considered by the ILT Doctoral Program Committee:

1. A 36-hour master's degree in Curriculum and Instruction, in a related educational field, such as early childhood and elementary education, special education, curriculum, instructional technology, literacy education, or adult learning and teaching, or in an academic discipline, such as history, mathematics, the sciences, humanities, or fine arts. Students with fewer than 36 hours credit may be considered for the program with probationary status pending the completion of deficient hours;
2. A master's degree transcript documenting a grade point average (GPA) of 3.5 or higher;
3. For applicants whose native language is not English, a score of at least 550 on the Test of English as a Foreign Language (TOEFL);
4. Three letters of recommendation from faculty, supervisors or professional affiliations attesting to the student's academic and professional attributes for success in the program and potential for contributing substantially to a field of study related to the degree;
5. A written personal statement/essay describing research interests and purpose for pursuing the Ph.D. in Interdisciplinary Learning and Teaching;
6. Graduate Record Examination (GRE) test scores not older than five years;
7. A professional vitae demonstrating experience in a work environment where education was the primary professional emphasis;
8. Agreement to participate in an interview, if so invited.

Degree Requirements. Program degree requirements include a minimum of 60 semester credit hours in Research Methods, Core Courses, Cognate Courses, and Doctoral Research Seminar and Dissertation Courses. Students pursuing the Ph.D. in Interdisciplinary Learning and Teaching 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 degree. For more information, refer to Doctoral Degree Regulations in Chapter 5 of this catalog.

- A. Research Methods Courses (12 semester credit hours required). Survey of qualitative and quantitative methods, and mixed-methods research designs.

ILR	7643	Advanced Research on Instruction
ILT	7013	Overview of Research Design for Instructional Inquiry

AND

6 semester credit hours of approved research methods courses selected from within the College of Education and Human Development

- B. Core Courses (18 semester credit hours required):

ILT	7003	Exploration of Interdisciplinary Learning and Teaching
ILT	7133	Perspectives and Approaches to Interdisciplinary Learning & Teaching
ILT	7143	Internship (Research and Teaching)
ILT	7153	Interdisciplinary Learning and Teaching in Sociocultural Contexts
ILT	7633	Multiple Perspectives on Learning and Teaching
ILT	7733	Evaluation of Research

- C. Cognate Courses (18 semester credit hours required):

Students select a cognate area in academic disciplines/fields related to research interests. Courses are selected from graduate offerings throughout the University and students must meet prerequisites for enrollment.

- D. Doctoral Research Seminar and Doctoral Dissertation (12 semester credit hours required):

ILT	7893	Doctoral Research Seminar in Interdisciplinary Learning and Teaching
ILT	7983	Doctoral Dissertation (repeated for a minimum of 9 semester credit hours)

COURSE DESCRIPTIONS
ADULT LEARNING AND TEACHING
(ALT)

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 more than one of the following: AHE 5813, ALT 5813, or C&I 5813.)

6003 Popular Culture and Informal Learning in Adult Learning and Teaching

(3-0) 3 hours credit.

This course is an overview of the intersection of adult learning and popular cultural products. Participants will consider how adults learn informally from popular television, music, movies, video games, etc. and how that learning impacts classroom learning and practice. (Formerly titled "The Community College.")

6063 Research Topics in Adult Learning and Teaching

(3-0) 3 hours credit. Prerequisite: EDU 5003.

Consideration of the major research problem areas in adult, workforce, and continuing education, identification of local, national and global problems in need of research, examination of research literature in selected areas, and study of research methods unique to or especially useful in adult education, workforce education, and transformative leadership. (Formerly AHE 6063. Credit cannot be earned for both ALT 6063 and AHE 6063.)

6103 Consumerism and Consumption in Adult Learning and Teaching

(3-0) 3 hours credit.

This discussion-based course will examine issues of consumption and consumer education from different perspectives, including psychology, sociology, anthropology, cultural studies, and adult education. This course is for anyone interested in adult education, consumer education, education for citizenship, environmental education, or consumer issues in general. (Formerly AHE 6103. Credit cannot be earned for both ALT 6103 and AHE 6103.) (Formerly titled "Effective Teaching in Higher Education I.")

6123 International Perspectives on Adult Learning and Teaching

(3-0) 3 hours credit.

This discussion-based course investigates global ethnic, cultural, and political structures in adult education across various regions and countries. (Formerly AHE 6123. Credit cannot be earned for both ALT 6123 and AHE 6123.) (Formerly titled "Effective Teaching in Higher Education II.")

6203 The Student, Community, and Instructor in Adult Learning and Teaching

(3-0) 3 hours credit.

This course is an overview of adult learning theories and their practical application in the community college, university, and other formal and informal learning situations. It will focus on both the experience of, and the practice of, adult learning and teaching, while examining the philosophies, the theoretical framework, and the social contexts of adult learning, human resource development, life-long learning, and adult continuing education. (Formerly AHE 5203, ALT 5203, and COU 5603. Credit cannot be earned for more than one of the following: AHE 5203, ALT 5203, ALT 6203, or COU 5603.)

6223 Distance and Blended Learning in Adult Education and Human Resource Development

(3-0) 3 hours credit.

Introduction to the field of distance and blended learning. Application of distance and blended learning theory and principles to post-secondary and training settings via a variety of technology-enhanced instructional modalities.

- 6343 Curriculum and Instruction in Adult Education and Human Resource Development**
 (3-0) 3 hours credit.
 Overview of instructional strategies, design, and practices of adult learning settings. Explores situational and cultural factors that influence adult learning in post-secondary, adult basic education, and human resource development organizations. (Formerly AHE 5343 and ALT 5343. Credit cannot be earned for more than one of the following: AHE 5343, ALT 5343, or ALT 6343.)
- 6503 Community Building and Mentoring in Human Resource Development**
 (3-0) 3 hours credit.
 This course will focus on facilitation of community and workplace support, creating strategic mentoring environments, and assisting adults in their development as productive members of their communities, both at work and home.
- 6603 Foundations and Contexts of Adult Education and Human Resource Development**
 (3-0) 3 hours credit.
 This course is designed to give participants an understanding of the history and current practice of adult education. Readings will trace the major historical developments and philosophical roots of adult education as well as examine administrative, programming, and instructional practices in the field. The social context of adult education, including race, class, and gender analyses, and the role of adult education in society. Relevant historical, sociological, political, and economic factors that influence adult education theory and practice. The course will also examine emerging issues in adult education and their implications for future practice. (Formerly AHE 5603 and ALT 5603. Credit cannot be earned for more than one of the following: AHE 5603, ALT 5603, or ALT 6603.)
- 6623 Assessment and Evaluation of Adult Education and Human Resource Development**
 (3-0) 3 hours credit.
 Overview of a variety of summative and formative classroom assessment and program evaluation methods appropriate for adult education and training settings. (Formerly AHE 5623 and ALT 5623. Credit cannot be earned for more than one of the following: AHE 5623, ALT 5623, or ALT 6623.)
- 6633 Multicultural Issues, Diversity, and Social Action in Adult Education and Human Resource Development**
 (3-0) 3 hours credit.
 Cultural (racial, ethnic, gender, linguistic) diversity in the local, national, and global adult educational contexts. Topics include cultural self-awareness, demographic changes and projections, problems/issues in inter-cultural educational settings, theoretical perspectives of multicultural adult education, practical problems and related strategies in handling diversity in adult education settings. (Formerly AHE 5633, ALT 5633, and COU 5633. Credit cannot be earned for more than one of the following: AHE 5633, ALT 5633, ALT 6633, or COU 5633.)
- 6933 Community-Based Research**
 (3-0) 3 hours credit.
 Overview of principles and strategies for Community-Based Research (CBR). Community-Based Research is an inquiry decision-making methodology that actively involves, and is largely directed by, participating community members. Students will create and address research questions in collaboration with members of the community to meet a particular community need.
- 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, or Human Resource Development settings. (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 Topics in Adult Learning and Teaching

(3-0) 3 hours credit.

A 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, may be counted toward the degree. (Formerly AHE 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 the Master’s degree. Credit will be awarded upon completion of the thesis. Enrollment is required for each term in which the thesis is in progress. (Formerly AHE 6983.)

**COURSE DESCRIPTIONS
CURRICULUM AND INSTRUCTION
(C&I)**

5003 Theory 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. (Formerly titled “Theory and Dynamics of Curriculum and Instruction.”)

5013 Curriculum, Instruction and Assessment

(3-0) 3 hours credit. Prerequisite: C&I 5003.

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. (Formerly titled “Classroom Instruction and Evaluation.”)

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 cannot be earned for both C&I 5043 and EDP 5043.)

5523 Metacognitive Learning Principles

(3-0) 3 hours credit.

Metacognition as a foundational learning construct is considered first as it is presented in the literature and then as a lived experience of reflective practice. Core questions include: What are ways of knowing? How does one know what and how one knows? What are appropriate metacognitive strategies across curricular contexts? Each participant will explore motivation with three foci: theory, practical application toward the self and practical application toward others. (Formerly titled “Metacognitive Thinking and Learning Strategies.”) (Same as ECE 6753. Credit cannot be earned for more than one of the following: ECE 5523, ECE 6753, or C&I 5523.)

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. Only 6 hours may be applied to the degree.

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 Secondary Literacy Development, Diagnosis and Practicum

(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. (Formerly titled "Reading in the Secondary School.")

5753 Literature for Children

(3-0) 3 hours credit.

This course focuses on diverse genres and formats of children's literature and examines current issues, practices, and perspectives in the field.

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. Prerequisites: C&I 5763 and C&I 5823.

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 more than one of the following: AHE 5813, ALT 5813, or C&I 5813.)

5823 Early Literacy Development, Diagnosis and Practicum

(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. (Formerly titled "Reading and Writing Development in Early Childhood.")

5833 Picture Books and the Practice of Literacy

(3-0) 3 hours credit.

This course focuses on the picture book. The course will investigate the formal properties of picture books, the potential of picture books for enabling literacy development, and how children and young adults interact with them. The course will include aesthetic theory, theories of text-picture relationships, theories of literacy and literary understanding, and will attempt to forge connections among these theories. Research on children's engagement with (and responses to) picture books will also be included.

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 and application of his thinking to contemporary educational, psychological, and social-bicultural issues.

5873 Critical Issues and Topics in Literacy Assessment

(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. (Formerly titled "Assessment Issues and Practices in Reading.")

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.

6023 Supervision: Tools and Techniques

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

6053 Instructional Supervision

(3-0) 3 hours credit. Prerequisites: C&I 5003 and C&I 5013.

The analysis and application of curriculum development theory and research on models, policies, and issues related to the teaching and learning process in the professional development of teachers. Study of impact strategies and interpersonal skills in instructional supervision.

6063 Research in Subject Matter Fields

(3-0) 3 hours credit. Prerequisite: C&I 5003.

A study of various past and current educational philosophies, purpose and methods of educational research including research of content, pedagogy, technology, and research on teaching and learning of concepts and skills, standards and assessments. Examination and in-depth discussion of existing links between educational research in specific subject fields and classroom practice. May be offered in:

- Science
- Mathematics
- Social Studies
- Language Arts
- Foreign Languages
- Physical and Health Education
- Interdisciplinary

May be repeated once for credit (for a total of 6 hours) when disciplines vary.

6073 Multiliteracy through Multimedia and Critical Perspectives

(3-0) 3 hours credit.

In our globalized and high-tech world, multiliteracy has taken on many meanings going beyond monocultural/monolingual contexts and literal representations of language. In this course, we will explore research-based and pedagogical definitions and applications of multiliteracy through a critical lens, including new informations and communications media, domain-specific literacies, and literacies that fall outside of the ever-shrinking “mainstream” (e.g., English learners, students from working-class backgrounds, etc.).

6103 Research in Action

(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. (Formerly titled “Action Research.”) (Credit cannot be earned for both C&I 6103 and ECE 6653.)

6123 Critical Perspectives in Curriculum and Instruction

(3-0) 3 hours credit. Prerequisites: C&I 5003 and C&I 5013.

This course offers an examination of curriculum as the intersection of power, identity, knowledge, and cultural politics. Critical theoretical frameworks introduced in this course include critical theory, postmodernism, queer theory, and others.

6133 Curriculum in International Contexts

(3-0) 3 hours credit. Prerequisites: C&I 5003 and C&I 5013.

This course explores curriculum through comparative analysis of education practices in international contexts. Questions include: How is learning approached globally? How does a global perspective on curriculum transform local and global educational practices?

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.

6403 Survey of Research in Literature for Children and Young Adults

(3-0) 3 hours credit.

This course surveys theory and research on literature for children and young adults and examines research on reader response and related classroom practices.

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.

6603 Middle Grades Theory, Research and Practice

(3-0) 3 hours credit.

Exploration of theory supporting the middle grades as a separate schooling experience for young adolescents (ages 10–15); research about principles and practices of middle school concepts, teaching at the middle school level, young adolescent development, curriculum, instruction, assessment, etc. (Formerly C&I 5603. Credit cannot be earned for both C&I 6603 and C&I 5603.)

6613 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. (Formerly C&I 5613. Credit cannot be earned for both C&I 6613 and C&I 5613.)

6623 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. (Formerly C&I 5623. Credit cannot be earned for both C&I 6623 and C&I 5623.)

- 6633 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. (Formerly C&I 5633. Credit cannot be earned for both C&I 6633 and C&I 5633.)
- 6643 Middle Grades Policy and Critical Issues**
(3-0) 3 hours credit.
Exploration of policy and examination of critical issues (e.g., funding, mandated assessments, parent involvement) affecting middle schools.
- 6653 History of Mathematics**
(3-0) 3 hours credit.
A study of major historical mathematical events, the evolution of mathematics from ancient times to the present and contributions of various mathematicians. Examination of the development of several branches of mathematics, including but not limited to number theory, algebra, geometry, probability, and calculus.
- 6673 Policy and Critical Issues in Teaching**
(3-0) 3 hours credit. Prerequisites: C&I 5003 and C&I 5013.
Study of critical issues in school. Investigation of research, practices, and policies related to special education, bilingual and multicultural education, early childhood education, middle and secondary schools and other current broad-based social issues. (Formerly C&I 5673. Credit cannot be earned for both C&I 6673 and C&I 5673.)
- 6683 Theory, Research and Practice in Social Studies Education**
(3-0) 3 hours credit.
Analysis and application: theories of learning and teaching that influenced social studies education. Current research in social studies education will be examined and analyzed. The impact that these theories and research has upon current social studies educational practices will be investigated.
- 6693 History, Policy and Critical Issues in Social Studies Education**
(3-0) 3 hours credit.
This course will present both the history and foundations of social studies education in America and how these have evolved over time. Students will investigate policies that impact social studies education from both historical and current viewpoints. Students will study, debate, and form a position on the research, practices and policies related to current critical issues in social studies education.
- 6733 Fundamentals of Environmental Education**
(3-0) 3 hours credit.
Provides educators with the knowledge and skills necessary to incorporate quality environmental education into their instruction and curriculum. Explores the explanation of the theory, history, definition, national standards, and goals of environmental education. Provides an understanding of the professional roles and instructional methods and assessment strategies of environmental educators within the context of environmental education.

6773 Environmental Education in the Curriculum

(3-0) 3 hours credit.

An exploration of the integration of environmental concepts and environmental education curricula into the total school curriculum. Using local, accessible outdoor locations, students will explore the many aspects that come together to create a "Sense of Place." This course will assist students to discover and interpret the natural history and critical environmental issues of their local communities through a variety of mediums. It is designed for educators who want to help learners of all ages to discover the wonders and intricacies of the natural world.

6783 Theory and Practice of Mathematics

(3-0) 3 hours credit.

Study of different theories of learning and teaching mathematics and analysis of practices which support these theories. In-depth discussion of contemporary critical issues in mathematics classrooms, standards, and assessments.

6803 San Antonio Writing Project Summer Institute

(3-0) 3 hours credit. Prerequisite: Must apply and be accepted into the San Antonio Writing Project Summer Institute. Concurrent enrollment in C&I 6813 is required.

This course is designed to provide opportunities for teachers to engage in a writing workshop, research applications of writing in classrooms, explore their own writing, and examine how to use writing in their classrooms effectively across all content areas from pre-K through university level academics.

6813 Advanced San Antonio Writing Project Summer Institute

(3-0) 3 hours credit. Prerequisite: Must apply and be accepted into the San Antonio Writing Project Summer Institute. Concurrent enrollment in C&I 6803 is required.

This course provides opportunities for professional growth and development, study of writing theory, and professional growth through writing. Students will research, develop and present demonstrations of best practices in writing.

6823 Oral and Written Discourse Analysis

(3-0) 3 hours credit.

This course examines qualitative and quantitative methods for analysis of oral and written discourse. Students will review authentic samples of discourse including family communication, teacher-student and peer interaction, other institutional or community, workplace, and everyday discourse with the goal of understanding life-long literacy and learning.

6923 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. (Formerly C&I 5923. Credit cannot be earned for both C&I 6923 and C&I 5923.)

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.

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 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.

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

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. (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.

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
- Supervision

May be repeated for credit when curriculum areas vary.

- 6363 Differentiated 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 more than one of the following: ECE 5473, ECE 6363, or ECE 6373.)
- 6423 Advanced Studies in Play**
 (3-0) 3 hours credit.
 This course focuses on the examination and analysis of play research as it relates to different areas of young children's development including cognitive, social, emotional, physical, and linguistic—birth through age eight. Examination of play theories, the role of the adult as facilitators of play, and contexts of play for all children including culturally and linguistically diverse children and children with special needs.
- 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 early childhood and 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.

6753 Metacognitive Thinking and Learning Strategies in Childhood Settings

(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. (Formerly ECE 5523. Same as C&I 5523. Credit cannot be earned for more than one of the following: ECE 5523, ECE 6753, or C&I 5523.)

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.

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 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.

7123 Cognitive and Linguistic Development in Early Childhood and Elementary Education

(3-0) 3 hours credit.

A consideration of how language production and language understanding interact with content learning. With a focus on how children's linguistic and cognitive development is promoted depending on how language is used in school activities. An exploration of the language policies and politics that affect schools, used in teaching and learning academic language for native speakers of English as well as those who speak other languages.

**COURSE DESCRIPTIONS
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.
- 7133 Introduction to Single-case Methodology**
(3-0) 3 hours credit. Prerequisite: SPE 5503 or approval of the instructor.
The content of this course will examine questions appropriate for single-case research, data collection procedures, selection, implementation, analysis of research designs, and manuscript development/structure.
- 7143 Application of Single-case Methodology**
(3-0) 3 hours credit. Prerequisite: ILR 7133.
This course will involve the application of single-case methodology in the area of education. This course will focus on the development of research questions, research-board approval, selection and implementation of research designs, and data analysis.
- 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.

7873 Survey Research Methods

(3-0) 3 hours credit. Prerequisite: Introductory statistics or research methods course; or consent of instructor. Exploration of survey research methodology, development of survey, questionnaire or inventory, including item construction. Discussion and application of sampling and data collection procedures. Coding data, piloting instrument and conducting reliability and validity of instrument. Conducting data analysis procedures using SPSS to respond to research question(s) will include application of descriptive and inferential statistics. Data analysis will include employing factor analysis as a data reduction technique and to determine underlying constructs measured by instrument.

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
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.

5313 Development of Instructional Technology

(3-0) 3 hours credit.
This course provides an overview of instructional technology development tools and opportunities to evaluate current trends in learning environments. Students will gain both theoretical and practical knowledge of these technologies. (Formerly titled "Media Design.")

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: IST 5003 or consent of instructor.
An investigation of theories, principles, and processes of instructional design including their application to instructional product and curriculum development.

5363 Distance Learning and Teaching

(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.)

5883 Storytelling as Instructional Method

(3-0) 3 hours credit.

One of the oldest instructional methods, storytelling is used across sectors to build upon case-based reasoning that engaged the learner through the analysis of personal experience. With an emphasis on digital storytelling practices, the course paints broad-brush strokes providing opportunities for students to perceive oral and digital forms of storytelling in multiple constructs: cultural, methods, strategies, and purposes. (Formerly C&I 5883. Credit cannot be earned for both IST 5883 and C&I 5883.)

6103 Virtual Learning and Teaching

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

Gaming, virtual reality, and virtual worlds provide opportunities to learning through active participation in environments organized for specific purposes. This course explores instructional applications of virtual learning and teaching as students design a learning experience in a virtual environment.

6353 Multimedia Development

(3-0) 3 hours credit. Prerequisite: IST 5313 or consent of instructor.

This course presents 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.

6373 Games and Learning

(3-0) 3 hours credit.

This course investigates games as a learning technology. Learners will evaluate, design, and review practical examples as well as the literature on games in formal and informal learning spaces. The class will require learners to engage with the latest trends and research in games and learning. (Formerly titled "Analysis and Evaluation of Instructional Technology Trends.")

6503 Advanced Topics in Instructional Technology

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

Course develops skills in instructional technology related to and derived from the characteristics of current topics in the field. May be repeated for credit when topics vary.

6513 Emergent Technologies in Education

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

This course explores emergent technologies in terms of functionalities and pedagogical frameworks of use. Students will complete theoretical and practical application tasks. (Formerly titled "Advanced Instructional Design.")

6603 Computer Programming and Learning Environments

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

This course provides participants with opportunities to engage in programming tasks across learning environments supported by instructional technologies. The emphasis of this course is on production rather than theoretical frameworks. (Formerly titled "Animation.")

6943 Internship

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

Individually supervised field experience in a setting that provides direct experience with the design, development, implementation, or evaluation of learning experiences that are technology-mediated. (Credit cannot be earned for both IST 6943 and other internships.)

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.

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 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.

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 Instructional Technology

(3-0) 3 hours credit.

This course is intended to acclimate and provide doctoral students with an opportunity to explore the main theories, practices, and areas of research in instructional technology. Readings include seminal work in instructional technology, instructional design, learning theories, and design-based research. Students will become familiar with the tools and practices of successful doctoral work.

7013 Field Research with Instructional Technologies

(3-0) 3 hours credit.

This course is designed to support students in doing field research in instructional technology, including observations, interviews, and analysis. Students will undertake their own research study and discuss relevant literature.

7023 Design and Development of Learning Environments

(3-0) 3 hours credit.

This is a doctoral course in which students will design, develop, pilot, and evaluate a learning environment using the theories and practices of instructional technology.

7033 Current Topics in Instructional Technologies

(3-0) 3 hours credit.

An organized course that offers doctoral students the opportunity to engage in specialized study not normally or not often available as part of the program's regular course offerings. Current Topics courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the doctoral degree.

COURSE DESCRIPTIONS
INTERDISCIPLINARY LEARNING AND TEACHING
(ILT)

7003 Exploration of Interdisciplinary Learning and Teaching

(3-0) 3 hours credit.

This course examines the history and definitions of the concept of interdisciplinary learning and teaching. Students will survey the various research areas within the field of Interdisciplinary Studies. Through group and individual examinations of interdisciplinary issues, topics, and problems, students will engage in scholarly literature study and research practice. Each student will select a topic of study that will be a personal research theme throughout a two-course orientation sequence. Research expectations and requirements will be presented so that students begin to understand the path and sequence of research courses.

7013 Overview of Research Design for Instructional Inquiry

(3-0) 3 hours credit. Prerequisite: Research methods or statistics course.

Overview of research design for quantitative, qualitative, or mixed-methods studies in Interdisciplinary Learning and Teaching. Topics include formulating research questions, defining variables, developing a sampling design, collecting data, selecting appropriate analyses, and interpreting results. The course will emphasize the procedures commonly used in the study of classroom instruction and learning and the specialized computer programs used in the study of instruction.

7023 Doctoral Seminar in Literacy

(3-0) 3 hours credit.

An organized course in the examination of critical issues in literacy. May be repeated for credit when topics vary.

7133 Perspectives and Approaches to Interdisciplinary Learning & Teaching

(3-0) 3 hours credit.

This course includes a rigorous study of the key paradigms and philosophies of knowledge construction and research used to inform teaching and learning in the field of education. Continuing with topics selected in ILT 7003, students work to understand and analyze their topic from within particular paradigms, applying diverse theories, principles and concepts to their study and comparing the outcomes of such study across the many theoretical and philosophical perspectives apparent within and beyond the field of education. The course focuses on transformation of issues, topics, and problems through sustained interdisciplinary analysis and application.

7143 Internship (Research and Teaching)

3 hours credit.

Students, with their advisor's recommendation, will complete an internship in which they collaborate and apprentice with departmental and college faculty on current research projects and teaching opportunities. May be repeated for credit.

7153 Interdisciplinary Learning and Teaching in Sociocultural Contexts

(3-0) 3 hours credit.

Advanced study of theories and research that explores sociocultural contexts that shape, influence, and constrain learning and teaching. Topics to be addressed include: sociopolitical and sociohistorical norms, values, and beliefs that impact education and the practice of democratic, inclusive and socially sensitive instruction. This course will investigate how the power dynamics and social constructions of race, class, gender, sexuality, religion, physical-ability-related concerns, etc., can be either validated or challenged by educational practitioners and institutions.

7633 Multiple Perspectives on Learning and Teaching

(3-0) 3 hours credit.

Survey of critical research on learning, teaching and school reform. Students will examine teaching/learning research from multiple perspectives and from diverse fields of inquiry that inform education (psychological, sociocultural, sociohistorical, sociocognitive, etc.). Emphasis will be placed on theory and theoretical frameworks.

7733 Evaluation of Research

(3-0) 3 hours credit.

This course offers students multiple opportunities to deeply reflect on, explore and analyze common practices in educational research. Students will take a critical look at strengths and weaknesses across the entire spectrum of research paradigms, including quantitative, qualitative, and mixed models. Students will evaluate which research methodologies will best be suited to finding answers to different kinds of research questions around current issues in education.

7893 Doctoral Research Seminar in Interdisciplinary Learning and Teaching

(3-0) 3 hours credit.

Intended to provide doctoral students with necessary background information about conducting dissertation research. Guidance will be provided to students regarding dissertation proposals.

7951,3 Independent Study

1 or 3 hours credit. Prerequisites: Doctoral standing and permission in writing (form available) of the instructor and the student's faculty advisor.

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 Doctoral degree.

7973 Special Topics Seminar

(3-0) 3 hours credit.

An organized special topics seminar (e.g., Teacher Quality Research in STEM; Research on Culturally Efficacious Student Learning) offering the opportunity for in-depth study on topics of interest and cutting-edge research. Special Topics Seminar courses may be repeated for credit when topics vary, but not more than 6 hours, regardless of discipline, will apply to the Doctoral degree.

7981,3 Doctoral Dissertation

1 or 3 hours credit. Prerequisites: Admission to candidacy and consent of student's faculty advisor.

May be repeated for credit, but not more than 9 hours may be applied toward the Doctoral degree. Credit will be awarded upon completion of the dissertation.

**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. A research project is required.

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.

- 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.
- 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 conferences, staff development, and consultative activities. Requires 5–10 hours of field experience.
- 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.
- 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, treatment, and education of 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. Credit cannot be earned for both SPE 5503 and EDP 5423.)
- 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.
- 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.

- 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.
- 5613 Legal Issues in Special Education**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
An examination of the historical and legal issues pertaining to special education. This course will provide an in-depth study of state and federal laws and will analyze litigation in the field. Students will also engage in activities that examine the ethical implications of special education.
- 5623 Seminar on Current and Critical Issues in Special Education**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or 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.
- 5893 Practicum in Special Education: Behavior Disorders**
3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
This course focuses on the application of theoretical principles to field settings. The student works in educational settings to plan, implement, and evaluate appropriate experiences with children and youth exhibiting emotional and/or behavior disorders.
- 6943 Assistive Technology for Individuals with Disabilities**
(3-0) 3 hours credit. Prerequisite: SPE 5403 or consent of instructor.
This course presents general and special education teachers, counselors, educational leaders, or students in other fields with methods and strategies related to the use of technology to assist the learning of individuals with disabilities. This course provides in-depth study of the use of assistive technology within the school curriculum. Current research on effective assessment and use of assistive technology is addressed especially as it relates to individuals with disabilities.
- 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).

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.

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
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.

college of engineering

college of engineering

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COLLEGE OF ENGINEERING

Graduate programs in engineering include the Master of Science in Advanced Manufacturing and Enterprise Engineering, the Master of Science in Biomedical Engineering, 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 Master of Civil 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. For master's degree programs, 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 Biomedical Engineering offers a matrix of academic tracks based on segments of biomedical engineering and/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 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 Computer Engineering, Systems and Control, Digital Signal Processing, Communications, and Electronic Materials and Micro Devices. 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: Computer Engineering, Systems and Control, Digital Signal Processing, Communications, and Electronic Materials and Micro Devices.

A Doctor of Philosophy degree in Environmental Science and Engineering offers research emphases in Water Resources, Environmental Quality, Environmental Remediation, Pollution Control, Conservation Ecology, Spatial Analysis, Remote Sensing, and Natural Hazards.

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. (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

Master of Science Degree in Biomedical Engineering

A Master of Science (M.S.) degree in Biomedical Engineering (BME) at The University of Texas at San Antonio (UTSA) is offered through a joint graduate program with The University of Texas Health Science Center at San Antonio (UTHSCSA). A matrix of academic tracks is offered based on segments of biomedical engineering and/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 M.S. degree in Biomedical Engineering (Thesis Option or Nonthesis Option) will be awarded to candidates who have displayed an in-depth understanding of the concepts that are necessary for critically judging the scientific literature, for formulating novel hypotheses, designing experimental protocols to test the hypotheses, interpreting their results and demonstrating their ability to make an original contribution to knowledge in the biomedical field.

The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 4, Master's Degree Regulations).

Admission Requirements. Students who hold an undergraduate degree may apply to the program. The minimum requirements for admission to the Master of Science degree in Biomedical Engineering program are described below. Note that admission is competitive and satisfying these requirements does not guarantee admission.

- 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, and physics prior to being admitted to the program. It is expected that these students will have B.S. degrees with emphasis in either engineering, physical science, or biological science disciplines. Students from nonengineering backgrounds are required to take selected fundamental engineering courses as a condition of acceptance.
- A satisfactory score, as evaluated by the Admissions 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). The applicant's performance on a standardized test will be considered in addition to other criteria, for admission or competitive scholarship awards and will not be used as the sole criterion for consideration of an applicant.
- Three letters of recommendation attesting to the applicant's readiness for graduate study.
- A **complete application** includes the application form, official transcripts, letters of recommendation, GRE scores, a résumé, and a statement of the applicant's research experience, interests, and goals. TOEFL scores are required for those applicants whose native language is not English.

Degree Requirements and Program of Study – Thesis Option. Typically, a Master's degree program of study will consist of at least 30.5 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 transferring students, course credit allowed for transfer will be decided on a case-by-case basis by the Biomedical Engineering Committee on Graduate Studies (COGS). If recommended by the COGS, the request will then be submitted to the Dean of the Graduate School for approval. Since this is a joint graduate program, courses can also be taken at The University of Texas Health Science Center at San Antonio (UTHSCSA). To enroll in UTHSCSA courses, students must register through the UTHSCSA Web site (www.uthscsa.edu). Any questions concerning registration at UTHSCSA should be directed to the BME Program Office at UTHSCSA. The required curriculum for all students in the Thesis Option is as follows:

- A. Regardless of their area of specialization, all students are required to take a total of 15.5 semester credit hours of Required Core Courses. The core courses are:

Required Core Courses offered at UTSA:

BME	6033	BME Engineering Analysis
BME	6703	Biomedical Imaging (Same as RADI 5015 at UTHSCSA.)

BME	6803	Biomechanics I
BME	6903	Biomaterials

Required Core Courses offered at UTHSCSA:

INTD	6002	Ethics in Research
ORTO	6004	Biology for Bioengineers
RADI	5015	Physics of Diagnostic Imaging I (Same as BME 6703.)

Upon approval of the Supervising Professor and the Program Director, students may substitute EGR 5093 (Special Topics in Engineering Analysis) for BME 6033 (BME Engineering Analysis).

- B. Research seminar. Registration in BME 6011 (or ORTO 6090 at UTHSCSA) is required for three semesters, in order to satisfy the requirements for the Master's degree program in Biomedical Engineering.
- C. A minimum of 6 semester credit hours of Elective Courses selected from the list below. Courses from this list may be taken with the approval of the Program Director, Supervising Professor, and course instructor.

UTSA Elective Courses:

BIO	5433	Neurophysiology
BIO	5483	Computational Neuroscience
BIO	5503	Sensory Physiology
BME	6093	Topics in Biomedical Engineering
BME	6203	Physiology for Engineers
BME	6213	Cellular Engineering
BME	6223	Transport Processes in Biological Systems
BME	6303	Computational Oncology and Cancer Treatment Simulations
BME	6313	Computational Bioengineering and Biomedicine
BME	6323	Bioinformatics
BME	6333	Stochastic Modeling in Bioengineering
BME	6343	Statistical Pattern Recognition and Data Mining in Biomedical Engineering
BME	6353	Computational Methods in Mass Spectrometry
BME	6363	Multiscale Computational Modeling of Biomedical Systems
BME	6523	Biological Laboratory Techniques in Biomedical Engineering
BME	6713	Biomedical Signal Processing
BME	6723	Bioinstrumentations
BME	6733	Fundamentals of Microfabrication and Application
BME	6743	Fundamentals of Biophotonics
BME	6753	Biosensors: Fundamentals and Applications
BME	6793	Topics in Image and Signal Processing
BME	6823	Biomechanics II
BME	6863	Mechanical Behavior of Living Tissues
BME	6893	Topics in Biomechanics
BME	6913	Biomaterials II
BME	6923	Tissue Engineering
BME	6933	Tissue-Biomaterials Interactions
BME	6943	Biomaterials & Cell Signaling
BME	6953	Biomaterials for Drug-Delivery/Pharmacology
BME	6963	Fundamentals to Polymer Science with Select Biomedical Applications
BME	6973	Current Analytical Tools for Biomaterials Characterizations
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	5243	Advanced Thermodynamics
ME	5413	Advanced Solid Mechanics
ME	5463	Fracture Mechanics
ME	5473	Viscoelasticity
ME	5483	Finite Element Methods
ME	5613	Advanced Fluid Mechanics
ME	5653	Computational Fluid Dynamics
ME	5713	Mechanical Behavior of Materials
ME	5743	Composite Materials
MOT	5163	Management of Technology
MOT	5243	Essentials of Project and Program Management
MOT	5253	Starting the High-Tech Firm
MOT	5313	Emerging Technologies
MOT	5323	Biotechnology Industry
STA	5103	Applied Statistics

UTHSCSA Elective Courses:

CSBL	5019	Gross Human Anatomy for Graduate Students
CSBL	5095	Experimental Design and Data Analysis
INTD	5000	Fundamentals of Biomedical Sciences
INTD	5005	Core Course I: Biochemistry
INTD	5006	Principles of Cellular and Molecular Biology
INTD	5007	Advanced Cell and Molecular Biology
INTD	5041	Neuroscience – Medical
INTD	5067	Introduction to Bioinformatics and Computational Biology
INTD	6033	Cell Signaling Mechanisms
MICR	5051	Introduction to Immunology
ORTO	6005	Biomaterials Surface Science
PHAR	5013	Principles of Pharmacology
PHYL	5013	Dental Physiology
PHYL	5045	Mammalian Physiology
PHYL	6091	Selected Topics of Physiology
RADI	6014	Physics of Dental Imaging
RADI	6016	Physics of Diagnostic Imaging II
RADI	6017	Neuroimaging Methods
RADI	6019	Medical Image Processing
RESD	6102	Biomaterials II

D. A minimum of 6 semester credit hours of biomedical engineering Master's Thesis Research is required.

The entire program of study must be recommended by the student's Master's Thesis Advisor, Master's Thesis Committee, and the COGS and must be submitted to the Dean of the Graduate School for approval. The courses taken by students are intended to focus and support the individual's mastery of his or her particular area of specialization.

Advancement to Candidacy. The student should seek recommendations from the COGS for advancement to candidacy. The COGS reserves the right to deny recommendation of the student's admission to Master's candidacy based on the student's academics and proposed research. Upon recommendation from the COGS, all students are admitted to candidacy after

successfully defending their proposed research, recommended by his/her Master's Thesis Committee, and approved by the Dean of the Graduate School. Students should also consult the University Master's Degree Regulations in Chapter 4 of this catalog for the other pertinent requirements.

Thesis Defense. A thesis, which is an original contribution to scholarship, based on independent investigation (graduate research) in the major area, is required of every candidate. The Master's thesis research will be conducted by the student under the guidance of the Supervising Professor and the advice of the Master's Thesis Committee. Prior to starting the thesis research, each student will submit a research proposal to the COGS for approval. The thesis will be the responsibility of the student and the Supervising Professor. Registration for thesis credit hours must be for a period of more than one semester. During each semester that a student receives advice and/or assistance from a faculty member or supervision by the Master's Thesis Committee or uses UTSA or UTHSCSA resources, he or she will be required to enroll for credit in the appropriate Master's degree course. The form and format of the thesis should follow the guidelines and rules already in effect at UTSA or UTHSCSA.

Composition of the Master's Thesis Committee. The Master's Thesis Committee is made up of at least four members. The committee should consist of the Supervising Professor, one BME Graduate Faculty member from UTSA, one BME Graduate Faculty member from UTHSCSA, and one external member. The student's thesis proposal and the proposed composition of the Master's Thesis Committee will be evaluated and approved by the COGS.

Final Oral Examination (Defense of Thesis). A satisfactory final oral examination is required for the approval of a thesis. Acceptance of the thesis will be contingent upon approval of the respective Master's Thesis Committee. The thesis defense consists of a seminar presentation by the candidate to the general public. A closed door examination by the Master's Thesis Committee follows and covers the general field of the thesis, and other parts of the student's program as determined by the respective committee. Members of the Master's Thesis Committee must be satisfied that the student has:

1. Completed the research approved by the Master's Thesis Committee.
2. Passed all examinations required by the COGS, including the successful defense of the thesis.
3. Completed the required coursework.
4. Completed a thesis that is an independent investigation in the biomedical engineering field and constitutes a contribution to the respective discipline.

Upon successful completion of the aforementioned requirements, the Master's Thesis Committee members will sign the approval forms for the Master's Thesis and make an official recommendation to the Graduate School of Biomedical Sciences at the UTHSCSA or to the Graduate School at UTSA that the Master's degree be awarded.

Degree Requirements and Program of Study – Nonthesis Option. All students enrolled in the Nonthesis Option will require approval from the Program Director and the student's Supervising Professor. Typically, a Master's degree (Nonthesis Option) program of study will consist of at least 34.5 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 transferring students, course credit allowed for transfer will be decided on a case-by-case basis by the Biomedical Engineering Committee on Graduate Studies (COGS). If recommended by the COGS, the request will then be submitted to the Dean of the Graduate School for approval. Since this is a joint graduate program, courses can also be taken at The University of Texas Health Science Center at San Antonio (UTHSCSA). To enroll in UTHSCSA courses, students must register through the UTHSCSA Web site (www.uthscsa.edu). Any questions concerning registration at UTHSCSA should be directed to the BME Program Office at UTHSCSA. The required curriculum for all BME students in the Nonthesis Option is as follows:

- A. All students are required to take a total of 16.5 semester credit hours of Required Core Courses. The core courses are:

Required Core Courses offered at UTSA:

BME	6033	BME Engineering Analysis
BME	6703	Biomedical Imaging (Same as RADI 5015 at UTHSCSA.)
BME	6803	Biomechanics I
BME	6903	Biomaterials
BME	6961	Comprehensive Examination

Required Core Courses offered at UTHSCSA:

INTD	6002	Ethics in Research
ORTO	6004	Biology for Bioengineers
RADI	5015	Physics of Diagnostic Imaging I (Same as BME 6703.)

Upon approval of the Supervising Professor and the Program Director, students may substitute EGR 5093 (Special Topics in Engineering Analysis) for BME 6033 (BME Engineering Analysis).

- B. Research seminar. Registration in BME 6011 (or ORTO 6090 at UTHSCSA) is required for three semesters, in order to satisfy the requirements for the Master's degree program in Biomedical Engineering.
- C. A minimum of 15 semester credit hours of Elective Courses selected from the list below. Courses from this list may be taken with the approval of the Program Director, Supervising Professor, and course instructor.

UTSA Elective Courses:

BIO	5433	Neurophysiology
BIO	5483	Computational Neuroscience
BIO	5503	Sensory Physiology
BME	6093	Topics in Biomedical Engineering
BME	6203	Physiology for Engineers
BME	6213	Cellular Engineering
BME	6223	Transport Processes in Biological Systems
BME	6303	Computational Oncology and Cancer Treatment Simulations
BME	6313	Computational Bioengineering and Biomedicine
BME	6323	Bioinformatics
BME	6333	Stochastic Modeling in Bioengineering
BME	6343	Statistical Pattern Recognition and Data Mining in Biomedical Engineering
BME	6353	Computational Methods in Mass Spectrometry
BME	6363	Multiscale Computational Modeling of Biomedical Systems
BME	6523	Biological Laboratory Techniques in Biomedical Engineering
BME	6713	Biomedical Signal Processing
BME	6723	Bioinstrumentations
BME	6733	Fundamentals of Microfabrication and Application
BME	6743	Fundamentals of Biophotonics
BME	6753	Biosensors: Fundamentals and Applications
BME	6793	Topics in Image and Signal Processing
BME	6823	Biomechanics II
BME	6863	Mechanical Behavior of Living Tissues
BME	6893	Topics in Biomechanics
BME	6913	Biomaterials II
BME	6923	Tissue Engineering
BME	6933	Tissue-Biomaterials Interactions
BME	6943	Biomaterials & Cell Signaling
BME	6953	Biomaterials for Drug-Delivery/Pharmacology
BME	6963	Fundamentals to Polymer Science with Select Biomedical Applications
BME	6973	Current Analytical Tools for Biomaterials Characterizations
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	5243	Advanced Thermodynamics
ME	5413	Advanced Solid Mechanics
ME	5463	Fracture Mechanics
ME	5473	Viscoelasticity
ME	5483	Finite Element Methods
ME	5613	Advanced Fluid Mechanics
ME	5653	Computational Fluid Dynamics
ME	5713	Mechanical Behavior of Materials
ME	5743	Composite Materials
MOT	5163	Management of Technology
MOT	5243	Essentials of Project and Program Management
MOT	5253	Starting the High-Tech Firm
MOT	5313	Emerging Technologies
MOT	5323	Biotechnology Industry
STA	5103	Applied Statistics

UTHSCSA Elective Courses:

CSBL	5019	Gross Human Anatomy for Graduate Students
CSBL	5095	Experimental Design and Data Analysis
INTD	5000	Fundamentals of Biomedical Sciences
INTD	5005	Core Course I: Biochemistry
INTD	5006	Principles of Cellular and Molecular Biology
INTD	5007	Advanced Cell and Molecular Biology
INTD	5041	Neuroscience – Medical
INTD	5067	Introduction to Bioinformatics and Computational Biology
INTD	6033	Cell Signaling Mechanisms
MICR	5051	Introduction to Immunology
ORTO	6005	Biomaterials Surface Science
PHAR	5013	Principles of Pharmacology
PHYL	5013	Dental Physiology
PHYL	5045	Mammalian Physiology
PHYL	6091	Selected Topics of Physiology
RADI	6014	Physics of Dental Imaging
RADI	6016	Physics of Diagnostic Imaging II
RADI	6017	Neuroimaging Methods
RADI	6019	Medical Image Processing
RESD	6102	Biomaterials II

Doctor of Philosophy Degree in Biomedical Engineering

A Doctor of Philosophy degree in Biomedical Engineering (BME) at The University of Texas at San Antonio (UTSA) is offered through a joint graduate program with The University of Texas Health Science Center at San Antonio (UTHSCSA). A matrix of academic tracks is offered based on segments of biomedical engineering and/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 the scientific literature, for formulating novel hypotheses, designing experimental protocols to test the hypotheses, interpreting their results and demonstrating their ability to make an original contribution to knowledge in the biomedical field.

The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations).

Admission Requirements. Students who hold an undergraduate or master's degree may apply to the program. The minimum requirements for admission to the Doctor of Philosophy in Biomedical Engineering degree program are described below. Note that admission is competitive and satisfying these requirements does not guarantee admission.

- 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, and physics prior to being admitted to the program. It is expected that these students will have B.S. degrees with emphasis in either engineering, physical science, or biological science disciplines. Students from nonengineering backgrounds are required to take selected fundamental engineering courses as a condition of acceptance.
- 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 recommended for transfer on a course-by-course basis to satisfy the formal coursework requirements of the doctoral degree.
- A satisfactory score, as evaluated by the Admissions 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). The applicant's performance on a standardized test will be considered in addition to other criteria, for admission or competitive scholarship awards and will not be used as the sole criterion for consideration of an applicant.
- Three letters of recommendation 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, and a statement of the applicant's research experience, interests, and goals. TOEFL scores are required for those applicants whose native language is not English.

Degree Requirements and Program of Study. Typically, a doctoral program of study will consist of at least 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, course credit allowed for transfer will be decided on a case-by-case basis by the Biomedical Engineering Committee on Graduate Studies (COGS). If recommended by the COGS, the request will then be submitted to the Dean of the Graduate School for approval. Since this is a joint graduate program, courses can also be taken at The University of Texas Health Science Center at San Antonio (UTHSCSA). To enroll in UTHSCSA courses, students must register through the UTHSCSA Web site (www.uthscsa.edu). Any questions concerning registration at UTHSCSA should be directed to the BME Program Office at UTHSCSA. The required curriculum for all students is as follows:

- A. Regardless of their area of specialization, all students are required to take a minimum of 24.5 semester credit hours of Required Core Courses. The core courses are:

Required Core Courses offered at UTSA:

BME	6033	BME Engineering Analysis
BME	6703	Biomedical Imaging (Same as RADI 5015 at UTHSCSA.)
BME	6803	Biomechanics I
BME	6903	Biomaterials

Required Core Courses offered at UTHSCSA:

CSBL	5019	Gross Human Anatomy for Graduate Students
		or
PHYL	5013	Dental Physiology
CSBL	5095	Experimental Design and Data Analysis

INTD	6002	Ethics in Research
ORTO	6003	Introduction to Clinical Practices
ORTO	6004	Biology for Bioengineers
RADI	5015	Physics of Diagnostic Imaging I (Same as BME 6703.)

Upon approval of the Supervising Professor and the Program Director, students may substitute EGR 5093 (Special Topics in Engineering Analysis) for BME 6033 (BME Engineering Analysis).

- B. Research seminar (BME 6011 or ORTO 6090 at UTHSCSA) is to be registered for during each Fall and Spring semester while in the BME Doctoral program. With the approval of the Program Director, Ph.D. students are not required to register for the seminar if they are in their fifth year of the program as a full-time student and have registered for the Fall and Spring semester seminars during the preceding four years.
- C. A minimum of 9 semester credit hours of Prescribed Elective Courses selected from the list below. Courses from this list may 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	6043	Critical Thinking & Writing for BME
BME	6093	Topics in Biomedical Engineering
BME	6203	Physiology for Engineers
BME	6213	Cellular Engineering
BME	6223	Transport Processes in Biological Systems
BME	6303	Computational Oncology and Cancer Treatment Simulations
BME	6313	Computational Bioengineering and Biomedicine
BME	6323	Bioinformatics
BME	6333	Stochastic Modeling in Bioengineering
BME	6343	Statistical Pattern Recognition and Data Mining in Biomedical Engineering
BME	6353	Computational Methods in Mass Spectrometry
BME	6363	Multiscale Computational Modeling of Biomedical Systems
BME	6523	Biological Laboratory Techniques in Biomedical Engineering
BME	6713	Biomedical Signal Processing
BME	6723	Bioinstrumentations
BME	6733	Fundamentals of Microfabrication and Application
BME	6743	Fundamentals of Biophotonics
BME	6753	Biosensors: Fundamentals and Applications
BME	6793	Topics in Image and Signal Processing
BME	6823	Biomechanics II
BME	6863	Mechanical Behavior of Living Tissues
BME	6893	Topics in Biomechanics
BME	6913	Biomaterials II
BME	6923	Tissue Engineering
BME	6933	Tissue-Biomaterials Interactions
BME	6943	Biomaterials & Cell Signaling
BME	6953	Biomaterials for Drug-Delivery/Pharmacology
BME	6963	Fundamentals to Polymer Science with Select Biomedical Applications
BME	6973	Current Analytical Tools for Biomaterials Characterizations
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	5243	Advanced Thermodynamics
ME	5413	Advanced Solid Mechanics
ME	5463	Fracture Mechanics
ME	5473	Viscoelasticity
ME	5483	Finite Element Methods
ME	5613	Advanced Fluid Mechanics
ME	5653	Computational Fluid Dynamics
ME	5713	Mechanical Behavior of Materials
ME	5743	Composite Materials
STA	5103	Applied Statistics

UTHSCSA Prescribed Elective Courses:

INTD	5000	Fundamentals of Biomedical Sciences
INTD	5005	Core Course I: Biochemistry
INTD	5006	Principles of Cellular and Molecular Biology
INTD	5007	Advanced Cell and Molecular Biology
INTD	5041	Neuroscience – Medical
INTD	5067	Introduction to Bioinformatics and Computational Biology
INTD	6033	Cell Signaling Mechanisms
MICR	5051	Introduction to Immunology
ORTO	6005	Biomaterials Surface Science
PHAR	5013	Principles of Pharmacology
PHYL	5045	Mammalian Physiology
PHYL	6091	Selected Topics of Physiology
RADI	6014	Physics of Dental Imaging
RADI	6016	Physics of Diagnostic Imaging II
RADI	6017	Neuroimaging Methods
RADI	6019	Medical Image Processing
RESD	6102	Biomaterials II

- D. A minimum of 9 semester credit hours of Free Electives may be selected from any graduate course offered at either UTSA or UTHSCSA with the approval of the Program Director, Supervising Professor, and course instructor.

Students are encouraged to consider elective courses that not only prepare them with skills in engineering and science, but also with their overall career objectives. Several courses offered in the UTSA College of Business serve as examples:

MOT	5163	Management of Technology
MOT	5243	Essentials of Project and Program Management
MOT	5253	Starting the High-Tech Firm
MOT	5313	Emerging Technologies
MOT	5323	Biotechnology Industry

- E. A minimum of 15 semester credit hours of Doctoral Dissertation, Research and Supervised Teaching is required.

The entire program of study must be recommended 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 taken by students are intended to focus and support the individual's mastery of his or her particular area of specialization.

Advancement to Candidacy. All students seeking a doctoral degree must be admitted to candidacy after passing a doctoral qualifying examination. Students should consult the University Doctoral Degree Regulations in Chapter 5 of this catalog for the other pertinent 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 basic knowledge necessary for research 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 BME faculty from both UTSA and UTHSCSA will be included. The QEC will administer the examination, evaluate the student's performance, and report its judgment to the Committee on Graduate Studies. A student is allowed to take the QEC twice. 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 Master's degree after completing additional prescribed courses and/or research approved by the Supervising Professor, Program Director and the COGS.

Doctoral Dissertation. A dissertation, which is an original contribution to scholarship, based on independent investigation (doctoral research) in the major area, is required of every candidate. The doctoral research will be conducted by the student under the guidance of the Supervising Professor and the advice of 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 dissertation credit hours must be for a period of more than one semester. During each semester 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 for credit in the appropriate dissertation course. The form and format of the dissertation should follow the guidelines and rules already in effect at UTSA or UTHSCSA.

Composition of the Dissertation Committee. The Dissertation Committee is made up of at least five members. The committee should consist of the Supervising Professor, one BME Graduate Faculty member from UTSA, one BME Graduate Faculty member from UTHSCSA, one member of the graduate faculty outside of the BME Graduate Faculty from either UTSA or UTHSCSA, 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.

Final Oral Examination (Defense of Dissertation). A satisfactory final oral examination is required for the approval of a dissertation. Acceptance of the dissertation will be contingent upon approval of the respective Dissertation Committee.

The dissertation defense will consist of a seminar presentation by the candidate to the general public. A closed door examination by the Dissertation Committee follows and covers the general field of the dissertation, and other parts of the student's program as determined by the respective committee. Members of the Dissertation Committee must be satisfied that the student has:

1. Completed the research approved by the Dissertation Committee.
2. Passed all examinations required by the COGS, including the successful defense of the dissertation.
3. Completed the required coursework.
4. Completed a dissertation that is an independent investigation in the biomedical engineering field and constitutes a contribution to the respective discipline.
5. Submitted an abstract for publication in Dissertation Abstracts International that meets with the approval of University requirements.

Upon successful completion of the aforementioned requirements, the Dissertation Committee members will sign the approval forms for the doctoral dissertation and make an official recommendation to the Graduate School of Biomedical Sciences at the UTHSCSA or to the Graduate School at UTSA that the Doctoral degree be awarded.

Students should note that the above is a summary of the requirements for the Doctoral degree and are advised to consult the University (UTSA) Doctoral Degree Regulations as well as the BME Student Handbook which contains details specific to the UTSA/UTHSCSA Joint Graduate Program in Biomedical Engineering.

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. (Same as ORTO 6002 at UTHSCSA.)

6011 Research Seminar

(1-0) 1 hour credit. Prerequisites: Graduate student standing; consent of instructor and the Graduate Advisor of Record. The seminar coordinator may require students to present their research. May be repeated for credit. The grade report for the course is either “CR” (satisfactory performance) or “NC” (unsatisfactory performance). (Formerly BME 5011 and BME 6991. Same as ORTO 6090 at UTHSCSA.)

6021-3 Supervised Teaching

1 to 3 hours credit. Prerequisites: Doctoral student standing; consent of the instructor and the Graduate Advisor of Record.

Supervised teaching of undergraduate or graduate students will be required for at least one semester. Students may be required to lecture at undergraduate courses or graduate courses in the field of their expertise. Students will work with the instructor of the course or with their research supervisor on the number of classes to be taught. (Same as ORTO 6071 at UTHSCSA.)

6033 BME Engineering Analysis

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of the instructor.

This course is designed to introduce students to advanced mathematical and numerical methods necessary to solve problems frequently encountered in biomedical engineering. Topics covered include vector differential and integral calculus, linear algebraic equations, and ordinary and partial differential equations. (Same as EGR 6013. Same as BME 6093 offered in Fall 2007. Credit can be earned for only one of the following: BME 6033, BME 6093 taken Fall 2007, or EGR 6013.)

6043 Critical Thinking & Writing for BME

(3-0) 3 hours credit. Prerequisites: Doctoral students who are either taking their qualifying examinations or have been admitted to candidacy; consent of the instructor and of the Graduate Advisor of Record.

This course introduces students to grant applications, manuscript writing, and provides the opportunity to learn through writing and critiquing research proposals, manuscripts, abstracts, and scientific presentations.

6051-3 Independent Study in Biomedical Engineering

1 to 3 hours credit. Prerequisites: Graduate standing; consent of the instructor and of 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 regular course offerings. May be repeated for credit on a different topic of study, but no more than 6 credit hours, regardless of discipline, will apply toward the degree.

6063 Introduction to Scientific Computing and Visualization

(3-0) 3 hours credit. Prerequisites: Graduate standing; consent of the instructor.

This is an introductory course covering the basic concepts and tools of scientific computing and visualization. It will cover basic UNIX operations (shell scripts and editors), UNIX tools (grep, awk, sed), basic visualization concepts and software tools (ParaView and VisIt). It will also cover parallel programming using Fortran/C/C++ with Message Passing Interface (MPI) and public domain libraries. (Credit can be earned for only one of the following: BME 6063, ME 4953 or ME 5013.)

6073 Professional Science Master's Practicum

3 hours credit. Prerequisites: Graduate standing and permission of the Program Director.
An internship in a Biomedical Engineering company. Students must have completed all required core courses and electives, and be in the writing phase of their thesis. May not be repeated for credit.

6093 Topics in Biomedical Engineering

(3-0) 3 hours credit. Prerequisites: Graduate standing; consent of the instructor and of the Graduate Advisor of Record. May be repeated for credit on a different topic of study.

6203 Physiology for Engineers

(3-0) 3 hours credit. Prerequisite: Permission of the instructor or completion of ORTO 6004 (UTHSCSA).
Designed to provide students with the essential graduate-level background for applications and practices of biomedical engineering. Integration of the nervous, skeletal, muscle, cardiovascular, and other systems from the sub-cellular to the whole-organism level will be emphasized.

6213 Cellular Engineering

(3-0) 3 hours credit. Prerequisites: Permission of the instructor and completion of ORTO 6004 (UTHSCSA).
This course will focus on the use of engineering skills and principles in the analysis and design of cellular function including protein engineering, enzyme kinetics, drug design, receptor-ligand interactions, cell signaling, metabolism, growth, adhesion and migration.

6223 Transport Processes in Biological Systems

(3-0) 3 hours credit. Prerequisites: Permission of the instructor and completion of ORTO 6004 (UTHSCSA).
This course will introduce the concepts of quantitative modeling of biological systems, particularly with respect to mass, momentum and energy transport, and reaction kinetics. Areas of study will include the use of conservation laws in quantifying cardiopulmonary, renal, and thermal systems of the human physiology, and also apply these principles in developing artificial and extracorporeal devices, drug delivery systems and pharmacokinetic analysis.

6303 Computational Oncology and Cancer Treatment Simulations

(3-0) 3 hours credit. Prerequisite: Completion of BME 6033 or permission of the instructor.
The objective of this course is to provide both engineering and medical students an introductory knowledge and skills of computational cancer biology, mathematical modeling and computer simulation, particularly in cancer diagnosis, treatment planning, image-guided control, and prognosis simulation. It will also cover basic methods in visualization and computational analysis of complex data.

6313 Computational Bioengineering and Biomedicine

(3-0) 3 hours credit. Prerequisite: Completion of BME 6033 or permission of the instructor.
The objective of this course is to provide both engineering and medical students an introductory knowledge and skills of mathematical modeling and computer simulation, particularly in bioengineering. The course will consist of three parts: theoretical background, computational methods, and practical applications. (Same as EGR 5023. Credit cannot be earned for both BME 6313 and EGR 5023.)

6323 Bioinformatics

(3-0) 3 hours credit. Prerequisites: Graduate standing and permission of the instructor.
This course is an introduction to algorithms and methods in bioinformatics, with special emphasis on computational molecular biology. Areas of study include fundamental topics such as sequence alignment, gene prediction, RNA secondary structure prediction, phylogenetic inference, gene regulation, microarray data analysis, and advanced topics such as biological network analysis and next-generation sequencing data analysis. (Same as CS 5263. Credit cannot be earned for both BME 6323 and CS 5263.)

6333 Stochastic Modeling in Bioengineering

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

This course deals with development and application of probabilistic and uncertainty quantification methods in engineering. In particular, it covers random variable definitions, probability distributions, distribution selection, functions of random variables, numerical methods including Monte Carlo sampling, First Order Reliability Methods, component and systems reliability, and decision process under uncertainty. (Same as ME 5543. Credit cannot be earned for both BME 6333 and ME 5543.)

6343 Statistical Pattern Recognition and Data Mining in Biomedical Engineering

(3-0) 3 hours credit. Prerequisites: Completion of BME 6333 and permission of the instructor.

This course introduces the fundamental theories and algorithms of statistical classification, regression, and clustering including Bayesian networks, k-nearest neighbor classifier, linear classifier, decision tree, kernel approach for classification and regression, k-means clustering, and hierarchical clustering. Applications to, among others, modeling and analysis gene regulation, cancer prognosis and diagnosis, and gene functions prediction will be discussed in detail.

6353 Computational Methods in Mass Spectrometry

(3-0) 3 hours credit. Prerequisites: Completion of BME 6333 and permission of the instructor.

This course will introduce basic computational processing methods of Mass Spectrometry (MS) for protein quantification and identification. Background topics includes protein, proteome, and proteomics; protein separation; protein digestion; peptide separation using HPLC; and introduction to Mass Spectrometry. The course will focus on computational methods for protein identification and characterization by MS; tandem MS or MS/MS analysis; de novo sequencing and database searching; and quantitative proteomics.

6363 Multiscale Computational Modeling of Biomedical Systems

(3-0) 3 hours credit. Prerequisites: Completion of EE 3413 or EE 5143 and permission of the instructor.

This course is an introduction to the mathematical modeling, simulation and analysis of biological systems focusing on the cardiovascular system. The proposed topics include: fundamental physical/biochemistry laws to model a biological system, current mathematical modeling methods, introduction to the cardiovascular system with respect to LV functions, cellular functions, and gene expressions, applications of the modeling methods to the cardiovascular system, simulation tools for biological systems, and stability analysis and parameter sensitivity analysis of mathematical models for biological systems. (Same as EE 5243 Topic 1. Credit cannot be earned for BME 6363 and EE 5243 on the same topic.)

6523 Biological Laboratory Techniques in Biomedical Engineering

(3-0) 3 hours credit. Prerequisites: Permission of the instructor and completion of ORTO 6004 (UTHSCSA).

Emphasis for this course will be on optical and fluorescence microscopy of mammalian cells and tissues using sterile technique. Common cell-biomaterial characterization techniques will be performed including live/dead analysis, apoptosis, and quantification of cell signaling markers using immunological and advanced fluorescence assays with practical applications to biomaterial design.

6703 Biomedical Imaging

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course will examine, from a systems perspective, the techniques used in a variety of medical imaging modalities, which include X-ray imaging, computed tomography (CT), magnetic resonance imaging (MRI), nuclear medicine (PET), ultrasound imaging, optical imaging and photoacoustic imaging. The fundamental principles and engineering underlying each imaging modality will be discussed and a performance analysis of each system will be examined. (Credit cannot be earned for both BME 6703 and RADI 5015 at UTHSCSA.) (Formerly titled "Biomedical Image Processing.")

6713 Biomedical Signal Processing

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

Theory and classification of biological signals such as EEG, EKG, EMG, etc. Data acquisition and analysis procedures for biological signals, including computer applications.

6723 Bioinstrumentations

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

This course will cover fundamental principles of bioinstrumentation used in clinical and research measurements. Topics include: principles of transducer operation, amplifiers and signal processing, recording and display. Overview of specific examples in optical sensors, biological sensors, MRI, ultrasound, pacemakers and defibrillators.

6733 Fundamentals of Microfabrication and Application

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

This course describes the science of miniaturization which is essential for nanotechnology development. Microfabrication techniques for micro-electro-mechanical systems (MEMS), bioMEMS, microfluidics, and nanomaterials and their applications in biomedical research will be covered.

6743 Fundamentals of Biophotonics

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

This course describes the fundamental principles of biophotonics and their wide range of applications in biomedical research. Topics will include fundamentals of light interactions with molecules, cells, and tissues, optical biosensing (fiber-optic biosensors, evanescent wave biosensors, surface plasmon resonance biosensors), optical imaging (transmission microscopy, fluorescence microscopy, confocal scanning microscopy, multiphoton microscopy, fluorescence lifetime imaging microscopy), flow cytometry, photodynamic therapy, laser tweezers and laser scissors, and nanotechnology for biophotonics.

6753 Biosensors: Fundamentals and Applications

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

This course will cover biosensing basics and in-depth view of device design and performance analysis. Topics include optical, electrochemical, acoustic, piezoelectric, and nano-biosensors. Emphasized applications in biomedical, environmental, and homeland security areas are discussed.

6793 Topics in Image and Signal Processing

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

May be repeated for credit on a different topic of study.

6803 Biomechanics I

(2-3) 3 hours credit. Prerequisites: BME 6033 and graduate standing.

Fundamental applications of engineering mechanics in studying and modeling fluid flow, tissues, organs, and the whole human body will be discussed. This course includes a laboratory. (Formerly BME 6833. Same as ME 6833. Credit can be earned for only one of the following: BME 6803, BME 6833, ME 5833, or ME 6833.)

6823 Biomechanics II

(3-0) 3 hours credit. Prerequisite: Graduate standing.

This course covers biomechanics of biological tissue deformation and their constitutive equations. Topics may include elasticity, viscoelasticity, deformation, stress analysis, strain measurement, stress and strain in organs. Tissues covered may include heart, blood vessels, cartilage, and bone.

6863 Mechanical Behavior of Living Tissues

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

Stress strain relationships, viscoelasticity, mechanical properties, and mechanical modeling of collagenous and mineralized human tissues will be addressed. (Formerly BME 6513. Credit cannot be earned for both BME 6863 and BME 6513.)

6893 Topics in Biomechanics

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

May be repeated for credit on a different topic of study. (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 the instructor.
Fundamentals of biomaterials science and engineering principles and concepts in repairing, replacing, and protecting human tissues and organs will be discussed. (Formerly BME 5903 and BME 6813. Same as ME 6813. Credit can be earned for only one of the following: BME 5903, BME 6903, BME 6813, ME 5813 or ME 6813.)
- 6913 Biomaterials II**
(3-0) 3 hours credit. Prerequisites: BME 5903 or BME 6903, and permission of the instructor.
Application of biomaterials in medicine and dentistry will be emphasized.
- 6923 Tissue Engineering**
(3-0) 3 hours credit. Prerequisite: Graduate standing.
This course is an introduction to the principles and current practice of tissue engineering endeavors. Strategies for choosing and using mammalian cells and scaffold biomaterials as well as select chemical and biophysical stimuli in order to obtain neotissue formation are reviewed in detail. Case studies are discussed to illustrate successful tissue engineering solutions of clinical problems pertinent to tissue regeneration. (Formerly BME 5923 and BME 6853. Credit can be earned for only one of the following: BME 5923, BME 6853, or BME 6923.)
- 6933 Tissue-Biomaterials Interactions**
(3-0) 3 hours credit. Prerequisite: Graduate standing.
This course is an introduction to biocompatibility with special emphasis on the interaction of proteins, cells and tissues with biomaterials. Blood-material interactions are reviewed in detail. Case studies of implants are discussed to illustrate biomaterial selection as a key aspect to successful design of implant materials and prosthetic devices.
- 6943 Biomaterials & Cell Signaling**
(3-0) 3 hours credit. Prerequisite: Graduate standing.
Develop current understanding of topics in cell receptors and signaling mechanisms with application for biomaterial design. Focus will emphasize receptor-ligand communication, methods of identification and quantification, and pathways involved for cell to material stress response.
- 6953 Biomaterials for Drug-Delivery/Pharmacology**
(3-0) 3 hours credit. Prerequisite: Graduate standing.
Provides conceptual understanding of therapeutic agents used to regulate physiological function of cells comprising organ systems with relevance to biomaterials. Interpretation of drug mechanisms at a molecular, cellular and tissue level. Traditional reviews of pharmacodynamics and pharmacokinetics will be addressed with particular application to biomaterial interaction and drug-delivery systems.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Approval of the Biomedical Engineering Committee on Graduate Studies to take the Comprehensive Examination.
Independent study course for the purpose of taking the Comprehensive Examination for M.S. students in the nonthesis option. May be repeated once if approved by the Biomedical Engineering Committee on Graduate Studies and if the student received an "unsatisfactory performance" on his/her previous attempt on 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).
- 6963 Fundamentals to Polymer Science with Select Biomedical Applications**
(3-0) 3 hours credit. Prerequisites: Graduate standing and BME 6903; or permission of the instructor.
This course introduces the fundamentals of polymer chemistry, characterization of the chemical and material properties, and determination of the biocompatibility of polymer formulations. Current applications of polymeric biomaterials in diagnostic and therapeutic devices, implants, tissue engineering and regenerative medicine are highlighted and discussed in detail.

6973 Current Analytical Tools for Biomaterials Characterizations

(3-0) 3 hours credit. Prerequisites: Graduate standing and BME 6903; or permission of the instructor.
This course introduces the fundamentals of biomaterials characterizations and its limitations.

6981,2,3,6 Master's Thesis Research

1, 2, 3, or 6 hours credit. Prerequisites: Master's student standing; consent of instructor and of Graduate Advisor of Record.

May be repeated for a maximum of 9 credit hours. (Formerly BME 5953,6.)

6993 Topics in Biomaterials

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

May be repeated for credit on a different topic of study.

7951,2,3,6 Doctoral Research

1, 2, 3, or 6 hours credit. Prerequisites: Doctoral student standing; consent of instructor and of Graduate Advisor of Record.

This course consists of independent, original research under the direction of a faculty advisor. May be repeated for a maximum of 18 credit hours. (Same as ORTO 6097 at UTHSCSA.)

7991,2,3,6 Doctoral Dissertation

1, 2, 3, or 6 hours credit. Prerequisites: Admission to Doctoral candidacy; consent of the Graduate Advisor of Record and Dissertation Advisor.

May be repeated for a maximum of 18 credit hours. (Same at ORTO 7099 at UTHSCSA.)

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 specialized knowledge in selected technical areas of Civil Engineering. The educational objective of this program is to produce graduates who are capable of research and professional practice in a specialized area of Civil Engineering, namely environmental engineering, geo-environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering. This program involves both coursework and a thesis and it is designed to provide exposure to research that could possibly lead to subsequent doctoral study.

Admission Requirements. For unconditional admission, applicants must satisfy the following requirements, in addition to the University-wide graduate admission requirements (refer to Chapter 1, Admission):

- 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 satisfactory score, as evaluated by the Civil Engineering Graduate Studies Committee, on the Graduate Record Examination (GRE);
- Test of English as a Foreign Language (TOEFL) minimum scores of 79 or 550 for Internet or paper versions, respectively;
- a statement of research/specialization interest; and
- a favorable recommendation by the Civil Engineering Graduate Studies Committee.

Degree Requirements. The minimum number of semester credit hours required for the degree is 30. At least 24 semester credit hours must be taken at UTSA. Elective courses may be chosen from the Department of Civil and Environmental Engineering (CEE) or outside the department, with approval from the CEE Graduate Studies Committee. In addition, 6 hours of undergraduate courses may be taken toward the course requirements if not previously taken and counted toward the student's undergraduate degree with the approval of the CEE Graduate Studies Committee. Any grade lower than "B" in a graduate course or in remedial coursework at the undergraduate level cannot be counted toward the coursework requirement. Each candidate is required to pass a thesis defense administered by his or her advisory committee.

Advisory Committee. Students must choose an Advisory Committee consisting of a chair and at least two additional graduate faculty members. Students must submit the names of their Advisory Committee to the CEE Graduate Studies Committee by the end of their first semester of study.

Program of Study	<u>Hours</u>
A. Degree Core Curriculum	6
CE 5043 Advanced Civil Engineering Statistics	
CE 5143 Numerical Methods in Civil Engineering	
B. Electives	18
C. CE 5983 Master's Thesis (includes thesis defense/seminar presentation)	6
Total semester credit hours required	30

Master of Civil Engineering Degree

The Master of Civil Engineering degree is designed to provide specialized knowledge in selected technical areas of Civil Engineering. The educational objective of this program is to produce graduates who are capable of professional practice in a specialized area of Civil Engineering, namely environmental engineering, geo-environmental engineering, geotechnical engineering, structural engineering, transportation engineering, and water resources engineering. It involves courses only and a seminar. It does not normally lead to subsequent doctoral study.

Admission Requirements. For unconditional admission, applicants must satisfy the following requirements, in addition to the University-wide graduate admission requirements (refer to Chapter 1, Admission):

- 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 satisfactory score, as evaluated by the Civil Engineering Graduate Studies Committee, on the Graduate Record Examination (GRE);
- Test of English as a Foreign Language (TOEFL) minimum scores of 79 or 550 for Internet or paper versions, respectively;
- a statement of specialization interest; and
- a favorable recommendation by the Civil Engineering Graduate Studies Committee.

Degree Requirements. The minimum number of semester credit hours required for the degree is 34. At least 24 semester credit hours must be taken at UTSA. Elective courses may be chosen from the Department of Civil and Environmental Engineering (CEE) or outside the department, with approval from the CEE Graduate Studies Committee. In addition, 6 hours of undergraduate courses may be taken toward the course requirements if not previously taken and counted toward the student's undergraduate degree with the approval of the CEE Graduate Studies Committee. Any grade lower than "B" in a graduate course or in remedial coursework at the undergraduate level cannot be counted toward the coursework requirement.

Each student has to give a seminar near the end of his or her program and he or she is expected to attend the seminars offered by other students. These seminars are administered by the Graduate Committee of the CEE Department.

Program of Study	<i>Hours</i>
A. Degree Core Curriculum	6
CE 5043 Advanced Civil Engineering Statistics	
CE 5143 Numerical Methods in Civil Engineering	
B. Electives	27
C. CE 5991 Graduate Seminar	1
Total semester credit hours required	34

Doctor of Philosophy Degree in Environmental Science and Engineering

The CEE Department offers the opportunity for advanced study and research leading to the Doctor of Philosophy degree in Environmental Science and Engineering. The educational objective of this program is to produce graduates who are capable of conducting original research in industry or academia as well as assuming a leadership role in their chosen employment field. This is a multidisciplinary program administered by the CEE Department. It encompasses faculty and facilities from the College of Sciences and the CEE Department, as well as individual faculty from other UTSA departments. Areas of research emphasis include water resources, environmental quality, environmental remediation, pollution control, conservation ecology, spatial analysis, remote sensing, cold regions environment and change and natural hazards. The Ph.D. degree 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 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations).

Admission Requirements. Applicants must satisfy the following requirements, in addition to satisfying the University-wide graduate admission requirements (refer to Chapter 1, Admission):

- a Bachelor of Arts or a 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 courses. The degree should be in biology,

ecology, environmental science, chemistry, geology, geography, environmental engineering, or other related scientific discipline. Exceptional applicants without a Master of Science may be considered for admission to the program on a case-by-case basis;

- three letters of recommendation from persons familiar with the applicant's academic potential;
- official Graduate Record Examination (GRE) scores;
- a letter of research/specialization interest; and
- a résumé/curriculum vitae.

Applications must be submitted to the UTSA Graduate School online at www.graduateschool.utsa.edu. Incomplete applications will not be considered. Acceptance to the program is decided by the Doctoral Studies Committee (DSC), comprised of graduate faculty members selected from the CEE Department and the College of Sciences. Full-time students accepted for the program are eligible to apply for financial support in the form of competitive teaching assistantships, research assistantships, or research fellowships.

Degree Requirements. The Doctoral program in Environmental Science and Engineering requires that students complete a minimum of 60 semester credit hours beyond the Master's degree. This coursework includes 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 3 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 prior to graduation. Any grade lower than "B" in graduate or remedial coursework at the undergraduate level does not count toward the 60 semester credit hours. Students can apply, with approval from the chair of their Dissertation Committee, 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 DSC.

15 semester credit hours of required electives are selected by the student with the approval of their Dissertation Committee. These elective courses may be offered by departments in the College of Sciences or the College of Engineering or by other departments at UTSA.

Dissertation Committee. Students must choose a Dissertation Committee consisting of a chair and at least four additional graduate faculty members. The committee must include a minimum of one faculty member from the CEE Department and one from the College of Sciences. Students must submit the names of their Dissertation Committee to the DSC Chair by the end of their second semester of study.

Program of Study

Hours

A. Degree Core Curriculum

12

Students must select four of the five core course options listed below:

CE	5613	Environmental Chemistry
CE	5623	Advanced Treatment Processes for Water Quality Control
CE	5043	Advanced Civil Engineering Statistics
		or
ES	5023	Environmental Statistics

one of the following:

CE	5203	Environmental Microbiology
ES	5063	Environmental Microbiology
ES	6213	Advanced Ecology

one of the following:

CE	6113	Global Change
ES	5043	Global Change

GEO	5043	Global Change	
GEO	5483	Environmental Hydrogeology	
B. Seminars			3
CE	6221	Graduate Seminar in Environmental Science and Engineering	
		or	
ES	5981	Graduate Seminar in Environmental Science and Engineering	
C. Doctoral Research and Dissertation			30
CE	7211-3	Doctoral Research	(15)
CE	7311-3	Doctoral Dissertation	(15)
		or	
ES	7211-3	Doctoral Research	(15)
ES	7311-3	Doctoral Dissertation	(15)
D. Electives			15
Total semester credit hours required			60

Advancement to Candidacy. Ph.D. students advance to candidacy after completing their written and oral qualifying examinations. First, students must complete the core curriculum courses and then take the written qualifying examination. Full-time students must take the written qualifying examination by the end of their second semester of study. Part-time students need to take the written qualifying examination at a time dictated by the DSC. The written qualifying examination may include questions from five core areas of environmental science and engineering, including hydrogeology, environmental statistics, biology, chemistry, and environmental engineering. This examination is administered by the DSC with input from the faculty participating in the program. The written qualifying examination tests the student's undergraduate background, their degree of understanding of the material presented in graduate courses, as well as their critical thinking and written communication skills. No more than two attempts to pass the written qualifying examination are permitted. Students who fail the written qualifying examination twice are terminated from the program.

Upon successful completion of the written qualifying examination, students are allowed to take Doctoral Research credit hours. Students must take their oral qualifying examination within two semesters after passing their written qualifying examination. The oral qualifying examination is a dissertation proposal defense. The dissertation proposal should describe the topic, the literature review, the proposed methodology and experimental approach, as well as highlight the novelty and potential contribution of the topic to the scientific field. The student's Dissertation Committee chair must approve the student's research proposal before scheduling the oral examination. Upon successful completion of the oral qualifying examination, students advance to Ph.D. candidacy and are allowed to take Doctoral Dissertation credit hours. No more than two attempts to pass the oral qualifying examination are permitted. Students who fail the oral qualifying examination twice are terminated from the program.

Results of the written and oral examinations must be reported to the DSC and the Dean of the Graduate School. Admission into the Doctoral program does not guarantee advancement to candidacy. After advancement to candidacy, the student's Dissertation Committee can be changed at the student's request and with the approval of the chair of the DSC.

Dissertation. Candidates must demonstrate their ability to conduct independent research by completing an original dissertation. The Dissertation Committee guides, critiques and finally approves the candidate's dissertation. The format of the dissertation must follow the doctoral degree regulations of the Graduate School as documented under Chapter 5 of this catalog.

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 a 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)

5013 Civil Engineering Systems Analysis

(3-0) 3 hours credit.

Systems approach to optimization and problem solving; operations research applications in civil engineering; mathematical modeling and analysis techniques including linear programming, dynamic programming, decision analysis and use of software to solve linear and nonlinear programming problems.

5023 Finite Element Methods

(3-0) 3 hours credit.

Derivation and computer implementation of the finite element method for the solution of civil engineering boundary value problems. (Same as ME 5483. Credit cannot be earned for both CE 5023 and ME 5483.)

5043 Advanced Civil Engineering Statistics

(3-0) 3 hours credit.

Statistical analysis methods include descriptive statistics, interval estimation and hypothesis testing, analysis of variance, design of experiments, regression analysis, and time series analysis. Additional topics covered include probabilistic methods, decision analysis and reliability analysis applied to civil engineering systems.

5103 Advanced Steel Design

(3-0) 3 hours credit.

Connection design, welded and bolted, moment-resistant connections, plate girders, column stability, bracing design, and seismic design of frames. (Formerly CE 5343 Topic 4: Advanced Steel Design. Credit cannot be earned for both CE 5103 and CE 5343 Advanced Steel Design.)

5123 Bridge Engineering

(3-0) 3 hours credit.

Design loads, load distribution, design of superstructures and substructures, and evaluation and load rating capacity of bridges. (Formerly CE 5343 Topic 8: Bridge Engineering. Credit cannot be earned for both CE 5123 and CE 5343 Bridge Engineering.)

5133 Advanced Reinforced Concrete

(3-0) 3 hours credit.

Curved beams, torsion design, retaining walls and shear walls, stairs, two-way slabs, yield-line theory, biaxial load on columns, slenderness effects, joint design, strut-and-tie methods, and concrete elasticity and failure criteria. (Formerly CE 5343 Topic 2: Advanced Reinforced Concrete Structures. Credit cannot be earned for both CE 5133 and CE 5343 Advanced Reinforced Concrete Structures.)

5143 Numerical Methods in Civil Engineering

(3-0) 3 hours credit.

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.

5153 Prestressed Concrete

(3-0) 3 hours credit.

Overview of prestressed concrete development; design properties of materials; analysis and design of pre-tensioned and post-tensioned concrete members; full and partial prestressing; serviceability and strength requirements, code criteria for prestressed continuous beams, statically indeterminate frames and other structures. (Formerly CE 5343 Topic 3: Prestressed Concrete. Credit cannot be earned for both CE 5153 and CE 5343 Prestressed Concrete.)

5203 Environmental Microbiology

(3-0) 3 hours credit.

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 ES 5063. Credit cannot be earned for both CE 5203 and ES 5063.)

5213 Industrial Waste Treatment

(3-0) 3 hours credit.

The major biological phenomena and processes used in environmental control. Fundamentals of microbiology and biochemistry as applied to wastewater treatment, drinking water treatment and hazardous waste remediation.

5293 Geographic Information Systems (GIS)

(3-0) 3 hours credit.

Introduces vector, raster and tabular concepts, emphasizing the vector approach. Topics include spatial relationships, map features, attributes, relational database, layers of data, data ingesting, digitizing from maps, projections, output, applications, and availability of public data sets. Focus will be placed on spatial/temporal data analyses using digitized maps and database information in an area of CE specialization.

5303 Hydrometeorology

(3-0) 3 hours credit.

The main objective of this course is to familiarize the student with the local and global distribution of freshwater. Conceptualizations of the water balance/budget are developed using principles of physical hydrology and meteorology. Emphasis will be on recent research and modern methods for data analysis and modeling. Real life events and phenomena will be discussed. In addition to the text, material will be presented from other sources. Guest instructors will give presentations on some case studies.

5403 Advanced Characterization of Highway Materials

(3-0) 3 hours credit.

Basic and advanced level of the fundamentals of material response to static and repeated loading; emphasis on the deformation and fatigue behavior of asphalt mixtures, constitutive modeling for mixtures, microstructure characterization for mixtures, nondestructive testing of pavements, asphalt binder characterization, unbound materials (base and sub-base materials) evaluation and characterization.

5423 Advanced Pavement Analysis and Design

(3-0) 3 hours credit.

Asphalt concrete and portland concrete pavement analysis and design. Layered elastic, nonlinear, and viscoelastic analysis. Slabs under environmental and traffic stresses. Software for layer analysis and slab analysis. AASHTO 1993 design method. Asphalt Institute and Portland Cement Association method. NCHRP 1-37A developed mechanistic-empirical design method. (Formerly CE 5513 Topic 5: Pavement Design. Credit cannot be earned for both CE 5423 and CE 5513 Pavement Design.)

5433 Advanced Geometric Design

(3-0) 3 hours credit.

Course deals with the geometric design of highways and streets. Topics include highway functions, design controls and criteria, elements of design, local roads and streets, freeways, and intersections. (Formerly CE 5513 Topic 6: Advanced Geometric Design. Credit cannot be earned for both CE 5433 and CE 5513 Advanced Geometric Design.)

5443 Pavement Management

(3-0) 3 hours credit.

Pavement evaluation and performance, evaluation of pavement distress condition surveys, evaluation of pavement roughness ride quality, skid resistance of pavements, evaluation of pavement structural capacity, maintenance and rehabilitation, prioritization and optimization of pavement maintenance, and rehabilitation needs. (Formerly CE 5513 Topic 4: Pavement Management Systems. Credit cannot be earned for both CE 5443 and CE 5513 Pavement Management Systems.)

- 5453 Transportation Engineering**
(3-0) 3 hours credit.
Study of the Highway Capacity Manual, traffic stream parameters and relationships, analytical techniques in traffic engineering such as capacity analysis, queuing theory, and traffic simulation. Design and operation of advanced traffic management systems including signalization, real-time motorist information, urban incident management, and ITS concepts. (Formerly CE 5513 Topic 8: Principles of Traffic Engineering. Credit cannot be earned for both CE 5453 and CE 5513 Principles of Traffic Engineering.)
- 5463 Foundation Engineering**
(3-0) 3 hours credit.
Shallow and deep foundations, including footings, slabs on-grade, cofferdams, sheet-pile walls, drilled shafts, piles and retaining walls. (Formerly CE 5353 Topic 2: Advanced Foundation Engineering. Credit cannot be earned for both CE 5463 and CE 5353 Advanced Foundation Engineering.)
- 5503 Advanced Open Channel Hydraulics**
(3-0) 3 hours credit.
Use of state-of-the-art computer models to evaluate gradually varied and unsteady flows. The concepts of dimensional analysis and similitude will also be addressed. (Formerly CE 5313 Topic 4: Advanced Hydraulic Engineering. Credit cannot be earned for both CE 5503 and CE 5313 Advanced Hydraulic Engineering.)
- 5613 Environmental Chemistry**
(3-0) 3 hours credit.
This course explores the chemistry of the environment, the chemistry underlying environmental problems and solutions to environmental problems. Emphasis is placed on thermodynamics and kinetics of reaction cycles; sources, sinks and transport of chemical species; and quantitation of chemical species. Examples are selected from the chemistry of natural and contaminated air, water, and soil.
- 5623 Advanced Treatment Processes for Water Quality Control**
(3-0) 3 hours credit.
Principles, modeling and design aspects of physical chemical treatment processes in drinking water, wastewater and groundwater remediation applications. (Formerly CE 5233 Topic 1: Physical and Chemical Treatment Operations. Credit cannot be earned for both CE 5623 and CE 5233 Physical and Chemical Treatment Operations.)
- 5703 Special Topics in Hydraulics and Hydrology**
(3-0) 3 hours credit.
Course deals with special aspects of hydraulics and hydrology. May be repeated for credit as topics vary.
- 5713 Special Topics in Structures**
(3-0) 3 hours credit.
Course deals with special aspects of structural engineering. May be repeated for credit as topics vary.
- 5723 Special Topics in Transportation**
(3-0) 3 hours credit.
Course deals with special aspects of transportation engineering. May be repeated for credit as topics vary.
- 5733 Special Topics in Environmental Engineering**
(3-0) 3 hours credit.
Course deals with special aspects of environmental engineering. May be repeated for credit as topics vary.
- 5743 Special Topics in Geotechnical Engineering**
(3-0) 3 hours credit.
Course deals with special aspects of geotechnical engineering. May be repeated for credit as topics vary.

5971,3 Special Project

1 or 3 hours credit.

Work carried out by nonthesis Master's students under the direction of their Advisory Committee to fulfill the project requirement of their degree. It may involve applied or theoretical work and a report documenting the findings.

5981-3 Master's Thesis

1 to 3 hours credit. Prerequisite: Approval of the student's Advisory Committee.

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. (Formerly CE 6983.)

5991 Graduate Seminar

(1-0) 1 hour credit.

Graduate seminar may be repeated for credit up to 3 semester credit hours.

6013 Hydrologic Modeling and Analysis

(3-0) 3 hours credit.

This course will address hydrological modeling (both theory and practical applications with focus on the latter) and related issues. Multimedia and advanced visualization will be used in lectures and class work. Most of the course is dedicated to hands-on, problem-oriented applications using a variety of practical techniques. It will provide students with the knowledge and tools necessary to use data derived from geographical information systems (GIS) to develop hydrologic estimates needed for different applications.

6103 Fate and Transport of Contaminants in the Environment

(3-0) 3 hours credit.

The course deals with the hydrodynamics of mixing and transport, as well as the interaction of mixing and various reaction rate processes. Applications in the course will include water and wastewater treatment, groundwater pollution, and transport and mixing in rivers, lakes and reservoirs. (Formerly CE 6053 Topic 1: Fate and Transport of Contaminants in Environmental System. Credit cannot be earned for both CE 6103 and CE 6053 Fate and Transport of Contaminants in Environmental System.)

6113 Global Change

(3-0) 3 hours credit.

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 ES 5043 and GEO 5043. Credit can be earned for only one of the following: CE 6113, ES 5043, or GEO 5043.)

6153 Advanced Mechanics and Modeling of Structural Materials

(3-0) 3 hours credit.

Constitutive models and strength theories for steel, concrete, reinforced concrete, soil and newly developed materials such as composite laminates. Theoretical basis of beam, plate (slab), shell, frame analysis of structural components. Buckling of beams, plates, shells and frames. Correlated design requirements based on strength and stability analysis of structural components implemented in the Steel Manual and the ACI code. Modeling of complicated, nonlinear behavior of structures under static and dynamic loadings, such as seismic, wind loading using finite element methods.

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.

6523 Advanced Surface Water Hydrology

(3-0) 3 hours credit.

Use of state-of-the-art computer models to study the rainfall-runoff process. Extreme events are the focus of the course (droughts and floods). Approaches to developing design precipitation events will also be presented. (Formerly CE 5313 Topic 3: Advanced Surface Water Hydrology. Credit cannot be earned for both CE 6523 and CE 5313 Advanced Surface Water Hydrology.)

6951-3 Independent Study

1 to 3 hours credit. Prerequisites: Written permission of the instructor and the student's Advisory Committee.

Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing 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.

6961 Comprehensive Examination

1 hour credit. Prerequisite: Approval of the student's Advisory Committee.

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).

7211-3 Doctoral Research

1 to 3 hours credit. Prerequisites: Admission to Doctoral candidacy, consent of the student's Dissertation Committee and consent of the DSC.

Research work carried out by the student under the supervision of their Dissertation Committee. May be repeated as necessary, but no more than 15 hours may be applied to the Doctoral degree.

7311-3 Doctoral Dissertation

1 to 3 hours credit. Prerequisites: Successful defense of the oral defense, consent of the student's Dissertation Committee and consent of the DSC.

Dissertation work carried out by the student under the supervision of their Dissertation Committee. 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. The program has emphases in five concentrations: Computer Engineering, Systems and Control, Digital Signal Processing, Communications, and Electronic Materials and Micro Devices. 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 evaluated 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 concentration core courses form the basis for the program:

EE	5123	Computer Architecture (Computer Engineering)
EE	5143	Linear Systems and Control (Systems and Control)
EE	5163	Digital Signal Processing (Digital Signal Processing)
EE	5183	Foundations of Communication Theory (Communications)
EE	5693	Dielectric and Optoelectronic Devices (Electronic Materials and Micro Devices)

B. The requirements for each option, with minimum semester-credit-hour requirements and their distribution, are as follows:

1. **Thesis Option:** The degree requires 30 semester credit hours including 24 technical course credits and 6 thesis credits identified as EE 6983 (Master's Thesis). At least 6 credits, including 3 credits of a core course, must be taken from courses in the student's concentration area. At least 3 credits of core courses must be taken outside the concentration area to satisfy the breadth requirement. No more than 4 credits of independent study should be included. Two (2) credit hours of EE 6991 (Research Seminar) are required. Up to 6 credits may be taken from other graduate courses including courses from outside electrical engineering with approval of the Electrical Engineering Graduate Program Committee. A current list of ECE Graduate Courses by Area is available in the department office. The distribution of required courses is given below.

<u>Thesis Option</u>	<u>Hours</u>
At least two courses from student's selected concentration	6
At least one core course from outside the concentration	3
Additional graduate electrical engineering courses (must include 2 credit hours of EE 6991 Research Seminar)	9
Other Electives (may be courses from outside electrical engineering)*	6
EE 6983 Master's Thesis	6
Minimum total semester credit hours required	30

*Chosen with approval of the Electrical Engineering Graduate Program Committee.

2. **Nonthesis Option:** The degree requires 33 semester credit hours of technical course credits. At least 9 credits, including 3 credits of a core course, must be taken from one area to establish the student's concentration. At least 6 credits of core courses must be taken outside the concentration area to satisfy the breadth requirement. No more than 2 credits of independent study should be included. One (1) credit hour of EE 6991 (Research Seminar) is required. Up to 6 credits may be taken from other graduate courses including courses from outside electrical engineering with approval of the Electrical Engineering Graduate Program Committee. A current list of ECE Graduate Courses by Area is available in the department office. The distribution of required courses is given below.

<u>Nonthesis Option</u>	<u>Hours</u>
At least three courses from student's selected concentration	9
At least two core courses from outside the concentration	6
Additional graduate electrical engineering courses (must include 1 credit hour of EE 6991 Research Seminar)	9
Other electives (may be courses from outside electrical engineering)*	6
EE 6943 Graduate Project	3
Minimum total semester credit hours required	33

*Chosen with approval of the Electrical Engineering Graduate Program Committee.

The Electrical Engineering (EE) courses are divided into five concentrations as follows:

Computer Engineering	EE 5103, EE 5113, EE 5123, EE 5193, EE 5223, EE 5323, EE 5423, EE 5453, EE 5463, EE 6323, EE 7423
Systems and Control	EE 5143, EE 5243, EE 5343, EE 5443, EE 5463, EE 6343, EE 7443
Digital Signal Processing	EE 5153, EE 5163, EE 5203, EE 5263, EE 5353, EE 6363, EE 7463
Communications	EE 5153, EE 5183, EE 5283, EE 5373, EE 5473, EE 5583, EE 6383, EE 7483
Electronic Materials and Micro Devices	EE 5293, EE 5403, EE 5413, EE 5503, EE 5593, EE 5693, EE 6493

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 a 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 evaluated 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. Two (2) semester credit hours of EE 6991 (Research Seminar) are required for the thesis option. One (1) semester credit hour of EE 6991 (Research Seminar) is required 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	5163	Digital Signal Processing
EE	5223	Topics in Digital Design (may be repeated when topic varies)
EE	5293	Topics in Microelectronics (may be repeated when topic varies)
EE	5323	Topics in VLSI Design (may be repeated when topic varies)
EE	5353	Topics in Multimedia Signal Processing (only Topic 1 and Topic 2)
EE	5423	Topics in Computer Architecture (may be repeated when topic varies)
EE	5453	Topics in Software Engineering (may be repeated when topic varies)
EE	6952	Independent Study (Topic must be computer engineering related. Needs approval from Computer Engineering Graduate Program Committee to be counted in Group B.)
EE	6991	Research Seminar

Group C. Free elective courses:

Any graduate-level electrical engineering course

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

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* (must include 2 credit hours of EE 6991 Research Seminar)	12
Elective courses from Group A or B or C*	6
EE 6983 Master's Thesis	6
Minimum total semester credit hours required	30

<i>Nonthesis Option</i>	<i>Hours</i>
Core courses (any two courses from Group A)	6
Additional computer engineering courses from Group A or B* (must include 1 credit hour of EE 6991 Research Seminar)	15
Elective courses from Group A or B or C*	9
EE 6943 Graduate Project	3
Minimum total semester credit hours required	33

*Chosen with approval of the Computer Engineering Graduate Program Committee.

Two (2) credit hours of EE 6991 (Research Seminar) are required for the thesis option. One (1) credit hour of EE 6991 (Research Seminar) is required for the nonthesis option.

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 five concentrations: Computer Engineering, Systems and Control, Digital Signal Processing, Communications, and Electronic Materials and Micro Devices. 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 2, General Academic Regulations, and Chapter 5, 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 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. The degree requires 90 semester credit hours beyond the bachelor's degree or 60 semester credit hours beyond the master's degree, passing of qualifying written and oral examinations, passing of a final oral examination, and acceptance of the Ph.D. dissertation. A two-semester residency research period is required. The course requirements include 54 technical course credits, 18 research credits identified as EE 7951-3 (Doctoral Research) and 18 dissertation credits identified as EE 7991-6 (Doctoral Dissertation). At least two courses must be taken from courses in two of the five concentration areas outside of the student's concentration, to complete the breadth requirement. No more than 6 credits of independent study should be included. One credit hour of EE 6971 (Special Problems) is required and up to three credit hours of EE 6971 or EE 6991 (Research Seminar) can be included. Up to 21 credits may be taken from other graduate courses including at least two courses from outside electrical engineering with approval of the Electrical Engineering Graduate Program Committee. A current list of ECE Graduate Courses by Area is available in the department office.

In general, undergraduate courses, general education courses, and prerequisites for graduate courses cannot be counted toward the total semester credit hours.

The entire program of study must be approved by the student's dissertation advisor, Dissertation Committee, and Graduate Program Committee prior to taking the Doctoral Qualifying Examination, 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 5 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 (listed below) in the graduate program. One of the three examinations must be from the area of specialization declared on the student's Program of Study.

EE	5123	Computer Architecture (Computer Engineering)
EE	5143	Linear Systems and Control (Systems and Control)
EE	5163	Digital Signal Processing (Digital Signal Processing)
EE	5183	Foundations of Communication Theory (Communications)
EE	5693	Dielectric and Optoelectronic Devices (Electronic Materials and Micro Devices)

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.)

5203 Multimedia Security Processing

(3-0) 3 hours credit. Prerequisite: EE 5163 or consent of instructor.

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. (Formerly EE 5353 Topic 1: Multimedia Signal Processing and Secure Communications. Credit cannot be earned for both EE 5203 and EE 5353 Multimedia Signal Processing and Secure Communications.)

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.

Topic 6: Advanced Topics of Embedded Control Systems. Study control techniques for embedded systems. Emphasis on hybrid system configuration, data acquisition, sensing and fundamentals for motion control system. Control schemes include NI DAQ based control and FPGA based control.

Topic 7: Advanced Power Electronics. DC-DC Converter dynamics and control, soft-switching operation, resonant power conversion, magnetics design, power factor correction, space vector PWM for inverters, matrix converter, other advanced converter topologies.

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, denoising 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 denoising; 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 Communications and GPS. Spread Spectrum (SS) Signals and Systems, Theory of Pseudorandom Sequences, Synchronization (Acquisition, Tracking), CDMA and Global Positioning Systems (GPS, A-GPS, Galileo), Simulations of SS Systems.

Topic 2: Simulation of Communication Systems. Simulation and implementation of representative communication systems, Automatic Gain Control (AGC), modulation/demodulation, pulse shaping and matched filters, carrier and time recovery, equalizers, fast correlators. Practical filter design for communication systems.

Topic 3: Wireless Communications and Networks. Communication systems, modulation techniques, Spread Spectrum, multiple access techniques, coding, error detection and correction, cellular systems, satellite systems, mobile communications, antennas, networks, TCP/IP suite, network protocols, Mobile IP, Wireless LANs, IEEE 802 standards.

Topic 4: Computer Network Security. Data communications, transmission systems, peer-to-peer protocols, local area networks, wide area networks, wireless networks, encryption techniques, symmetric ciphers, public key cryptography, Hash Functions, authentication, email security, IP security, Web security, wireless network security, firewalls.

Topic 5: 4G Wireless Communications. Concepts, theory, and modeling of 4G cellular systems in Matlab from the perspective of 3GPP Long Term Evolution (LTE). Coverage includes multi-carrier modulation, OFDM, fading, multiple antenna systems, diversity, MIMO spatial multiplexing and space time coding, adaptive modulation and coding, H-ARQ and system ergodic and outage capacity.

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 oversampling 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: 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 1: Digital Image Processing and EE 5363.)

Topic 2: Computer Vision and Application. Image perception, edge detection in the visual system, feature extraction, image enhancement, shape from shading, image segmentation by textural perception in humans, chain codes, B-splines, classification (SVM and others).

Topic 3: Biomedical Image Processing. This course will examine the fundamental and mathematical aspects of imaging; new algorithms and mathematical tools for the advanced processing of medical and biological images, which include fundamental methods of image reconstruction from their projections, multi-modal imaging, image analysis and visualization, image enhancement, image segmentation and gene-expression calculation, image parameter estimation and measurements, target location, texture synthesis and analysis, morphological image processing, processing of microarray images, processing of FISH stacked images, automated analysis of gene copy numbers by fluorescence in situ hybridization, image acquisition and processing in major imaging techniques, including magnetic resonance, 2-D and 3-D computed tomography, positron emission tomography, and others.

Topic 4: 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.

5403 Advanced Dielectric and Optoelectronic Engineering Laboratory

(1-6) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Topic 1: Principles of Dielectric Devices. Evaluation of capacitance devices, impedance frequency and temperature spectrum analysis, characterization of tunable dielectric microwave materials, characterization of piezoelectric devices.

Topic 2: Principles of Optical Components and Systems. Lasers, photo-detectors, phase locked interferometer, electro-optical and nonlinear optic devices, optical image processing, Fourier optics, holographic recording, and photorefractive storage.

May be repeated for credit as topics vary.

5413 Principles of Microfabrication

(1-6) 3 hours credit. Prerequisite: EE 3323.

Photolithography, thin film deposition, doping, wet patterning, plasma etching, thin film characterization. Students will fabricate simple microstructures such as coplanar waveguides, micro-fluidic devices and nano-powder silica films. (Same as ME 5803. Credit cannot be earned for both EE 5413 and ME 5803.)

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 codesign, 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.

5503 Introduction to Micro and Nanotechnology

(2-3) 3 hours credit. Prerequisite: Graduate standing or completion of or concurrent enrollment in EE 3323.

Survey of micro-fabrication techniques, scaling laws, mechanical, optical and thermal transducers, micro-fluidic applications, nanostructures. (Same as ME 5883. Credit cannot be earned for both EE 5503 and ME 5883.)

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.

5593 Topics in Advanced Sensor Devices

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Fundamentals of materials parameters to design nano-micro level pyroelectric, piezoelectric, ferroelectric and various electronic sensors and actuators. May be repeated for credit as topics vary.

5693 Dielectric and Optoelectronic Devices

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Introduction to functional dielectric and optoelectronic materials and devices. Dielectric polarization, relaxation, loss and breakdown properties. Mechanisms of piezoelectric, pyroelectric, and electro-optic properties of solid state materials.

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.

- 6493 Advanced Topics in Electronic Materials and Micro Devices**
(2-3) 3 hours credit. Prerequisite: EE 4543 or EE 5503 or EE 5693.
Topics to be selected from advanced sensors, actuators, engineered materials, device physics, microwave applications of MEMS structures, optoelectronics and photonics, microelectronic devices and nanotechnology. May be repeated for credit as topics vary.
- 6941-3 Graduate Project**
1 to 3 hours credit. Prerequisites: Consent of the Graduate Advisor of Record and Project 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. May be repeated for credit, but not more than 3 hours will apply to the Master's degree. Enrollment is required each term in which the project is in progress. (Formerly EE 6963.)
- 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.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisite: Consent of the Graduate Advisor of Record.
Independent study course for the purpose of taking the Comprehensive Examination. May be repeated for credit as many times as approved by the Graduate Studies 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 degree.
- 6981-3 Master's Thesis**
1 to 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**
(1-0) 1 hour credit.
Organized research lectures and seminar presentations. 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. May be repeated for credit, but not more than 2 hours will apply to the Master's degree, regardless of discipline.
- 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.

7951-3 Doctoral Research

1 to 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.

7991-6 Doctoral Dissertation

1 to 6 hours credit. Prerequisites: 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 Advanced Manufacturing and Enterprise Engineering

The Master of Science program in Advanced Manufacturing and Enterprise Engineering (M.S. in AMEE) is designed to offer an opportunity to individuals for continued study toward positions of leadership in industry and academia and for continuing technical education in a more specialized area. The graduates of this program will have the fundamental knowledge and understanding of the operational complexity of enterprises, manufacturing and business process improvement/optimization, and integrated product/process/system design. In addition, they will have the cognitive skills to critically evaluate the potential benefits of alternative manufacturing strategies; to use virtual/simulated platforms to facilitate and improve business processes; and to analyze enterprise systems as systems of interacting units, components, and subsystems. The program offers a thesis option and a nonthesis option.

Program Admission Requirements. Applicants must meet University-wide graduate admission requirements as outlined in Chapter 1, Admission, of this catalog. Applicants must also comply with general University regulations as outlined in Chapter 2, General Academic Regulations, and Chapter 4, Master's Degree Regulations, of this catalog. Due to the multidisciplinary nature of the program, the Graduate Advisor of Record (GAR), in consultation with the Mechanical Engineering Graduate Program Committee and the Department Chair, will evaluate each student's transcript and determine any course deficiencies on a case-by-case basis. Students admitted with course deficiencies will be required to take additional courses within their Program of Study to make up the deficiencies. Courses taken to make up deficiencies may not count toward the graduate degree. Applicants who have insufficient preparation for the program, or who lack certain supporting documentation, may be admitted on a conditional basis.

Degree Requirements. The minimum number of semester credit hours required for the degree is 30 for the thesis option and 33 for the nonthesis option.

A. 3 semester credit hours of a Required Mathematics Course selected from the following:

EGR	5023	Numerical Techniques in Engineering Analysis
EGR	5213	Topics in Systems Modeling
MAT	5603	Numerical Analysis
MS	5003	Quantitative Methods for Business Analysis
STA	5093	Introduction to Statistical Inference
STA	5103	Applied Statistics

B. 9 semester credit hours of Required Topical Courses selected from the following:

ME	5503	Lean Manufacturing and Lean Enterprises
ME	5563	Computer Integrated Manufacturing
ME	5583	Advanced Enterprise Process Engineering
ME	5603	Advanced Manufacturing Systems Engineering

C. Degree candidates must complete the following course requirements for one of the degree options:

<u>Thesis Option</u>	<u>Hours</u>
Required Mathematics Course	3
Required Topical Courses	9
Prescribed Electives	6
ME 6953 Independent Study	6
ME 6983 Master's Thesis	6
Minimum total semester credit hours required for Thesis Option	30

<u>Nonthesis Option</u>	<u>Hours</u>
Required Mathematics Course	3
Required Topical Courses	9
Prescribed Electives	15
ME 5973 Special Project	6
Minimum total semester credit hours required for Nonthesis Option	33

Prescribed Electives

CS	5233	Artificial Intelligence
CS	5253	Expert Systems
CS	5623	Simulation Techniques
EE	5143	Linear Systems and Control
EE	5243	Topics in Systems and Control
EE	5343	Intelligent Control and Robotics
EE	5413	Principles of Microfabrication
EGR	5233	Advanced Quality Control
EGR	5613	New and Emerging Technologies
IS	5043	Analysis and Design of Information Systems
IS	5143	Information Technology
IS	6433	Supervisory Control and Data Acquisition
ME	5113	Advanced Systems Dynamics and Control
ME	5143	Advanced Dynamics
ME	5503	Lean Manufacturing and Lean Enterprises
ME	5563	Computer Integrated Manufacturing
ME	5573	Facilities Planning and Design
ME	5583	Advanced Enterprise Process Engineering
ME	5593	Advanced Topics in Manufacturing and Enterprise Engineering
ME	5603	Advanced Manufacturing Systems Engineering
ME	6563	Flexible Automation and Manufacturing Systems
ME	6573	Robotics Design and Analysis
MOT	5163	Management of Technology
MOT	5233	Advanced Topics in Project Management
MOT	5313	Emerging Technologies
MS	5003	Quantitative Methods for Business Analysis
MS	5023	Decision Analysis and Production Management
MS	5343	Logistics Systems Management
MS	5393	Topics in Production Operations Management
MS	5453	Management and Control of Quality
MS	5483	Operations Research Methods in Statistics
STA	5073	Methods of Statistics
STA	5093	Introduction to Statistical Inference
STA	5103	Applied Statistics
STA	5803	Process Control and Acceptance Sampling

Students in the nonthesis option are advised throughout their program by the GAR. Students in the thesis option, upon completion of the first 9 semester credit hours of their program, must select a Thesis Advisor from the program's contributing faculty members and obtain the faculty member's consent to serve in this capacity. After this point, the student's Thesis Advisor assumes the role of the student's advisor.

Upon completion of 18 credit hours (typically the end of the second semester), students in the thesis option are expected to form a Thesis Committee in consultation with their Thesis Advisor. In addition to the Thesis Advisor, the Thesis Committee must include two additional faculty members who are also members of the UTSA Graduate Faculty. Thesis option students are expected to defend their research work during their last semester (i.e., completion of 30 semester credit hours).

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 doctoral studies and leadership roles in government, industry, or research institutions. The program offers thesis and nonthesis options.

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 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 or relevant coursework.

Applicants may be admitted on a conditional basis as determined by the Graduate Committee of the Department. 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. Undergraduate courses listed as deficiencies do not count toward the graduate degree. Other applicants who wish to continue their education in an area of Mechanical Engineering but do not intend to pursue a Master of Science degree in Mechanical Engineering may seek admission as special graduate students.

Degree Requirements. The minimum number of semester credit hours required for the degree is 30 for the thesis option and 33 for the nonthesis option.

A. 3 semester credit hours of a required mathematics course:

EGR 6013 Analytic Techniques in Engineering Analysis

B. Degree candidates must complete two core courses selected from the following list:

ME 5113 Advanced Systems Dynamics and Control
 ME 5243 Advanced Thermodynamics
 ME 5413 Advanced Solid Mechanics
 ME 5613 Advanced Fluid Mechanics

C. Degree candidates must complete the following course requirements for one of the degree options:

<u>Thesis Option</u>	<u>Hours</u>
Required mathematics course	3
Core courses	6
Designated electives (with approval of the student's committee chair)	15
ME 6983 Master's Thesis	6

Minimum total semester credit hours required 30

<u>Nonthesis Option</u>	<u>Hours</u>
Required mathematics course	3
Core courses	6
Designated electives (with approval of the Graduate Advisor of Record)	21
ME 5973 Special Project	3

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 and chaired by a full-time graduate faculty member. A successful thesis defense satisfies the University's comprehensive examination requirement.

Students in the thesis option must select a Thesis Advisor within the first 9 semester credit hours of coursework and form a Thesis Committee with a minimum of three faculty members within the first 18 semester credit hours of coursework. Within the

first 9 hours of coursework, students in this option must meet with the Thesis Advisor to develop their program of study. New students who have not selected a Thesis Advisor will be advised by the Graduate Advisor of Record.

Students seeking the nonthesis option must develop their program of study in consultation with the Graduate Advisor of Record within the first 9 semester credit hours of coursework. Nonthesis option students are required to complete a special project in consultation with a graduate faculty member. The project must meet with the approval of the Graduate Committee.

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 Systems Dynamics and Control

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Dynamic modeling of mechanical and multi-energy domain systems; state-space and frequency-domain analysis of dynamic systems; feedback control systems; multivariable state-feedback control; principles of controllability, observability, stability; computer-based simulation system dynamics. (Formerly titled "Advanced Controls.")

5143 Advanced Dynamics

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering 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: Graduate standing in engineering or consent of instructor.

Matrix methods for analysis of dynamics of complex structures, computer solutions, systems identifications, and experimental modal analysis.

5183 Advanced Mechanical Vibration

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering 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: Graduate standing in engineering or consent of instructor.

Concepts and postulates of macroscopic thermodynamics; formulation of thermodynamic principles; exergy stability of thermodynamic systems, principles of irreversible thermodynamics, chemical equilibria.

5263 Combustion

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

5273 Alternative Energy Sources

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Solar, nuclear, wind, hydrogen, and geothermal energy sources. Resources, production, utilization, economics, sustainability, and environmental considerations.

- 5283 Power Plant System Design**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
Application of thermodynamics and fluid mechanics to the design of vapor and gas-turbine power plant systems including boilers, condensers, turbines, pumps, compressors, cooling towers, and alternative energy power plants.
- 5303 Advanced Heat and Mass Transfer**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
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.
- 5343 Convection**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
Derivation of equations of convection of mass, momentum, and energy; scale analysis; boundary layer solutions; classical, laminar convection problems; turbulent convection; natural convection.
- 5353 Radiation**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
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: Graduate standing in engineering or consent of instructor.
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: Graduate standing in engineering or consent of instructor.
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. Prerequisite: Graduate standing in engineering or consent of instructor.
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: Graduate standing in engineering or consent of instructor.
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. (Same as CE 5023. Credit cannot be earned for both ME 5483 and CE 5023.)
- 5493 Fundamentals of Robotics**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
Theoretical and analytic developments, Denavit-Hartenberg parameters, quaternions, state-space, linear and nonlinear analysis, classical and modern methods of mechanics, serial manipulators, parallel manipulators, and controls.

5503 Lean Manufacturing and Lean Enterprises

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Methodologies for transforming an enterprise into a lean enterprise. Topics include Lean Manufacturing basics and tools; Lean Implementation Guidelines; Lean Metrics and Performance Measures; Lean Extended Enterprise; Six-Sigma; and Lean Supply Chain Design and Management. Hands-on applications include lean simulation games and various Web-based applications.

5513 Advanced Mechanism Design

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

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 3823 and ME 4543, or their equivalents.

Advanced problems in design of cam follower systems, gear trains and spur, helical, bevel, and worm gears.

5563 Computer Integrated Manufacturing

(3-1) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Advanced concepts and models related to computer-aided design, computer-aided process planning, computer-aided manufacturing, production planning and scheduling, and manufacturing execution systems. Laboratory work includes computer-aided applications and programming of automated production equipment.

5573 Facilities Planning and Design

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Advanced concepts and fundamentals essential to understand, analyze, and solve problems related to manufacturing plant layout and material handling system selection. Topics include Product, Process, and Schedule Design; Flow, Space, and Activity Relationships; Material Handling; Layout Planning Models and Design Algorithms; and Warehouse Operations. The subjects included in this course are organized around integrated product, process, and manufacturing system design principles.

5583 Advanced Enterprise Process Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Concepts, methodologies, and tools for the design, engineering and continuous improvement of manufacturing systems and enterprise operations. Topics include Six Sigma for Process Improvement and Design, Lean Systems, Performance Evaluation, and other contemporary enterprise process engineering approaches.

5593 Advanced Topics in Manufacturing and Enterprise Engineering

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Current topics in the manufacturing engineering area. May be repeated for credit as topics vary.

- 5603 Advanced Manufacturing Systems Engineering**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
Design, planning, scheduling, and control of manufacturing systems with emphasis on information flow and decision-making. After introducing students to system simulation, simulation models of manufacturing systems are developed and evaluated in terms of system performance under different production planning and control policies. Contemporary manufacturing topics and research areas are emphasized.
- 5613 Advanced Fluid Mechanics**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
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: Graduate standing in engineering or consent of instructor.
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.
- 5703 Advanced Enterprise Systems Engineering**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
Theory and applications of lean manufacturing and six-sigma to enterprise functions beyond production shop floor, with focus on lean product and process development, lean costing, and integration of IT and ERP systems to sustain continuous improvement. (Credit cannot be earned for both ME 5703 and ME 5583 taken prior to Fall 2011.)
- 5713 Mechanical Behavior of Materials**
(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.
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. Prerequisite: Graduate standing in engineering or consent of instructor.
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.)
- 5803 Principles of Microfabrication**
(1-6) 3 hours credit. Prerequisite: EGR 3323 or consent of instructor.
Photolithography, thin film deposition, doping, wet patterning, plasma etching, thin film characterization. Students will fabricate simple microstructures such as coplanar waveguides, micro-fluidic devices and nano-powder silica films. (Same as EE 5413. Credit cannot be earned for both ME 5803 and EE 5413.)
- 5883 Introduction to Micro and Nanotechnology**
(2-3) 3 hours credit. Prerequisite: Graduate standing or completion of or concurrent enrollment in EE 3323.
Survey of micro-fabrication techniques, scaling laws, mechanical, optical and thermal transducers, micro-fluidic applications, and nanostructures. (Same as EE 5503. Credit cannot be earned for both ME 5883 and EE 5503.)

5963 Topics in Bioengineering

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

Topics may include: biomechanics, biological systems, biosolid and biofluid, transport phenomena, biomaterials, medical devices, and medical imaging. 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 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. The course requires an oral presentation of the work done at the end of the semester. 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.

6563 Flexible Automation and Manufacturing Systems

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

This course focuses on major integration issues related with flexible manufacturing systems and their components. Introduces mathematical models related to design, planning, scheduling, and control of flexible manufacturing systems. Contemporary manufacturing topics and research areas are emphasized.

6573 Robotics Design and Analysis

(3-0) 3 hours credit. Prerequisites: ME 5113 and ME 5143.

Serial manipulator design and controls; electromechanical issues at the actuator level; analytic modeling and synthesis techniques with emphasis on the influence of sensors, machine vision, and control at the actuator-level and robot system designs.

6813 Biomaterials

(3-0) 3 hours credit. Prerequisite: Graduate standing in engineering or consent of instructor.

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. Prerequisite: Graduate standing in engineering or consent of instructor.

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.

6981-3 Master's Thesis

1 to 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

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; indigenous and environmental politics in lowland and Andean South America; and medical anthropology of the Border region.

Program Admission Requirements. Applicants for admission to the M.A. program must satisfy all University-wide graduate admission 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 61 and 100 (Internet version). See Chapter 1, Admission, of this catalog for details.

Degree Requirements. The minimum number of semester credit hours required for this degree is 33 (with 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	Theory in Cultural 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 examination (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 thesis research and writing.
- F. 6 semester credit hours of ANT 6983 Master's Thesis.

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. Students will develop empirical understandings of how humans culturally construct and organize past and present environments; how power relations are embedded in these activities; and the impact social and physical environments have upon human and nonhuman primates.

The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations).

Program Admission Requirements. Applicants for admission to the Ph.D. program in Anthropology must satisfy all University-wide graduate admission 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 550 and 600 (paper version) or 79 and 100 (Internet version). See Chapter 1, 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 organized coursework 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. 18 semester credit hours of Foundational Courses:

ANT	5023	History, Method, and Theory of Archaeology
ANT	5033	Theory in Cultural Anthropology
ANT	5073	Advanced Biological Anthropology
ANT	5583	Teaching 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 other analytical techniques

C. 18 semester credit hours of Designated Elective courses, distributed as follows:

1. 6 semester credit hours of Theory Electives selected from the following:

ANT	5283	Hunters and Gatherers
ANT	5483	Landscape and Settlement
ANT	5573	Anthropology and Science
ANT	5613	Seminar in Resource Frontiers
ANT	5643	Primates in Ecological Communities
ANT	6133	Seminar in Medical Anthropology
ANT	6233	Topics in the Anthropology of Complex Societies
ANT	6643	Seminar in Culture and Economy
ANT	6713	Topics in Primatological Research
ANT	6853	Topics in Human Evolution
ANT	6903	Anthropology of Gender

2. 9 semester credit hours of Applied and Area Electives selected from the following:

ANT	5043	Seminar in Laboratory Methods in Anthropology
ANT	5413	Seminar in the Prehistory of Texas and Adjacent Areas
ANT	5453	Seminar on the Archaeology of the American Southwest and Adjacent Regions
ANT	5556	Field Course in Archaeology
ANT	5563	Seminar in Andean Archaeology and Ethnography
ANT	5603	Ancient Civilizations
ANT	5623	Archaeology of Mexico
ANT	5633	Peoples of Mexico and Central America since 1492
ANT	6213	Topics in the Anthropology of Native North America
ANT	6223	The Archaeology of Household and Residence
ANT	6503	Seminar in Cultural Resource Management
ANT	6513	Maya Civilization
ANT	6653	Spatial Techniques in Anthropology

ANT	6663	Research Methods in Ecological Anthropology
ANT	6723	Seminar in Culture, Environment, and Conservation
ANT	6803	Medical Ecology
ANT	6823	Human-Animal Relations
ANT	6863	Evolution of Human Diet
ANT	6873	Energy, the Brain and the Gut in Primate and Human Evolution
ANT	6923	Conservation of Primates and Other Threatened Species
ANT	6973	Special Problems

3. 3 semester credit hours of coursework outside the student's area of concentration
- D. 9 semester credit hours of Free Elective courses chosen in consultation with the student's advisor. If students wish to take free elective courses outside the Department, they must first seek approval from the Graduate Program Committee.
- E. 3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of the qualifying examination and nearing the completion of organized coursework)
- 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 an Advisory Committee, which needs to be approved by the Ph.D. Graduate Advisor of Record, 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 lay the groundwork for subsequent dissertation research.

Earning a Master's Degree. Students who pass their qualifying examinations will be awarded the M.A. degree, and will be given permission to work toward completion of doctoral requirements. Students who fail their qualifying examinations may be given one of two options by their Advisory Committees. Those options are: permission to retake all or portions of the examination; or, permission to pursue a terminal M.A. degree according to the requirements of that degree program.

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. Students are required to produce a dissertation proposal that will be submitted to their Advisory Committee for review. This will occur following successful completion of the qualifying examination, and as students near completion of required coursework (51 semester credit hours). Students will enroll in 3 credit hours of ANT 7003 (Dissertation Proposal), in order to conduct preliminary research and write a successful proposal. Students must orally defend the proposal in order to qualify for doctoral degree candidacy.

Dissertation Committee. Following successful defense of the dissertation proposal, 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 5, Doctoral Degree Regulations, for further information on requirements of committee composition).

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, passing the qualifying examination, passing a foreign language examination or demonstrating statistical or computer competency, as applicable, submitting and successfully defending the dissertation proposal, and forming a Dissertation Committee approved by the University.

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 5, Doctoral Degree Regulations, for further information).

Program of Study for Students Admitted With a Master's Degree

Students who are admitted into the Doctoral Program with acceptable Master's degrees from accredited institutions may receive approval to transfer up to 30 hours of their Master's-level coursework. Outside coursework must be approved 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. 6 semester credit hours of Doctoral Core Courses:

ANT	6603	Ecological Anthropology
ANT	6703	Human Population Ecology

B. A minimum of 15 semester credit hours of coursework chosen in consultation with the Graduate Program Committee from the following domains:

1. Foundational Courses:

ANT	5023	History, Method, and Theory of Archaeology
ANT	5033	Theory in Cultural Anthropology
ANT	5073	Advanced Biological Anthropology
ANT	5583	Teaching 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 other analytical techniques

2. Elective courses, distributed among the following three categories:

Theory Electives

ANT	5283	Hunters and Gatherers
ANT	5483	Landscape and Settlement
ANT	5573	Anthropology and Science
ANT	5613	Seminar in Resource Frontiers

ANT	5643	Primates in Ecological Communities
ANT	6133	Seminar in Medical Anthropology
ANT	6233	Topics in the Anthropology of Complex Societies
ANT	6643	Seminar in Culture and Economy
ANT	6713	Topics in Primatological Research
ANT	6853	Topics in Human Evolution
ANT	6903	Anthropology of Gender

Applied and Area Electives

ANT	5043	Seminar in Laboratory Methods in Anthropology
ANT	5413	Seminar in the Prehistory of Texas and Adjacent Areas
ANT	5453	Seminar on the Archaeology of the American Southwest and Adjacent Regions
ANT	5556	Field Course in Archaeology
ANT	5563	Seminar in Andean Archaeology and Ethnography
ANT	5603	Ancient Civilizations
ANT	5623	Archaeology of Mexico
ANT	5633	Peoples of Mexico and Central America since 1492
ANT	6213	Topics in the Anthropology of Native North America
ANT	6223	The Archaeology of Household and Residence
ANT	6503	Seminar in Cultural Resource Management
ANT	6513	Maya Civilization
ANT	6653	Spatial Techniques in Anthropology
ANT	6663	Research Methods in Ecological Anthropology
ANT	6723	Seminar in Culture, Environment, and Conservation
ANT	6803	Medical Ecology
ANT	6823	Human-Animal Relations
ANT	6863	Evolution of Human Diet
ANT	6873	Energy, the Brain and the Gut in Primate and Human Evolution
ANT	6923	Conservation of Primates and Other Threatened Species
ANT	6973	Special Problems

Free Electives

If students wish to take free elective courses outside the Department (not to exceed 9 semester credit hours), they must first seek approval of the Graduate Program Committee.

C. 3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of the qualifying examination and nearing the completion of organized coursework)

D. 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 required Doctoral Core and Foundation courses. At least two months prior to taking the qualifying examination, the student and the Supervising Professor will select an Advisory Committee, which needs to be approved by the Ph.D. Graduate Advisor of Record, 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. Students are required to produce a dissertation proposal that will be submitted to their Advisory Committee for review. This will occur following successful completion of the qualifying examination, and as students near completion of required coursework (51 semester credit hours). Students will enroll in 3 credit hours of ANT 7003 (Dissertation Proposal), in order to conduct preliminary research and write a successful proposal. Students must orally defend the proposal in order to qualify for doctoral degree candidacy.

Dissertation Committee. Following successful defense of the dissertation proposal, 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 5, Doctoral Degree Regulations, for further information on requirements of committee composition).

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, passing the qualifying examination, passing a foreign language examination or demonstrating statistical or computer competency, as applicable, submitting and successfully defending the dissertation proposal, and forming a Dissertation Committee approved by the University.

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 5, 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 Theory in Cultural Anthropology

(3-0) 3 hours credit.

This course surveys the main conceptual, methodological, and theoretical developments in cultural anthropology. (Formerly titled "Paradigms of Americanist Anthropology.")

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.

5563 Seminar in Andean Archaeology and Ethnography

(3-0) 3 hours credit.

This seminar focuses on Andean anthropology from the perspective of archaeology, ethnology and ethnohistory. Topics include the development of civilizations such as Tiwanaku and the Inka, the Colonial period, and the politics of indigenism and the state. May be repeated for credit when topics vary.

5573 Anthropology and Science

(3-0) 3 hours credit.

This course examines anthropology's historical and ongoing relationship to science, scientific theory and the ethnography of science. Attention is paid to methodological, epistemological and ontological debates as they inform current practices.

5583 Teaching Anthropology

(3-0) 3 hours credit.

This course provides students with the opportunity to examine key pedagogical issues that instructors confront in the construction and implementation of a semester-long undergraduate course. Emphasis will be placed on discipline-specific concerns and approaches to teaching. Basic areas of exploration include: fundamentals of putting together a class; educational technology; pedagogical theory and practice; and consideration of changes in higher education and the nature of the job market for academics.

5603 Ancient Civilizations

(3-0) 3 hours credit.

This course presents a global survey of the development of the world's ancient civilizations, beginning with the transition to food-producing economies. The case studies include civilizations of both the New World (Maya, Teotihuacan, Tiwanaku, Inka) and the Old World (Mesopotamia, Indus Valley, Egypt, China).

- 5613 Seminar in Resource Frontiers**
(3-0) 3 hours credit.
This seminar examines the social and environmental implications of resource development at the fringes of the global economic system. Core readings engage both theory and ethnography to explore the dynamics of actual and intended resource developments on politically and economically marginalized peoples. Topics generally include mining, logging, petroleum development, biotechnology, hunting and trapping, and other areas of interest to the instructor and students.
- 5623 Archaeology of Mexico**
(3-0) 3 hours credit.
This course charts the development of the civilizations of ancient Mexico as understood through archaeology, art, inscriptions, and historical documents. The societies covered include the Olmec, Zapotec, Teotihuacan, and Aztec.
- 5633 Peoples of Mexico and Central America since 1492**
(3-0) 3 hours credit.
This course brings together archaeology, ethnography, and ethnohistory to examine the societies and cultures of Mexico and Central America since European Contact, with a focus on indigenous peoples. Topics discussed include native responses to conquest and colonialism; the transformation of Native American economies; and recent indigenous political movements.
- 5643 Primates in Ecological Communities**
(3-0) 3 hours credit.
This course is a community ecology class focusing on the interactions that primates have with other species and with their habitat. Specific topics to be explored include: models of species diversity, coexistence mechanisms, determinants of primate community density, coevolution, competition, species packing, assembly rules, conservation, and primate-plant interactions such as seed dispersal and pollination.
- 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.
- 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.
- 6233 Topics in the Anthropology of Complex Societies**
(3-0) 3 hours credit.
Attention focuses on issues central to the comparative study of ancient complex societies. Topics may include, but are not limited to, the development of hierarchical political systems; the nature of divine kingship; agricultural intensification and surplus production; and the collapse of socio-political systems. May be repeated for credit when topics vary.

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.

6513 Maya Civilization

(3-0) 3 hours credit.

This course brings together archaeological data, art and iconography, ancient texts, colonial documents, paleoenvironmental studies, and ethnographic accounts to present the rich and complex history of Maya civilization, from its origins to the present time. Special attention will be given to the Classic period (A.D. 300–900).

6603 Ecological Anthropology

(3-0) 3 hours credit. Prerequisite: Admission to the Doctoral Program in Anthropology or consent of instructor.

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.

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.)

6643 Seminar in Culture and Economy

(3-0) 3 hours credit.

This course offers a background in economic anthropology through the study of production, distribution, and consumption from a cross-cultural perspective. Topics may include: the history of economic approaches in anthropology; comparisons of economies across different scales of complexity; the articulation of capitalist and noncapitalist modes of production; and resource extraction, management, and development in various cultural and political contexts.

6653 Spatial Techniques in Anthropology

(3-0) 3 hours credit.

This course explores the main theories and techniques underlying spatial analysis, the operation of geographic information systems, and the use of digital and remotely sensed imagery.

6663 Research Methods in Ecological Anthropology

(3-0) 3 hours credit.

This course provides an overview of various field research methods used by ecological anthropologists. Topics include sampling and research design, quantitative and qualitative ranking, mapping and transects, resource inventories, participatory appraisal, preparing environmental specimens, and other applicable methods chosen by the instructor.

6703 Human Population Ecology

(3-0) 3 hours credit. Prerequisite: Admission to the Doctoral Program in Anthropology or consent of instructor.

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 Topics in Primatological Research

(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.) (Formerly titled "Seminar in Primate Behavioral Ecology.")

6723 Seminar in Culture, Environment, and Conservation

(3-0) 3 hours credit.

This course takes an anthropological approach to the analysis of environmental conservation. The core readings focus on community-based projects that join actors across cultural and political divides. Students will engage critiques of conservationist ideology and practice in order to envision more effective ways to protect threatened environments and the rights of their human and nonhuman inhabitants.

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.

6823 Human-Animal Relations

(3-0) 3 hours credit.

This course is centered on the interactions between human and nonhuman animals. Topics may include animal histories, agencies and behaviors; the role of animals in biotechnology, research, and agricultural practices; domesticates and companion species; animal rights and human values; cross-cultural classification and the social construction of animals.

6853 Topics in Human Evolution

(3-0) 3 hours credit.

This course examines evolutionary theory, hominid taxonomy and selected topics in human evolution. Topics may include hominin origins, cerebral expansion and the emergence of culture, modern human origins, and the role of environmental change in human evolution. May be repeated for credit with approval of instructor.

6863 Evolution of Human Diet

(3-0) 3 hours credit.

All species have unique adaptations for procuring energy from their environment, as well as adaptations that they share with other species. This course explores the evolutionary underpinnings and ecological implications of these adaptations within the Order Primates. Topics include: metabolism, nutritional requirements, the influence of plant defense chemicals on feeding, the evolution of body size and its implications for diet and feeding, sensory ecology, hypotheses for the evolution of human diet, and dietary implications for modern human health and the origin of medicine.

6873 Energy, the Brain and the Gut in Primate and Human Evolution

(3-0) 3 hours credit.

This course centers on the brain and gut in human and primate evolution. This will include evaluations of the interactions between these two anatomical systems and their relationship with the acquisition of energy in the diet of fossil hominins, modern humans, and nonhuman primates. Other topics include the anatomy of the gut and brain, metabolism, dietary quality and energy, digestion, and interactions between the gut and brain.

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.

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 nonhuman 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.

6991-3 Pre-Doctoral Research

1 to 3 hours credit. Prerequisites: Consent of Supervising Professor and the Ph.D. Graduate Advisor of Record; must be a doctoral student.

Supervised research conducted prior to completion of the qualifying examination. Pre-doctoral research hours do not apply to the doctoral program of study. The grade report for this course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). May be repeated for credit.

7003 Dissertation Proposal

3 hours credit. Prerequisites: Consent of Supervising Professor and the Ph.D. Graduate Advisor of Record; 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 Ph.D. 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 Ph.D. 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, painting/drawing, photography, printmaking, sculpture, and video/digital media.

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 the equivalent. Equivalency is defined as completion of a minimum of 45 semester credit hours in studio art and 15 semester credit hours in art history as part of, or in addition to, a bachelor's degree.

Application. The Graduate School application for the M.F.A. is available online at www.graduateschool.utsa.edu. 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, and total running time. No more than fifteen minutes will be reviewed. Please do not use adhesive labels on CD/DVD discs—label with permanent marker directly on the label side of the disc.

The portfolio must be submitted directly to: Graduate Advisor of Record, 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, Semester Progress Reviews, a Candidacy Review (available in the fourth semester after completion of 36 to 42 semester credit hours within the program), 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 (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 (AHC) 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/Drawing**
(0-6) 3 hours credit. Prerequisite: B.F.A. or equivalent.
The exploration of painting/drawing's broad capacity for conceptual and formal inquiry. 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, non-silver and digital 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. Prerequisites: Consent of instructor and approval of the Department Chair prior to the beginning of the practicum.
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, ceramics or video/digital media. 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.

6953 Independent Study

3 hours credit. Prerequisites: Graduate standing and permission in writing (form available in the Department office) of the instructor, the Graduate Advisor of Record (GAR), and the Department Chair.

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 (3 semester credit hours). Students determined as having no studio background and completing a 3000- or 4000-level UTSA Art (ART) studio course offered by a graduate faculty member will fulfill this requirement and this coursework can be utilized to fulfill 3 semester credit hours of free electives under part C of the Master of Arts program of study. Students needing to fulfill this requirement should consult with the Graduate Advisor of Record (GAR) for Art History for advice concerning appropriate courses and instructors.

Application Materials. Application to the program is submitted online through the Graduate School's Web site at www.graduateschool.utsa.edu. 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 Graduate School's Web site. 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 must 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 any of the supporting fields comprising the College of Liberal and Fine Arts, including art studio, with the selection approved by the Graduate Advisor of Record (GAR) for Art History.
- 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 and criticism. 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 critical and historical 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 critical and historical 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 critical and historical 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 critical and historical 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. Non-Art History (M.F.A.) majors utilizing this course for fulfillment of Art History requirements for a graduate program of study will require approval of the Art History and the Art Studio GARs as well as the approval of the Department Chair.

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. Non-Art History (M.F.A.) majors utilizing this course for fulfillment of Art History requirements for a graduate program of study will require approval of the Art History and the Art Studio GARs as well as the approval of the Department Chair.

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. Non-Art History (M.F.A.) majors utilizing this course for fulfillment of Art History requirements for a graduate program of study will require approval of the Art History and the Art Studio GARs as well as the approval of the Department Chair.

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 and criticism. 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. Non-Art History (M.F.A.) majors utilizing this course for fulfillment of Art History requirements for a graduate program of study will require approval of the Art History and the Art Studio GARs as well as the approval of the Department Chair.

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 critical 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. Non-Art History (M.F.A.) majors utilizing this course for fulfillment of Art History requirements for a graduate program of study will require approval of the Art History and the Art Studio GARs as well as the approval of the Department Chair.

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. Students enrolling in this course will receive a performance evaluation of Satisfactory Progress (S) or Unsatisfactory Progress (U) for each semester of enrollment. Students receiving an evaluation of unsatisfactory (U) will be placed on program probation and students receiving two unsatisfactory evaluations will be reviewed for a determination of removal from the degree program. The Instructor of Record will make the determination of Satisfactory (S) or Unsatisfactory (U) progress for each semester of enrollment. Determination of continuation within the program, in the event of two unsatisfactory evaluations, will be made by a majority vote of the full-time graduate faculty of the Art History faculty.

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. Submit 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 other qualifications to be admitted to this program, areas of interest in the program, and goals related to pursuing the Master's degree in Communication.

The number of students admitted to this program may be limited.

Degree Requirements. The minimum number of semester credit hours required for this degree is 36, exclusive of coursework or other study required to remove admission deficiencies. 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 E.

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/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, but courses must relate to the student's program of study.
- D. No more than a total of 6 semester credit hours from COM 6931-3 Directed Readings, COM 6941-3 Internship in Communication, and/or COM 6951-3 Independent Study may be applied to the Master's degree.
- E. 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.

F. As per University requirements, all students must complete a comprehensive examination as detailed below.

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 successfully pass a written exam and then an oral defense of the written exam tailored to the student's program and specialized coursework. The comprehensive examination is offered each Fall and Spring semester. 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 can only be taken twice.

Students in the thesis or project option, in addition to passing both a written comprehensive examination and oral defense of the written exam, will present a written prospectus at a meeting for approval by their thesis or project committee and defend the prospectus. Students in the thesis or project option also will orally defend the final thesis or project before the committee.

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. Covers principal descriptive and inferential statistics (e.g., univariate and multivariate) applied in communication research. Demonstrates techniques in data analysis using 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 contexts. 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 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, intercultural communication, health communication or issues management. May be repeated for credit when topics vary, but not more than 9 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. Prerequisite: COM 5103.

This course applies theories of interpersonal processes and communication principles in relational contexts, such as marriages, families, friendships, 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. Prerequisite: COM 5103.

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.

5313 Health Communication

(3-0) 3 hours credit. Prerequisite: COM 5103.

Examination of the ways that health professionals and health seekers, journalists, politicians, and society in general contribute to the creation of health issues and the promotion of health activities. Health issues as they relate to interpersonal relationships and communication will be addressed. The course includes integration of theory with research and/or practice.

5413 Seminar in Organizations

(3-0) 3 hours credit. Prerequisite: COM 5103.

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. Prerequisite: COM 5103.

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. Prerequisite: COM 5103.

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 5103.

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. Prerequisite: COM 5103.

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. Prerequisite: COM 5103.

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 5103, 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 6 hours will apply to the Master's degree.

6931-3 Directed Readings

1 to 3 hours credit. Prerequisites: Graduate standing 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 explore/prepare an area of specialization when other appropriate classes are unavailable. May be repeated for credit, but not more than 3 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. May be repeated for credit, but 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.

6981-3 Master's Thesis

1 to 3 hours credit. Prerequisites: Written thesis proposal must be approved by the faculty advisor, the thesis committee, and the Graduate Advisor of Record prior to enrollment.

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.

6991-3 Master's Project

1 to 3 hours credit. Prerequisites: Written project proposal must be approved by the faculty advisor, the project committee, and the Graduate Advisor of Record prior to enrollment.

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

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. The applicant must submit scores from the Graduate Record Examination (GRE) General Test. 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.

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:

- 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
- 6 semester credit hours of ENG literary study between 1700 and 1900
- 6 semester credit hours of ENG literary study after 1900

At least 6 hours of the above prescribed electives must include the study of literatures of the U.S., 3 of which must include the study of multiethnic literatures of the U.S. after 1900.

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-semester-credit-hour concentration available to degree-seeking students who have been admitted to any UTSA graduate program. Students who already have a graduate degree may also be considered for admission to the Creative Writing certificate program as special graduate students.

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 nontraditional 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 nonacademic 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 "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.

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 2, General Academic Regulations, and Chapter 5, 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 (a research paper of approximately 15 pages).

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 79 (Internet 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 (OR, if a course equivalent to ENG 5183 has already been taken, ENG 6023 Rhetoric and Composition: Text and Context)
ENG	6013	Theoretical and Research Methods
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 (if not taken to fulfill core requirement)
		or
ENG	6033	Language and Linguistics
		or
ENG	6063	Cross Cultural Issues: Text and Context

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 written and oral examination. After completion of the Qualifying Examination and submission of the dissertation prospectus (approximately 15–20 pages), the student will submit a portfolio (as described in the Graduate Student Handbook). The student’s Dissertation Committee approves the student’s dissertation prospectus and the portfolio 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, drama, or film. 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 degrees 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 Theoretical and Research Methods**
(3-0) 3 hours credit.
Introduction to the theories and methods of professional literary research, including research in cross-cultural studies. (Formerly titled "Bibliography and Research.")
- 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 degrees 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 degrees 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.

6973 Special Topics

(3-0) 3 hours credit.

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’s or Doctoral degrees 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 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 on 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 on 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 on 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 on 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 3.2 or better (on a 4.0 scale) in the last 60 hours of undergraduate education and a grade point average of 3.2 or better in all History courses taken.

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.

In addition to submitting all University required application materials (e.g., application form, official transcripts), applicants must submit a 500-word essay outlining their qualifications and goals.

Letters of recommendation and Graduate Record Examination (GRE) scores are optional; students may submit one or both in support of their application.

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 consecutive long semesters. Note: HIS 5023 Historical Methods and HIS 5113 Historical Approaches and Interpretations 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 written comprehensive examination.

Note: 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 should take this course during the first year of their program.)

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 centuries. 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 should take this course during the first year of their program.)

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 and its social consequences, 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.

5283 Race in United States History

(3-0) 3 hours credit.

This course explores the development of racial ideology from the Colonial Era to the present, paying particular attention to the context in which racial categories are constructed, maintained, and transgressed. Students will have the opportunity to survey foundational and recent historical scholarship that both advances and draws upon theoretical models of race.

5293 The American West

(3-0) 3 hours credit.

A broad historiographical overview focused on nineteenth and twentieth century westward expansion from the Louisiana Purchase in 1803 to the present. Zones of contact, the development of hybrid cultures, racial relations, the environment, and the role of the federal, state, and local governments in Western development are among the topics that may be covered in this course.

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.
- 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. (This course may employ an explicitly comparative approach.)

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 experiences 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 Comparative Urban 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.) (Formerly titled “The City in History.”)

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. The 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.
- 6923 Teaching Practicum**
3 hours credit.
This course is designed to assist advanced graduate students in developing their instructional skills for a career in college teaching. The primary focus will be to translate the best pedagogy on student learning into the practical design and conduct of history courses, including such elements as syllabi, lectures, discussions, exams and other assignments, and grading. Students will work closely with a specific undergraduate instructor in a specific class.

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. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).

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 4, 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.

Graduate Certificate in Spanish Translation Studies

The Certificate in Spanish Translation Studies is a 15-hour option in Spanish graduate studies with its primary focus on the language skills necessary to perform translation. Translation is defined as the rendering of a written text from a source language into another, while interpretation is the rendering of spoken language from a source language into another. Although this program will concentrate on the former rather than on the latter, both draw on the same type of general linguistic skills as those gained by studies in literature, language, and culture. This certificate focuses more closely on practical applications in modern day life than does the more comprehensive M.A. in Spanish, with a total of 36 hours.

Entrance and Exit Requirements

In addition to meeting University-wide admission requirements either as a special graduate student or a degree-seeking student in a graduate program, all prospective students must pass a written entrance examination in Spanish and English to determine linguistic competence and general cultural preparation.

Entrance- and exit-level skills in both languages will be no lower than Level 3 and Level 4, respectively, according to the U.S. Government's Interagency Language Roundtable (ILR) Skill Level Descriptions for Translation Performance.

Program Requirements

The Certificate in Spanish Translation Studies consists of 15 semester credit hours to include an introduction to theory and practice and the terminology of translation, with supplementary training to include areas such as computer applications, translation workshops and individualized, practical coursework. Courses in Spanish linguistics, literature, and culture strengthen the interdisciplinary underpinnings of the Certificate. The capstone course provides training and reinforcement in written translation skills through a translation case study.

Students must complete the following requirements:

A. 3 semester credit hours from the following:

FL	5043	Principles of Translation
SPN	6083	Theory and Practice of Translation

B. 6 semester credit hours from the following:

SPN	5023	Writing and Editing in Spanish
SPN	5843	History of the Spanish Language
SPN	5853	Spanish of the Southwest
SPN	5883	Spanish Morphology and Syntax
SPN	5893	Spanish Dialects
SPN	6973	Special Problems

C. 3 semester credit hours of any SPN 5000-level course or above with a focus on language, literature, or culture

D. FL 6013 Practicum in Translation

Students will take this course during their last semester of enrollment in the Certificate Program. In consultation with the instructor, they will select an area of interest and define a task within that area. Project translation work will normally be exclusively into the student's dominant language.

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 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. Topics may include the Conquest, the Colonial period, and the nineteenth century. May be repeated for credit when topics vary.

- 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, its application to Spanish and analysis of its phonological system. Other areas may include theoretical approaches to phonology, applications for teaching, appreciation of regional variation, and the like.
- 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.

6013 Practicum in Translation

3 hours credit. Prerequisite: FL 5043 or SPN 6083 or faculty approval.

Students will take this course during their last semester of enrollment in the Certificate Program. In consultation with the instructor, they will select an area of interest and define a task within that area. Project translation work will normally be exclusively into the student's dominant language.

**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 qualified students to pursue advanced study in music with an emphasis in Instrumental or Choral Conducting, Vocal or Instrumental Performance, Music Education, or Piano Pedagogy and Performance or Vocal Pedagogy and Performance. The Master of Music degree is designed to develop and foster high achievement in performance and teaching; to prepare the student for a career as a performer, conductor, or educator; or to serve as a basis for pursuing doctoral studies in music.

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 emphasis or the equivalent, submit three recommendations from established professionals commenting on the appropriateness of graduate study in music for the applicant, and successfully complete one of the following:

Instrumental and Choral Conducting: Audition in person or provide a recent digital video (CD or DVD format preferred, VHS videotape accepted) demonstrating the level of mastery in a rehearsal or performance situation.

Vocal and Instrumental Performance: Audition in person (or with acceptable justification approved by the auditioning committee provide a recent digital recording) demonstrating the level of mastery in the proposed performance medium.

Music Education: Submit a digital video of teaching skills (CD or DVD format preferred, VHS videotape accepted), a curriculum vitae or portfolio, document two years of successful elementary or secondary level teaching, and complete written entrance exam.

Piano Pedagogy and Performance or Vocal Pedagogy and Performance: Audition in person or provide a recent digital recording or video (CD or DVD format preferred, VHS videotape accepted) demonstrating the level of mastery in the proposed pedagogy and performance medium.

Students are required to take placement examinations in music theory and music history before taking graduate courses. The vocal pedagogy placement examination is required of all students with an emphasis in voice performance or choral conducting. Voice principals must take diagnostic examinations in French, German, Italian, and English lyric diction. If the student is found deficient in any one of the languages, the appropriate course(s) will be required. The student's advisor will counsel the student in correcting deficiencies and selecting courses for the student's degree program.

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 31 to 36 hours depending on the emphasis. Courses in which a grade of "C" or lower is earned are not applicable toward coursework for the Master of Music degree.

Degree candidates must complete the following requirements:

A. 9 semester credit hours in music history, music theory, and research:

MUS	5133	Topics in Music Theory
MUS	5233	Introduction to Music Research
MUS	5263	Topics in Music History

B. 16–22 semester credit hours of studies in music selected according to the area of emphasis and approved by the student's advisor:

Instrumental and Choral Conducting

MUS	5223	Ensemble Repertoire
MUS	5523	Rehearsal Techniques

MUS	5554	Music Performance–Performance Emphasis (two semesters)
MUS	6941	Recital
MUS	6961	Comprehensive Examination

Vocal and Instrumental Performance

MUS	5433	Performance Repertoire
MUS	5533	Pedagogy of Musical Performance
MUS	5554	Music Performance–Performance Emphasis (two semesters)
MUS	6941	Recital
MUS	6961	Comprehensive Examination

Piano Pedagogy and Performance

MUS	5421	Practicum in Advanced Teaching
MUS	5433	Performance Repertoire
MUS	5533	Pedagogy of Musical Performance
MUS	5542	Music Performance (three semesters)
MUS	5572	Pedagogy of Classroom Instruction
MUS	6903	Project in Music Pedagogy
MUS	6941	Recital

Vocal Pedagogy and Performance

MUS	5421	Practicum in Advanced Teaching
MUS	5433	Performance Repertoire
MUS	5533	Pedagogy of Musical Performance
MUS	5542	Music Performance (two semesters)
MUS	5554	Music Performance–Performance Emphasis (only in semester of recital)
MUS	5572	Pedagogy of Classroom Instruction
MUS	6903	Project in Music Pedagogy
MUS	6941	Recital
MUS	6961	Comprehensive Examination

Music Education

MUS	5403	Psychological Foundations of Music Education
MUS	5413	Research in Music Education
MUS	5423	Foundations of Music Education (required for nonthesis option)
MUS	5523	Rehearsal Techniques
MUS	5542	Music Performance
MUS	6423	Seminar in Music Education
MUS	6913	Thesis in Music Education (required for thesis option)

- C. 5–12 semester credit hours of electives, approved by the student’s advisor, of which no more than 2 hours may be in a music ensemble. Nonmusic electives may be used with consent and approval of the student’s advisor.

Special Degree Requirements. Candidates for the Master of Music degree with an emphasis in Instrumental Conducting, Choral Conducting, Vocal Performance, or Instrumental Performance must complete a total of 31 semester credit hours. Candidates for the Master of Music degree with an emphasis in Music Education, Piano Pedagogy and Performance, or Vocal Pedagogy and Performance must complete a total of 36 semester credit hours.

Students selecting the Music Performance Emphasis or the Conducting Emphasis are required to participate for two semesters in an ensemble appropriate to their program of study.

Students selecting the Music Performance Emphasis, Conducting Emphasis, and the Vocal Pedagogy and Performance Emphasis must successfully complete a recital document and oral comprehensive examination. Students selecting the Music Education Emphasis must successfully complete written and oral comprehensive examinations. Students selecting the Piano Pedagogy and Performance Emphasis must successfully complete an oral comprehensive examination.

Graduate Certificate in Keyboard Pedagogy

The Certificate in Keyboard Pedagogy is designed for active pre-college piano teachers who are interested in continuing their education through a program that is focused on practical courses in their field. Admission requirements to the Certificate Program are the same as admission requirements to the Master of Music program (audition, three letters of reference, and a grade point average of 3.0 in the last 60 hours of undergraduate work).

The Certificate in Keyboard Pedagogy requires the following 15 semester credit hours:

MUS	5421	Practicum in Advanced Teaching	1 hour
MUS	5533	Pedagogy of Musical Performance (two semesters)	6 hours
MUS	5542	Music Performance	2 hours
MUS	5572	Pedagogy of Classroom Instruction	2 hours
MUS	6903	Project in Music Pedagogy	3 hours
MUS	6971	Special Problems (Opportunity for specialized study with experts in the field.)	1 hour

Individuals interested in pursuing the Certificate in Keyboard Pedagogy should contact the Department of Music Keyboard Area Coordinator.

Graduate Certificate in Keyboard Performance

The Certificate in Keyboard Performance is a graduate option that allows exclusive focus on the performance aspects of musicianship. Admission requirements to the Certificate Program are the same as admission requirements to the Master of Music program (audition, three letters of reference, and a grade point average of 3.0 in the last 60 hours of undergraduate work).

The Certificate in Keyboard Performance requires the following 15 semester credit hours:

MUS	5554	Music Performance—Performance Emphasis (two semesters)	8 hours
MUS	5583	Advanced Instrumental Techniques	3 hours
MUS	5711	Graduate Ensemble (two semesters)	2 hours
MUS	6941	Recital (two recitals – one solo, one chamber)	2 hours

Individuals interested in pursuing the Certificate in Keyboard Performance should contact the Department of Music Keyboard Area Coordinator.

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.

5023 Graduate Music Pedagogy Review

(3-0) 3 hours credit.

Designed to satisfy deficiencies indicated by the Graduate Pedagogy Placement Examination. Anatomy, physiology, acoustics, lifespan development and performing arts health issues will be reviewed. A grade of “B” or higher is required before taking further graduate studies in music pedagogy. Cannot be counted toward any Master of Music degree program.

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 twentieth-century analytical techniques, Schenkerian analysis, 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; (3) Keyboard. 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. Topics are (1) Middle Ages; (2) Renaissance; (3) Baroque Period; (4) Classic Period; (5) Romantic Period; (6) Twentieth Century; (7) World Music; and (8) 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 Emphasis

4 hours credit. Prerequisites: Graduate standing in music and successful audition.

Private instruction for graduate students with emphasis 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 Pedagogy of Classroom Instruction

(2-0) 2 hours credit. Prerequisite: Graduate standing in music.

A study of pedagogical techniques and materials used for group instruction in the classroom for instrumentalists and/or vocalists. Students will have an opportunity to tutor individual students under the supervision of the instructor. (Formerly titled “Class Piano Pedagogy.”)

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; (3) Keyboard. 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.
- 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.
- 6413 Seminar in Piano Pedagogy**
(3-0) 3 hours credit. Prerequisite: Graduate standing in music or consent of instructor.
Studies in the specialized methods and materials and current trends in piano pedagogy. May be repeated for credit when topics vary.
- 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 pedagogy and performance emphasis and music performance emphasis.
A recital approximately one hour in length; required of all students in the performance, conducting, or pedagogy and performance emphases.

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). MUS 6961 is a degree requirement for all students in all emphases. Credit earned in MUS 6961 cannot be counted in the total hours required for the Music Education emphasis or Piano Pedagogy and Performance emphasis. Credit earned in MUS 6961 will be counted in the total hours required for the Instrumental Performance, Vocal Performance, Instrumental Conducting, Choral Conducting, and Vocal Pedagogy and Performance emphases.

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.

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.graduateschool.utsa.edu)
2. an application fee
3. results of the Graduate Record Examination (GRE) or Law School Admission Test (LSAT)
4. official transcripts from all collegiate institutions attended including community colleges
5. a statement of purpose (roughly 500 words or two typed pages) indicating your interests and goals in studying political science
6. three letters of recommendation from references who can speak to your qualifications for the graduate program (at least two of these must be from a college or university professor who can discuss and evaluate specifically your academic qualifications and potential for graduate-level study).

Applicants must satisfy all University requirements and must have completed 18 semester credit hours in upper-division undergraduate or graduate-level courses in Political Science or directly related fields in the social and/or behavioral sciences. It is strongly recommended that applicants have at least a 3.0 grade point average (on a 4.0 scale) in the last 60 hours of undergraduate and graduate work. An overall grade point average of 3.0 in Political Science courses is also required. All applications are evaluated by an internal review committee to determine compliance with University and program requirements. Admission is competitive, satisfying the requirements does not guarantee admission.

Returning Students. Master's students who have not been in attendance for two full years will have their status changed to inactive. An inactive student may reapply to the program but they must file a new application for graduate admission, along with a nonrefundable application fee, by the application deadline and meet the catalog requirements and admission conditions in effect at the time of reapplication. All returning students will be subject to a full course review in the program. Courses over six years old may need to be repeated (see section "Repeating Courses" in Chapter 2, General Academic Regulations, in this catalog).

Students who wish to take courses in the program without earning credit toward a Master's degree may apply as non-degree-seeking students.

Upon admission to the Graduate Program, all students must meet with the Graduate Advisor of Record for the department as well as their Faculty Subfield Advisor (assigned at time of admission) before enrolling in coursework. Additionally, all graduate students should attend the Department's Graduate Program Orientation held at the beginning of each semester and review the materials contained in the Department's Graduate Program Handbook.

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 thesis option or 24 semester credit hours for the nonthesis option (see section D below) 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
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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	5453	Political Advertising
POL	5503	Constitutional Law and Judicial Decision-Making

Students specializing in *International Politics* must complete:

POL	5043	International Politics
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And at least 9 semester credit hours from the following:

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	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
POL	5943	Threat Environments and Homeland Security and Defense

Students specializing in *Political Theory and Public Law* must complete:

POL	5063	Political Philosophy
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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	Theories of Justice and Rights
POL	5253	Issues of Immigration
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. Students must complete the core course requirements within their first 18 hours of coursework. All students are required to pass a first-year qualifying examination to assess their progress in the program. This review must be completed before enrollment in further courses will be allowed. In consultation with the Faculty Subfield Advisor and Graduate Advisor of Record, students will also be required to indicate at that time which exit option they plan to pursue (see section D below). Students choosing the thesis option must complete 18 hours of coursework and the core and breadth courses before enrolling in POL 6893 Master's Thesis Proposal. Students choosing the nonthesis option must complete at least 24 hours in addition to the core and breadth courses before taking the comprehensive examination. (See the Department's Graduate Program Handbook for more details.) Students are encouraged to pursue languages or other formal competencies as appropriate to their needs.

- D. *Option 1* (with thesis): 6 semester credit hours:

POL	6893	Master's Thesis Proposal
POL	6983	Master's Thesis

or

Option 2 (without thesis): Students will prepare for examination under faculty supervision and in consultation with their Faculty Subfield Advisor and Graduate Advisor of Record. In consultation with the Faculty Subfield Advisor and Graduate Advisor of Record, students will designate an exam committee and exam chair in the semester prior to the one in which they plan to take the comprehensive examination. The comprehensive examination will be evaluated as either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination). Students are expected to take the comprehensive examination during the semester in which they plan to complete the degree. The comprehensive examination can be attempted twice but only once a semester. Credit earned for the comprehensive examination will not count toward the 36 semester credit hours required for the Master's degree.

Graduate Certificate in Security Studies

The Graduate Certificate in Security Studies (GCSS) is a 15-hour concentration available to *special graduate students* who have been admitted to UTSA by application through the normal graduate admissions process. Applicants should become fully familiar with the requirements for "special graduate" admission status, as discussed in the University graduate admission

section of this catalog. The GCSS is a program that mainly serves the needs of San Antonio regional professionals, such as leaders in military and civilian contract functions, who require advanced education short of full degree programs and in areas directly connected with their work in homeland security and defense at national, state, and local levels. The Department of Political Science and Geography is responsible for all coordination of students participating in the certificate program.

The program's goals are to expand horizons of awareness of domestic and global conditions that reasonably can be expected to impact on homeland security and defense in a democratic society, and to deepen awareness of how political systems address particular conditions of threat arising from natural disasters and external attacks. It is assumed that most applicants will have an established record of basic expertise through their assignments in operational areas in domestic or international security in private or public organizations.

Requirements for the GCSS include 15 semester credit hours, of which 6 semester credit hours are in POL 5083 Geo-Political Context of Homeland Security and Defense and POL 5943 Threat Environments and Homeland Security and Defense; and 9 semester credit hours of electives are chosen in consultation with the program director and advisor. The list of electives is intentionally diverse and drawn from relevant existing courses across the University in order to encourage students to self-identify disciplinary interests. No course in which a grade lower than a "B" is earned may be used to complete the GCSS. Graduate credit earned at other colleges or universities cannot be applied as credit in the certificate program. Students must complete the certificate program within an 18-month period from the time of first registration.

Individuals interested in the GCSS should contact the Graduate Advisor for the GCSS in the Department of Political Science and Geography. An application for admission to the certificate program must be completed online and all required supporting materials must be submitted before students may register for courses. GCSS students interested in applying to a Master's program must apply through the Graduate School and seek degree-seeking status. Students must comply with all Graduate School and department requirements for the program they apply for.

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.

5083 Geo-Political Context of Homeland Security and Defense

(3-0) 3 hours credit.

A broad overview of the geo-political dynamics of domestic and international crises and their relationship to homeland security and defense (HSD) policies. Course topics may include discussions of how U.S. political systems develop policies to reduce negative impacts of domestic and international crises, principles of federalism related to political responses to crises, political communications in times of crisis, domestic and foreign policy implications, geospatial factors, and foreign policy considerations. May include guest lectures by prominent practitioners and scholars.

5093 Politics of U.S. National Security Policy Making

(3-0) 3 hours credit.

An examination of the political dynamics of national security decision making, placing particular emphasis on executive branch leadership and coordination with other institutions of government. Discussion of the history and politics, evolution, and institutional roles of the U.S. national security system. Includes discussion of policy initiatives, institutional decision making settings, constitutional and statutory controls on institutional powers, and policy outcomes. Course may explore a sample of major national security decisions in terms of political characteristics and principles.

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 to 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 Theories of Justice and Rights

(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. (Formerly titled "International Justice and Values Relativism.")

- 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.
- 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, and 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 political institutions, policy processes, political representation, and public opinion in the 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.

5453 Political Advertising

(3-0) 3 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.

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 theories and issues pertaining to political institutions and processes in post-industrial, developing, and transitional systems. Topics may include state theory, nationalism, new institutionalism, political economy, party systems, politics of contention, regional integration, and the internationalization of public policy.
- 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 circumstances and issues leading to war and the conditions necessary to return nations and regions to stability and security in the world community. 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), regional integration, 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.

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, public and private institutions, and the many ways in which they interact in managing common affairs. Theoretical and empirical issues include, but are not limited to, contending perspectives and systems of rule-making in the areas of security, poverty, trade and finance, human rights and the environment.

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.)
- 5943 Threat Environments and Homeland Security and Defense**
(3-0) 3 hours credit.
An in-depth analysis of political system responses to domestic and international threats in terms of homeland security and defense. Consideration is given to political systems direction of operations, planning, and policy making organizations as they conceptualize and develop homeland security and defense strategies. Course topics may include lectures on political systems responses to natural disasters and panic, transportation systems disasters, hostage takings, weapons of mass destruction, cyber attacks, human trafficking; and on threat modeling, law and legal institutions in crisis situations, communications systems and media roles in emergencies, dynamics of leadership and decision making under stressful conditions, and inter-organizational cooperation and response negotiations. May include guest lectures by prominent practitioners and scholars.
- 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.
- 6893 Master's Thesis Proposal**
3 hours credit. Prerequisites: Permission of the Thesis Advisor or Faculty Subfield Advisor, course instructor, and Graduate Advisor of Record.
An examination of the research questions and the theoretical and methodological assumptions that characterize different subfields in Political Science. As part of this course, the student will develop, prepare and defend a proposal for the Master's thesis. Credit will be awarded upon approval of the proposal by the student's course instructor and thesis advisor. A thesis committee must be formed by the end of the course. This course will be taken in the student's third long semester in the program. Failure to meet this requirement within four long semesters from the time when the student enters the graduate program will preclude continuation of the student in the Master's program.
- 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.
- 6961 Comprehensive Examination**
1 hour credit. Prerequisites: Approval of the Faculty Subfield Advisor, Graduate Advisor of Record, and the student's Comprehensive Examination Committee.
Students will select fields of study and prepare for examination under faculty supervision. Students will designate an exam committee and exam chair in the semester prior to enrollment. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. May be repeated once during a different semester. Credit earned in POL 6961 may not be counted toward the Master's degree. 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.

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 Master's Thesis

3 hours credit. Prerequisites: POL 6893 and permission of Graduate Advisor of Record and Thesis Committee.

Thesis research and preparation. May be repeated for credit, but not more than 3 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
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 desire additional coursework and research experience in order to be more competitive for admission to doctoral programs, and students who need graduate-level training in order to be competitive for jobs in behavioral, psychological, and related research settings. The program is designed to give students extensive research experience and coursework in research methodology, statistics, and the content areas of research-based psychology (e.g., social, personality, cognitive, developmental, clinical).

Program Admission Requirements. All application materials must be submitted using the University's online application system and received by the Fall deadline. 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 "B" or higher in a statistics for psychology course (equivalent to PSY 2073) and a psychological research methods course (equivalent to PSY 3403).
5. A description of research experience (e.g., independent study/internship, employment, etc.) in basic or applied settings must be provided before the application is considered complete. Amount and nature of experience will be considered as part of the selection criteria for admission to the program.
6. A statement of professional goals and reason for interest in pursuing a Master's in Psychology and interest in this program specifically must be provided before the application is considered complete. These statements will be evaluated and considered as part of the selection criteria for admission to the program.
7. Two letters of recommendation from behavioral researchers in a position to evaluate the candidate's academic or research potential (e.g., undergraduate instructors, research advisors) must be submitted and will be evaluated as part of the selection criteria. Recommendation forms are included in the online application materials.

The highly individualized nature of the program dictates that a limited number of students be admitted each year. As such, students who meet the minimum requirements are not necessarily guaranteed admission, and early submission of application materials is strongly encouraged. Applicants who do not meet requirements for unconditional admission may be considered for conditional admission if there are indications of unrealized potential. General information on successful applicants (grade point averages, GRE scores, etc.) can be found on the Department's Web site (<http://colfa.utsa.edu/psych/>).

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	Professional Ethics and Standards
PSY	5213	Research Design
PSY	5413	Inferential Statistics

PSY	6113	Psychological Measurement
PSY	6213	Correlation and Regression Analyses

B. 9 semester credit hours chosen from the following:

PSY	5303	Developmental Psychology
PSY	5313	Seminar in Psychopathology
PSY	5323	Individual Differences and Assessment
PSY	5333	Social Psychology
PSY	5343	Human Cognition
PSY	5353	Industrial/Organizational Psychology
PSY	5363	Health Psychology
PSY	5383	Biological Psychology
PSY	5393	Cross Cultural Psychology

C. 6 semester credit hours of electives chosen from the following:

PSY	6513	Research Internship
PSY	6951-3	Independent Study
PSY	6973	Special Topics in Psychology

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 course options listed in Section B and PSY 6513 Research Internship 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 Professional Ethics and Standards

(3-0) 3 hours credit. Prerequisite: Consent of the instructor or admission to the psychology program.

An examination of the professional standards, ethics, and theoretical and methodological assumptions governing the conduct and publication of research in psychology. (Formerly titled "Research Paradigms in Psychology.")

5213 Research Design

(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. (Formerly titled "Design Considerations in Behavioral Research.")

5303 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 processes and age-related change.

5313 Seminar in Psychopathology

(3-0) 3 hours credit. Prerequisites: PSY 5213 and prior consent of instructor.

A critical review of the phenomenon of psychological/psychiatric illness and an outline of the DSM criteria for diagnosing mental, emotional, and behavioral disorders.

5323 Individual Differences and 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 the manifestation of individual differences in human thought and behavior.

5333 Social Psychology

(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. (Formerly titled "Research Seminar in Social Psychological Research.")

5343 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 about external events.

5353 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 Health Psychology

(3-0) 3 hours credit. Prerequisite: PSY 5213 or consent of instructor.

A critical analysis of the theories, research methods, empirical findings, and applications that form a basis for understanding psychological factors in physical and mental health. (Formerly titled "Research Seminar in Psychology and Health.")

5383 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 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.

- 6113 Psychological Measurement**
(3-0) 3 hours credit. Prerequisite: Consent of instructor or admission to the psychology program.
An examination of the criteria and procedures used to develop valid and reliable measures of psychological constructs and human behavior. (Formerly titled “Perspectives in Measurement 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 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.
- 6951-3 Independent Study**
1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing (form available) of the instructor and the program’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 Topics in Psychology**
(3-0) 3 hours credit. Prerequisites: Consent of instructor and student’s graduate advisor.
An organized course offering the opportunity for specialized study not often available as part of the regular course offerings. The course may be repeated for credit when the topics vary, but not more than 3 hours, regardless of discipline, may be applied to the Master’s degree. (Formerly titled “Special Problems.”)
- 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 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 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, religion, 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	5123	Family Contexts and Social Change
SOC	5133	Sociology of Health and Health Care
SOC	5143	Demography and Community Trends
SOC	5203	Social Stratification
SOC	5213	Race and Ethnic Relations
SOC	5223	Mexican Americans: Community, Culture, and Class
SOC	5233	Sociology of Gender
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	5363	Theory Building and Methods

SOC	5403	Social Movements
SOC	5423	Social Psychology
SOC	6043	Immigration and Society
SOC	6053	Political Sociology
SOC	6063	Health and Health Disparities
SOC	6143	Sociology of Religion
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 shape 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.

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.

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 Sociology of Gender

(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. (Formerly titled “Gender and Society.”)

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.
Analyzes the role of crime and delinquency in society. 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.
- 5363 Theory Building and Methods**
(3-0) 3 hours credit.
Explores the role of theory building and methodology in sociology. The philosophy of science and sociology of knowledge and of science are used to understand the scientific dynamics of sociology. Theory building, methodology, and research design are explored.
- 5403 Social Movements**
(3-0) 3 hours credit.
Involves evaluation of dominant theoretical perspectives and research strategies in social movements and organized protests. Contrasts classic theoretical models with more recent scholarship emphasizing the cultural dimensions of social movement dynamics. Case studies may include the American Civil Rights Movement, Labor Unionization, and the Feminist and Environmental Movements.
- 5423 Social Psychology**
(3-0) 3 hours credit.
Provides the student with foundation in the theoretical background of social psychology as well as exposure to contemporary empirical examination of the theories and concepts utilized in this perspective. Topics for study may include socialization, social roles, aggression, pro-social behavior, interpersonal attraction, group dynamics, and collective behavior.
- 6043 Immigration and Society**
(3-0) 3 hours credit.
Analyzes theoretical explanations and social, economic, cultural, and ideological features of migration. May include topics such as border dynamics, transnationalism, incorporation of immigrants, remittances, and the impact on sending and receiving countries.

6053 Political Sociology

(3-0) 3 hours credit.

Focuses on forms of economic, political, social, scientific or knowledge based power. Discussion compares Marxist, elitist, and pluralist theories to understand variations in the use of concepts such as domination, exploitation, and influence. Course may include modern American and European societies and how these theories are used to explain power structures and processes in Latin America and the former colonial world.

6063 Health and Health Disparities

(3-0) 3 hours credit.

Explores issues related to disparities in population health. Health care based on racial, ethnic, and socioeconomic backgrounds in the United States and other nations will be analyzed. Discussions may include differences in health and health care at the local, national or international level.

6143 Sociology of Religion

(3-0) 3 hours credit.

A seminar to provide a theoretical and methodological appraisal of contemporary research in the sociology of religion. Classic texts will be considered with emphasis on current trends in the field. May include topics such as religion and health, religion and globalization, new religious movements, religion and politics, religion and family and the immigrant religious experience. Theoretical debates from the secularization thesis to rational choice approaches will be considered.

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 or 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

DEPARTMENT OF CRIMINAL JUSTICE

Master of Science Degree in Justice Policy

The Master of Science (M.S.) degree in Justice Policy is designed to provide students with competency in policy planning, evaluation, criminal justice agency management, and preparation for continued graduate study in criminal justice and criminology. The program assists students to develop and apply research expertise toward resolution of contemporary justice practice and policy issues.

Program Admission Requirements. To qualify for unconditional admission, applicants must satisfy University-wide graduate admission requirements and submit all transcripts and Graduate Record Examination (GRE) General Test scores as well as two letters of recommendation and a personal statement. An applicant admitted unconditionally as a degree-seeking student must possess a baccalaureate degree from an accredited university or equivalent training at a foreign institution; have 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; have 18 hours in criminal justice, criminology, or a closely-related discipline, or professional experience in the justice system; be in good standing at the last institution attended; have a valid GRE test score 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 other study to remove deficiencies, is 36.

Degree candidates must complete the following requirements:

A. 15 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	6373	Crime Theory and Justice Policy

Students are expected to complete the majority of core courses prior to enrolling in elective courses. Normally, students should enroll in CRJ 5073 Research Methods and/or CRJ 5123 Justice Policy Formation and Implementation in their first two semesters, or as soon as offered thereafter.

B. 15 semester credit hours of electives as follows: at least 9 semester credit hours of prescribed electives should be taken from the required list below and up to 6 semester credit hours of free electives may be taken outside of the discipline in related UTSA graduate programs with approval of the Graduate Advisor of Record (GAR).

CRJ	5323	Criminal Justice Program Evaluation
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	6213	Gender Issues in the Criminal Justice System
CRJ	6223	Ethics and the Practice of Social Control
CRJ	6233	Minorities in the Criminal Justice System
CRJ	6303	Seminar on Topics in Policing and Crime Control
CRJ	6353	Jury Trials in American Jurisprudence

CRJ	6363	Paradigms of Justice Policy
CRJ	6403	Seminar on Topics in Law, Society and Justice Policy
CRJ	6951,3	Independent Study
CRJ	6961	Comprehensive Examination

- C. 6 semester credit hours of Master’s Thesis or Justice Policy Research Project. Students may enroll in CRJ 6983,6 Justice Policy Research Project or CRJ 6991,3,6 Master’s Thesis after 24 credit hours. CRJ 6983,6 Justice Policy Research Project requires faculty supervision and approval of the final report by the Graduate Studies Committee. To enroll in 1 semester credit hour of Master’s Thesis, a student must have already completed 6 semester credit hours in that course. CRJ 6991,3,6 Master’s Thesis requires compliance with UTSA thesis requirements and thesis defense. See Section IV of the Policies and Procedures of the Master of Science in Justice Policy Program for additional information.
- D. Comprehensive examination. Degree candidates are required to pass an oral or written comprehensive examination. The examination may be administered in the form of a presentation of the thesis or policy research project paper to a faculty committee. Candidates for the Master’s degree may complete the comprehensive examination requirement in a successful proposal submission. 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. See Section IV of Policies and Procedures of the Master of Science in Justice Policy Program for additional information.

COURSE DESCRIPTIONS JUSTICE POLICY (CRJ)

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 in research design, quantitative techniques, and statistical software used in criminal justice 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 Criminal Justice Program Evaluation

(3-0) 3 hours credit. Prerequisite: CRJ 5083 or equivalent.
Introduction to program evaluation strategies and methods. Surveys implementation, process, and outcome evaluation research designs and the utilization of both quantitative and qualitative analytic techniques. Ethical dilemmas and real-world barriers common to evaluation are examined.

- 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, but no more than 6 hours will apply to the Master's degree.
- 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 or other relevant 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, but no more than 6 hours will apply to the Master's degree.
- 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, but no more than 6 hours will apply to the Master's degree.
- 6213 Gender Issues in the Criminal Justice System**
(3-0) 3 hours credit.
This course uses an interdisciplinary approach to provide students with an overview of gender issues in the criminal justice system. The course integrates research design and both qualitative and quantitative methods to develop a graduate level understanding of gender and justice policy issues. Students will learn to examine issues and problems associated with changes in the representation of men and women in justice organizations, explore the internal/psychological and structural barriers to equal treatment of men and women in the justice system, as well as examine employment and policy decisions within a framework of traditional and nontraditional gender role expectations and justice system needs.
- 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.
- 6233 Minorities in the Criminal Justice System**
(3-0) 3 hours credit.
This course is an interdisciplinary exploration of the historical and contemporary differences and similarities in the study of minorities within the criminal justice system. The course integrates a variety of interdisciplinary perspectives used in the past to study minority issues and to empirically test the most important ideas concerning these topics. Topics for discussion may include the following: deviance, juvenile delinquency, substance use, gang membership, images of criminality, as well as involvement with police, courts, and correctional institutions.

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, but no more than 6 hours will apply to the Master's degree.

6353 Jury Trials in American Jurisprudence

(3-0) 3 hours credit.

Opportunity for advanced study of jury trials. Focus on readings and cases that impact jury selection, deliberations, outcomes, peremptory challenges, juror stress and jury nullification.

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, but no more than 6 hours will apply to the Master's 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 usually available as part of the regular course offerings. May be repeated for credit, but no 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).

6983,6 Justice Policy Research Project

3 or 6 hours credit. Prerequisites: Permission of the Graduate Advisor of Record and Faculty Advisor.

A formal policy research project involving interaction with one or more justice agencies, conducted by the student under the supervision of a faculty member. May be repeated for credit, but no more than 6 hours may be applied to the Master's degree. Credit will be awarded upon submission and acceptance of the formal research project report.

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 and administration, urban and regional planning, 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.

The Applied Demography program prepares students to address the expanding education and research problems that are at the intersection of demography, public policy and administration, education, public health, and health care. Students may pursue careers in university-based medical centers, public health related organizations and agencies, health science centers, national and corporate settings, and local, state and federal government. Students are trained to examine the effects of demographic factors on policy—both private and public.

The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 5, 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, and
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.

All students are expected to enter the program with some proficiency and aptitude for utilizing statistical software (i.e., SAS, SPSS, Stata). Basic ability to use the DEM-Research server to import and transform data sets and conduct basic statistical analyses is a requirement to be successful with a number of courses, and skills demonstrated by this ability are important to being an applied demographer. Recognizing that some students start the program with computer and software skills and knowledge,

an examination has been developed that will assess this competency. Students who pass the competency exam within the first semester of being admitted to the program may have DEM 7203 (Software Applications for Demographic Analysis) waived and may substitute another course for this requirement with the approval of the Graduate Program Committee.

Program of Study

A. Core Research and Statistics Courses (18 semester credit hours):

1. 9 semester credit hours of the following required courses:

Software

DEM 7203 Software Applications for Demographic Analysis

Research Methods

DEM 7243 General Research Methods for Demographers

DEM 7253 Survey Methods for Demographers

2. 9 semester credit hours selected from the following:

Mathematical Statistics

DEM 7223 Advanced Methods for Life Table Analysis

DEM 7263 Spatial Demography

DEM 7273 Statistics for Demographic Data I

DEM 7283 Statistics for Demographic Data II

Applied Statistical Methodology

DEM 7143 Applied Mathematical Demography

DEM 7233 Applied Forecasting Methods in Demography

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 of required courses:

DEM 7013 Demographic Methods of Analysis I

DEM 7023 Demographic Methods of Analysis II

DEM 7093 GIS for Population Science

DEM 7113 Social Demography and Community Trends

2. 3 semester credit hours selected from the following:

DEM 7033 Mortality

DEM 7043 Migration

DEM 7053 International Migration

DEM 7083 Fertility

C. Advanced Courses (a minimum of 15 semester credit hours is required):

1. 9–15 semester credit hours selected from the following:

DEM 7063 Applied Demography in Policy Settings

DEM 7073 Disparities in Health and Health Care

DEM	7123	Applied Demography in Education
DEM	7153	Applied Demography in Public Health
DEM	7163	Organizational and Industrial Demography
DEM	7173	Applied Demography in Urban and Regional Planning
DEM	7183	Social and Economic Impact Assessment
DEM	7193	Demography of Complex Organizations
DEM	7403	Health Care Organizations, Professions, and the Government
DEM	7783	Internship in Applied Demography

2. 0–6 semester credit hours selected from the following:

MKT	5003	Introduction to Marketing
PAD	5323	Public Policy Process
PH	1110*	Social and Behavioral Aspects of Community Health
PH	1120*	Introduction to Program Evaluation
PH	2610*	Introduction to Epidemiology
PH	3740*	Community-Based Health Assessment
PH	3915*	Methods for the Economic Evaluation of Health Programs
SOC	5103	Complex Organizations

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/academics/course-information/catalogs/> or on the Web site for the UTSA Ph.D. program in Applied Demography at <http://copp.utsa.edu>.

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/GI_catalog.aspx or on the Web site for the UTSA Ph.D. program in Applied Demography at <http://copp.utsa.edu>.

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. 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 will be scheduled twice a year. 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 Demographic Methods of Analysis I

(3-0) 3 hours credit. Prerequisite: DEM 7113 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. (Formerly titled “Basic Demographic Methods of Analysis.”)

7023 Demographic Methods of Analysis II

(3-0) 3 hours credit. Prerequisites: DEM 7013 and DEM 7113, 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. (Formerly titled “Advanced Methods of Applied Demographic Analysis.”)

7033 Mortality

(3-0) 3 hours credit. Prerequisite: DEM 7113 or consent of instructor.

Theoretical and demographic empirical analysis of current and historical issues concerning epidemiological/health transition, demographic and socioeconomic differentials in health and mortality, infant and child mortality, status of women and health, environment and health, demographic change and nutrition, health care systems, and health planning policies in the United States and in other developed and developing countries. Explores advanced sources of demographic data, measures, and methods of analyses used to analyze the levels and changes in these processes used in applied demographic settings. (Formerly titled “Fertility and Mortality.”)

7043 Migration

(3-0) 3 hours credit. Prerequisite: DEM 7113 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: DEM 7113 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, DEM 7023 and DEM 7113, or consent of instructor. Student must have a minimum of 30 credit hours in the Applied Demography doctoral program.

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.

7073 Disparities in Health and Health Care

(3-0) 3 hours credit. Prerequisites: DEM 7013 and DEM 7113 or 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.

7083 Fertility

(3-0) 3 hours credit. Prerequisite: DEM 7113 or consent of instructor.

Theoretical and empirical overview of major issues and methodological approaches in the demographic study of human fertility in developing and developed countries. Explores advanced sources of demographic data, measures, and demographic methods of analyses used to analyze the levels and changes in these processes used in applied settings.

7093 GIS for Population Science

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

This course is designed to give graduate students interested in population science and policy fields a hands-on introduction to the use of Geographic Information Systems (GIS). The course will cover geographic data types, spatial data creation and management, exploratory spatial analysis, and basics of geospatial modeling. At the close of the course, students are expected to be able to: create and modify geographic data, perform GIS visualization of spatial data, use database software to manage geographic data and perform descriptive analysis of spatial data using industry-standard GIS software.

7113 Social Demography and Community Trends

(3-0) 3 hours credit.

This seminar is a survey of the major themes in demographic research. It will focus on the causes and consequences of demographic change and world population problems and policies, and we will explore the major theoretical perspectives focusing on the interrelationship of social and environmental causes of population change and the dynamics of human populations.

7123 Applied Demography in Education

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

Objectives for this course are focused upon development of an understanding of demographic issues in the field of education and skills in the application of demographic methods and techniques in this area. Topics will include issues of population dynamics related to school enrollment and completion and application of demographic techniques relevant for education related topics.

7143 Applied Mathematical Demography

(3-0) 3 hours credit. Prerequisites: DEM 7013 and DEM 7273.

This course will examine the mathematical background behind the major methods and models used in demographic research and show how they are applied in population analysis. Students are assumed to have had the basic demographic techniques class, and a firm grasp of basic algebra. Calculus and matrix algebra will be used throughout the course, but extensive exposure to each is not assumed.

7153 Applied Demography in Public Health

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

Course work and readings will provide overview of demographic methods applied to examination of issues in the area of public health. A range of public health and epidemiologic topics will be reviewed in relation to issues related to demography and demographic methods. Assignments will provide students with opportunities to examine key issues in public health and explore specific topics of public health relevance.

7163 Organizational and Industrial Demography

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

This course focuses on the analyses of organizations and industries by looking beyond their prototypical structures to the range and diversity of organizations in their social, political, and economic settings. This is the study of populations of organizations and those which make up entire industries. Course content will focus on the theory, theoretical models or conceptual frameworks, methods, and data used in corporate demographic research.

7173 Applied Demography in Urban and Regional Planning

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

Urban and regional planning is strongly dependent on information generated from applied demography. This course will review the field of urban and regional planning with particular reference to the use of demographic information. Elements of the course will emphasize learning and applying traditional and innovative approaches to estimating and projecting population for small areas with particular reference to issues of geography and land use patterns.

7183 Social and Economic Impact Assessment

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

The purpose of this course is to provide students with an understanding of the requirements of, methodologies for, and issues in, socioeconomic impact assessment and to provide practical, working experience with socioeconomic impact assessment techniques.

7193 Demography of Complex Organizations

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

Demographic issues influence the structure and dynamics of large organizations. In this course, demographic forces will be examined as related to organizational behavior as well as issues regarding culture and society.

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.

7223 Advanced Methods for Life Table Analysis

(3-0) 3 hours credit. Prerequisites: DEM 7013, DEM 7023, and DEM 7273 or 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. Prerequisites: DEM 7013, DEM 7023, and DEM 7273 or 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

(3-0) 3 hours credit. Prerequisites: DEM 7013 and DEM 7113 or 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 Survey Methods for Demographers

(3-0) 3 hours credit. Prerequisite: DEM 7243 or consent of instructor.

This course examines the use of survey methodology and the research process, with special attention given to survey instruments as they relate to demographic research. 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. (Formerly titled "General Research Methods for Demographers II.")

7263 Spatial Demography

(3-0) 3 hours of credit. Prerequisite: DEM 7093 or consent of instructor.

This course will give an in-depth coverage of spatial demographic processes including models of migration, multiregional population growth, and spatial dependence in vital rates. The course will include a brief introduction to Geographic Information Systems, availability of spatial data and construction of geo-databases for population studies. The course will have a large analytical component with topics to include global and local spatial autocorrelation, analysis of spatial point patterns, neighborhood statistics and spatial regression analysis. Emphasis is placed on usage of computer software for the analysis of population data.

7273 Statistics for Demographic Data I

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

This course covers two main areas of statistical analysis. First, techniques for the description of univariate and bivariate distributions are covered, including summary statistics, confidence intervals, correlations, graphical exploratory methods and hypothesis testing for two and more groups. Also covered is the analysis of categorical data, including analysis of contingency tables and measures of association for categorical data. Secondly, ordinary least squares regression analysis and analysis of variance procedures and their diagnostics are covered. All methods are complemented by the application to demographic survey data sets and instruction in the Linux environment using both the SAS and R statistical programming languages. (Formerly titled "Univariate and Categorical Statistical Analysis for Demographic Data.")

7283 Statistics for Demographic Data II

(3-0) 3 hours credit. Prerequisite: DEM 7273 or consent of instructor.

This course represents an in-depth coverage of the general linear model framework, including multivariable regression analysis, logistic and Poisson regression and multilevel modeling. Model fit, model comparison and regression diagnostics for each method are covered. In addition to these topics, students are introduced to techniques for dealing with missing data including multiple imputation. All methods are complemented by the application to demographic survey data sets and instruction in the Linux environment using both the SAS and R/Splus statistical programming languages. (Formerly titled "Multivariate Statistical Analysis for Demographic Data.")

7403 Health Care Organizations, Professions, and the Government

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

7701 Professional Development Colloquium

(1-0) 1 hour credit. Prerequisite: Consent of instructor.

This is a professional development course focusing on the field of applied demography. Topics will vary by semester, and may include such things as grant writing, proposal preparation, peer-reviewed journal publication procedures, presentation development, demographic data sources and literature, grant funding sources, and job hunting. Other professional development topics will be addressed. May be repeated for credit when topics vary.

7783 Internship in Applied Demography

3 hours credit. Prerequisites: Consent of faculty advisor for internships and the Graduate Advisor of Record. Student must have a minimum of 40 semester credit hours in the Applied Demography doctoral program.

Practical experience in a workplace setting approved by the faculty advisor for internships and the GAR in which classroom knowledge of demographic research, methods, processes, and implications are applied. No more than 3 hours will apply to the Doctoral degree. A research paper under the supervision of assigned faculty is required at the end of the internship.

7801,3 Directed Research

1 or 3 hours credit. Prerequisites: 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 not 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).

Mission Statement. The MPA program at The University of Texas at San Antonio fosters a commitment to responsible leadership and ethical public service in a complex society. The program's diverse graduates, representing a wide range of professional and community backgrounds, will serve the public locally, regionally and nationally. Bridging research and practice, MPA graduates are expected to possess the decision making, management, communication and analytical skills necessary to sustain a responsive and effective public sector.

Program Admission Requirements. Applicants must satisfy University-wide graduate admission requirements, submit a letter of intent, and complete (or have completed) an undergraduate course in 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 (normally, professors and/or work supervisors). Applicants may be admitted as unconditional, conditional, or special graduate students, or as non-degree-seeking. Admission as a special graduate student or as non-degree-seeking does not guarantee subsequent admission as a degree-seeking student; such students must reapply for degree-seeking status. Applicants may be required to complete an American Government course if the class was not taken as an undergraduate student.

Degree Requirements. The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies, is 40. In addition to these basic degree requirements, students without previous work experience that supports attainment of careers and leadership roles in public and nonprofit organizations must complete an additional 6 semester credit hours of PAD 6963 or PAD 6966 Internship.

Degree candidates must complete the following requirements:

A. 24 semester credit hours of core courses:

PAD	5003	Introduction to Public Service Leadership and Management
PAD	5023	Research Design and Methods
PAD	5033	Theories of Public Organizations
PAD	5233	Applied Research I
PAD	5323	Public Policy Process
PAD	5363	Public Budgeting and Finance
PAD	5393	Economics for Public Affairs
PAD	6923	Applied Research II

B. 9 semester hours of prescribed electives, choose three (3) courses from the following list:

PAD	5243	Management Information Systems
PAD	5303	Ethics in Government Administration
PAD	5313	Public Policy Analysis
PAD	5333	Program Evaluation
PAD	5343	Human Resource Management in the Public Sector
PAD	5443	Diversity Policies and Management
PAD	5913	Nonprofit Organizations
PAD	5923	Nonprofit Leadership and Management
PAD	5943	Strategic Planning and Management for Public and Nonprofit Organizations
PAD	6243	Administrative Law

Normally, students enroll in PAD 5003, Introduction to Public Service Leadership and Management, during their initial semester.

- C. 6 semester credit hours of Public Administration electives, chosen in consultation with the student's advisor.
- D. 1 semester credit hour of PAD 6001, Leadership and Communication Skills Development Seminar.
- E. 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 II course.

Graduate Certificate in Nonprofit Administration and Leadership

The Graduate Certificate in Nonprofit Administration and Leadership is a 15-semester-credit-hour program offered by the Department of Public Administration established to provide students who are currently managing or working in the nonprofit sector, or who seek careers in the nonprofit sector, with essential management skills and a foundation in the theory and values fortifying the nonprofit sector in America.

The certificate enables graduate students with good academic standing from multiple program areas to develop their expertise, explore the current issues facing the sector, enhance their employment opportunities with nonprofit and public agencies, and meet the growing complexity and demands of the nonprofit sector.

To meet the curricular requirements for the Graduate Certificate in Nonprofit Administration and Leadership, students must complete 15 semester credit hours from the following:

- A. 9 semester credit hours of required courses:

PAD	5363	Public Budgeting and Finance
PAD	5913	Nonprofit Organizations
PAD	5923	Nonprofit Leadership and Management

- B. 3 semester credit hours selected from the following courses:

PAD	5933	Fiscal Resource Development in Nonprofit Organizations
PAD	5953	Grant Development and Proposal Writing
PAD	5963	Nonprofit Financial Management

- C. 3 semester credit hours selected from the following courses:

PAD	5933	Fiscal Resource Development in Nonprofit Organizations*
PAD	5943	Strategic Planning and Management for Public and Nonprofit Organizations
PAD	5953	Grant Development and Proposal Writing*
PAD	6973	Special Topics (with permission from Advisor)

*Cannot be repeated for credit if taken under section B.

Course substitutions are not permitted except under extenuating circumstances and prior department approval is required.

If it is determined by the Graduate Certificate in Nonprofit Administration and Leadership Program Advisor that a student requires prerequisite background courses to adequately prepare for the courses included in the Graduate Certificate in Nonprofit Administration and Leadership Program, this will be noted in the student's file. Prerequisite courses must be taken before enrolling in Graduate Certificate in Nonprofit Administration and Leadership Program coursework or within the first semester of coursework.

Students not currently enrolled in a graduate degree program are required to apply for admission to UTSA as a special (non-degree-seeking) graduate student and indicate their intent to seek admission into the certificate program. Applicants must 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 the formal intent form.

Completion of the Certificate program will be recorded on the student's transcript if the student has applied for and been admitted into the Certificate program and after completion of all coursework, and has applied for the Certificate by submitting the necessary application to the Enrollment Services Center. It is the student's obligation to apply for the Certificate, much like applying for graduation, after completion of the coursework.

Students should note that if they are currently pursuing a degree in a graduate program and pursuing the Certificate, and they graduate from the graduate program before they complete the Certificate, they must reapply for admission to UTSA as a special (non-degree-seeking) graduate student and indicate their intent to seek readmission into the Certificate program.

All other requirements for certificate programs described in Chapter 3, Certificate Programs, of this catalog apply to this program.

COURSE DESCRIPTIONS PUBLIC ADMINISTRATION (PAD)

5003 Introduction to Public Service Leadership and Management

(3-0) 3 hours credit.

This course introduces students to the discipline of public administration with an emphasis on the importance of public service ethic for a vibrant and active civil society. Public service is a vocation and centers on service to others. Students will be provided an opportunity to develop the self-awareness and capabilities to be successful and effective public servants. Topics include a basic introduction to the field and normative history, and context of public administration and related theories and a general overview of leadership theories and basic topics in public administration. Students should take this course in their first 6 hours of coursework. (Formerly titled "Introduction to Public Administration.")

5023 Research Design and Methods

(3-0) 3 hours credit.

Examines data analysis and hypothesis testing. Topics include descriptive statistics, probability, inference, and multivariate regression analysis. Provides opportunities to develop proficiency in statistical software applications. (Formerly titled "Quantitative Methods for Public Administration.")

5033 Theories of Public Organizations

(3-0) 3 hours credit.

Surveys organizational theory including analysis of how public organizations are managed and how individuals behave in public organizations. Addresses emerging models in public organizational theory and focuses on practical applications of theories to management of diverse public organizations.

5103 Planning and Land Use Law

(3-0) 3 hours credit.

Designed to provide a core background of the legal environment of planning and land use. This course will cover the various levels of government involved in defining this environment, with an emphasis on crucial historic and contemporary legal decisions that inform planning and land-use decisions. Special attention is given to the ethical and philosophical background that informs the balance of property rights and the public good. Topics covered may include regulatory mandates, eminent domain and takings, and the local tools of land use control.

5223 Urban Management

(3-0) 3 hours credit.

With a focus on local government, this course examines the intersection of administrative, political, fiscal, economic, and social processes for delivering public services. Students will explore the ways government creates opportunity and incentives, implements policy, serves citizens, and provides basic services in a complex environment. Topics may include contemporary issues in urban areas, urban finance, citizen participation, local government tax policies, sustainability, and intergovernmental dimensions of urban management.

5233 Applied Research I

(3-0) 3 hours credit.

This course represents the first half of the exit paper requirement. It will cover the necessary skills and tools requisite to preparing a successful, professional-level research paper. Topics will include designing an appropriate research question, research design, literature reviews, and tools of data collection and analysis. Tools presented will include the case study method and various qualitative techniques used in the social sciences. Students will use this course to prepare their own exit paper, in preparation for its completion in PAD 6923. (Formerly titled “Scope and Methods of Inquiry.”)

5243 Management Information Systems

(3-0) 3 hours credit.

This course examines managerial means of accessing, organizing, and using information and data in public and nonprofit organizations. The course emphasizes using information and communication technology to enhance managerial decision making. The major technologies and issues in management information systems are covered such as databases, telecommunications, Internet, wireless technology, and information security.

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.

Those who work in public service are responsible for developing and maintaining public trust by behaving ethically and with accountability. This course provides an introduction to the philosophy of ethics as it has developed in Western society. Students in this class will be introduced to ethics and how to analyze and confront ethical challenges as professional public servants as they relate to power, authority, accountability, justice, divided allegiances, and citizen priorities.

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 Process

(3-0) 3 hours credit.

A broad overview of the process of formulating, deciding on, and implementing public policies. Through theoretical approaches and case studies, this course examines issues such as the impact of politics on policy formulation, the role of nongovernmental actors in the policy process, and the decision-making challenges typically found in public policy making. (Formerly titled “Public Policy Formulation and Implementation.”)

- 5333 Program Evaluation**
(3-0) 3 hours credit.
The course provides an overview of the design and methodological issues in evaluating public programs and policies. Addresses the uses and limitations of methods such as cost-benefit analysis, time-series analysis, case studies, and the logic of experimental, quasi-experimental and nonexperimental assessments.
- 5343 Human Resource Management in the Public Sector**
(3-0) 3 hours credit.
This course explores the current state and practice of human resource management in public organizations. Traditional human resource management tasks and topics such as recruitment, selection, compensation, benefits, discipline and evaluation, are examined. An introduction to the legal issues in public human resource management may be covered. Students are also introduced to the history and political nature of human resource management.
- 5363 Public Budgeting and Finance**
(3-0) 3 hours credit.
This course provides a foundation in public budgeting and finance that includes an exploration of concepts, processes, and principles essential to effective professional practice in the public sector. Topics include the politics of the budgetary process, budget preparation, budgeting for performance, capital budgeting, revenue strategies, debt management, and budget reporting and analysis. (Formerly titled "Public Sector Financial Management.")
- 5373 Social Policy**
(3-0) 3 hours credit.
An examination of social policy issues in the American context. This course analyzes social policy from the standpoint of both theory and practice and explores its impact on society at all levels. Topics include the economics of redistribution, political institutions and participation, and the role of the courts and bureaucracy in shaping social policy. Issues in social policy design, implementation, and evaluation are also examined.
- 5383 Housing Policy**
(3-0) 3 hours credit.
An examination of U.S. housing policy at the federal, state, and local level. This course places housing policy within the context of sustainable communities and includes an analysis of issues such as the economic functioning of housing markets, urban politics, and challenges associated with social and geo-spatial segmentation. The course also focuses on the collaborative nature of housing policy design and implementation, including the role of the public sector, nonprofit organizations, and for-profit sector.
- 5393 Economics for Public Affairs**
(3-0) 3 hours credit.
This course introduces the use of economic reasoning and tools of analysis with a primary focus on application to issues in public policy and administration. Concepts and principles addressed include demand and supply, consumer choice, market structures, market failure, tax systems, inequality, redistribution, and cost-benefit analysis. The interrelationship between government and the private sector in a market economy is also explored with a particular emphasis on implications for public policy. (Formerly titled "Economics for Public Administrators.")
- 5443 Diversity Policies and Management**
(3-0) 3 hours credit.
Provides an overview of policies, laws and historical framework on workplace diversity issues. Focuses on providing tools for leaders of public organizations to effectively manage a multicultural organization. Examines impact of changing workforce demographics on public management.
- 5453 Public-Private Contracting**
(3-0) 3 hours credit.
State and federal agencies increasingly contract out services and activities previously conducted in-house. This course aims to provide an understanding of the issues that arise from public-private contracts and the contracting process. The course examines 1) the market for public goods and services, 2) the role contracts play in these markets, and 3) the issues public administrators face when designing and managing public-private contracts.

5463 Collaborative Governance

(3-0) 3 hours credit.

This course explores issues of theory and practice in collaborative governance structures. Methods for building and sustaining collaborative coalitions among public, private, and nonprofit organizations are introduced. Collaborative structures examined will include local, regional, state, and federal policy and program networks. (Formerly titled “Intergovernmental Relations.”)

5473 Land Use Policy

(3-0) 3 hours credit.

A broad overview of the formulation and implementation of land use policies in the United States, with an emphasis on South Texas. Special attention is given to traditional local land use tools such as platting and zoning, as well as more contemporary and innovative strategies such as form-based zoning and regional planning bodies. Topics may also include: how our changing orientation to land functions as a key determinant of land use policy; environmental protection; the provision of affordable housing.

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 Urban Planning and Society

(3-0) 3 hours credit.

This course examines the role of planning in the context of society, including the institutional setting and governmental environment of planning practice. Topics include citizen participation, growth strategies, community sustainability, zoning and development regulation, strategic and comprehensive planning, and development analysis. The role of planners in fostering social equity and in bridging public and private interests is also explored. (Formerly titled “Introduction to Urban Planning.”)

5513 Urban and Regional Economic Development

(3-0) 3 hours credit.

Focus on economic development theory and tools for urban-regional economic development. Analyses of factors contributing to the economic growth or decline of U.S. cities or regions. Research approaches and development theories and practices provide the student with options for approaches and policies for economic development. Case studies of specific urban areas are analyzed.

5523 Community Sustainability

(3-0) 3 hours credit.

This course examines policy issues associated with the social, economic, and environmental sustainability of communities, and provides an exploration of policy tools appropriate for enhancing the effectiveness of such efforts. The course focuses on the nexus among diverse, yet related, policy areas such as transportation, land use, housing, education, resource protection, and economic development, especially against a background of socioeconomic context and community self-governance.

5563 Introduction to Urban Planning Methods

(3-0) 3 hours credit.

Provides an overview of tools and methods used by practicing planners. Topics include: demographic analysis and forecasting, employment analysis and forecasting, program evaluation, strategies for engaging the public and presentation techniques. Primarily intended for students enrolled in the Master of Science in Urban and Regional Planning program.

- 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.
- 5583 Urban Policy**
(3-0) 3 hours credit.
This course explores the role of policy in urban settings and its impact on social welfare. Topics covered will include the history of urban policy in the U.S., evaluation of urban policies, and current urban issues. In addition, the role of federal government in urban policy will be analyzed. Students will also consider the role of public, nonprofit and private organizations in responding to urban challenges.
- 5813 Health Issues and Policies**
(3-0) 3 hours credit.
Provides an overview of the social, economic, legal, political, and internal and external context of health care policies in America. The historical development of issues and policies is explored. Students explore the trends and current issues facing health care. Competing or conflicting interests, the role of government, and future challenges, are examined.
- 5913 Nonprofit Organizations**
(3-0) 3 hours credit.
This course focuses on the role, characteristics, and management of nonprofit organizations. Central to the course is the unique role of the nonprofit sector in buttressing civil society. Students examine the difference between the nonprofit and public sectors, the values of the sector, nonprofit organizations as a means for collective action, and a brief history of the development of the sector. Additional topics may include legal issues, accountability, and voluntarism.
- 5923 Nonprofit Leadership and Management**
(3-0) 3 hours credit. Prerequisite: PAD 5913 is recommended.
This course focuses on leadership and managerial responsibilities and techniques in nonprofit organizations. Topics may include the roles and functions of boards of directors, recruiting and retaining volunteers and staff, and understanding the complex context of nonprofit organizations. Case studies are analyzed to further integration of course material and student experience.
- 5933 Fiscal Resource Development in Nonprofit Organizations**
(3-0) 3 hours credit.
This course provides a practical approach to funding sources and activities for financing nonprofit organizations. Course material and activities are designed to promote knowledge about, and practical application of, fundraising activities that include fundraising planning, special events, marketing, corporate and foundation funding, direct mail and annual campaigns, planned giving, capital campaigns, and major gifts.
- 5943 Strategic Planning and Management for Public and Nonprofit Organizations**
(3-0) 3 hours credit.
This course introduces students to the basic concepts and processes of strategic planning and management for public and nonprofit organizations. The focus will be on external environment, strategic issues that face the organizations, and long-term planning perspective. The course teaches special techniques such as SWOT and strategic issue analysis to help students align organizational goals and strategies with developments in the political, social, economic, legal, and technological forces. Case studies are used to assist students in understanding the important concepts and applying strategic planning techniques to real-life problems.
- 5953 Grant Development and Proposal Writing**
(3-0) 3 hours credit.
Provides preparation for public managers to develop effective grant proposals. Examines important trends in philanthropy, specifically outcome measurement and program evaluation. Other topics include: creating partnership proposals, identifying possible funding sources, program design, and effective writing for grants.

5963 Nonprofit Financial Management

(3-0) 3 hours credit.

This course is designed to provide students with concepts and techniques for managing the financial health of nonprofit organizations. Basics of nonprofit accounting are introduced, as well as exploration of the ways in which effective nonprofits manage revenues, expenses, assets, and liabilities. The course also includes techniques for budgeting, cash management, inventory management, donated receivables management, and debt management.

6001 Leadership and Communication Skills Development Seminar

(1-0) 1 hour credit.

This professional symposium will cover a variety of relevant topics for public, nonprofit and private sector professionals. Topics may include decision-making and leadership skills, professional writing, and business etiquette. Symposia may be taught by faculty or by professionals in the community. May not be repeated for credit. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).

6233 Law and Policy

(3-0) 3 hours credit.

An overview of the interrelationship 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 rules that govern the activities of administrative agencies 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 discretion, and the appropriate scope of judicial review.

6303 Disaster Response and Preparedness

(3-0) 3 hours credit.

This course examines disaster preparedness, mitigation, response, and recovery. The differences between human-caused disasters, technological accidents, and natural disasters are explored. The ways in which individuals, communities, and organizations (government, nonprofit, and for-profit) can participate in disaster preparedness and response 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.

A brief history of the development of the city, the current state of the city, and the potential future for the city are explored. Study of infrastructure, planning, technology, housing, economic development, education, and transportation systems is included. Economy, equity, and effectiveness are also addressed. Political and social dimensions may also be examined.

6923 Applied Research II

(3-0) 3 hours credit.

In this course, the student will complete their professional research paper, using the skills and background developed in PAD 5233 Applied Research I.

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 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 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 not more than 6 hours, regardless of discipline, will apply to the Master’s degree.

DEPARTMENT OF SOCIAL WORK

Mission Statement

Educating transformative culturally competent social workers.

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 cultural competence, multidimensional contextual practice, social responsibility, and transformative social work. The UTSA MSW program is fully accredited by the Council on Social Work Education (CSWE).

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 addressing interest in and the fit with the UTSA MSW program not to exceed 1,250 words (approximately five pages);
- three completed department recommendation forms from professionals 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), 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).

Only 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. For students receiving other than unconditional admission, BSW degree deficiencies may require additional coursework.

For advanced standing admission, the applicant must meet program admission requirements, and in addition:

- hold a BSW degree received from a CSWE-accredited BSW program within ten years from the date of application to the UTSA MSW program (students with appropriate rationale, such as post-BSW practice experience, may apply and request an exception to this requirement in their application);
- 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 one additional reference letter from the BSW field director/coordinator or BSW program director;
- provide a copy of the BSW field evaluation form which indicates number of clock hours completed, final grade, description of practicum setting (including 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 in a CSWE-accredited master of social work program. The minimum number of semester credit hours required for the modified MSW degree transfer option is 36. For students receiving other than unconditional admission, MSW course deficiencies may require additional coursework.

For admission as a transfer student from a CSWE-accredited Master of Social Work Program, the applicant must meet program admission requirements and:

- 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 one additional reference letter from the MSW field director/coordinator or MSW program director, and provide a copy of the MSW field evaluation form which indicates number of clock hours completed, final grade, description of practicum setting (including 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 the non-BSW, advanced standing, or modified MSW program may also be admitted as unconditional, conditional, probationary, special graduate, or non-degree-seeking students. Students admitted as conditional or probationary students must satisfy specified conditions their first semester in the program for their admission status to be changed to that of an unconditional student. 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://copp.utsa.edu/social-work/home/>.

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	5103	Social Problems and Social Welfare Policy Analysis
SWK	5113	Generalist Social Work Practice
SWK	5203	Social Work Research
SWK	5303	Foundations of Social Work I
SWK	5313	Foundations of Social Work II
SWK	5403	Foundation Field Practicum I and Integrative Seminar
SWK	5413	Foundation Field Practicum II and Integrative Seminar

B. 6 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

C. 18 semester credit hours in Advanced Culturally Competent Practice. All students must complete the following courses:

SWK	5423	Advanced Field Practicum III and Integrative Seminar
SWK	5433	Advanced Field Practicum IV and Integrative Seminar
SWK	5443	Advanced Social Work Methods: Individuals
SWK	5463	Advanced Social Work Methods: Groups
SWK	5493	Advanced Social Work Methods: Community Practice
SWK	5523	Advanced Social Work Methods: Children and Families

D. 6 semester credit hours in Advanced Research and Policy. All students must complete the following courses:

- SWK 5243 Advanced Social Work Research: Practice and Program Evaluation
- SWK 5473 Advanced Social Work Methods: Policy Practice and Advocacy

E. 3 semester credit hours from the following selectives. All students must complete one of the following courses:

- SWK 5483 Multidimensional Assessment
- SWK 5633 Transformational Leadership in Social Work

F. 3 semester credit hours of electives. All students must complete one of the following courses:

3 semester credit hours of free elective graduate coursework chosen in consultation with the student's faculty advisor, or

- SWK 6953 Independent Study
- or
- SWK 6973 Special Topics in Culturally Competent Practice

Comprehensive Examination. Students who successfully complete SWK 5433 Advanced Field Practicum IV and Integrative Seminar with a grade of "B" or better satisfy the comprehensive examination requirement for master's degree graduates. (Students must earn a minimum grade of "B" in SWK 5433 as a degree requirement.)

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.

This foundation course focuses on building students' understandings of individual and family life span development with an emphasis on diversity and social justice issues. Ecological systems and cross-cultural development provide the organizing framework for this course. Critical to understanding individual and family dynamics is the student's ability to critically evaluate and differentially apply multiple paradigms and theories. Emphasis is placed on the social construction of knowledge of human development.

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 course examines the overall structure of the American social welfare system from a historical multidimensional contextual perspective that emphasizes the diversity of clients/client systems, problems, needs, and injustices. It also considers the parallel historical development of the profession of social work, including the ways it has responded to the demands of social problems across key periods of the American social welfare experience. An emphasis is placed on policy analysis as a foundation for advocacy on behalf of clients/client systems.

5113 Generalist Social Work Practice

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This foundation course, taken the semester before students enter their first semester of foundation field practicum, focuses on the development of beginning knowledge, skills, and values needed to practice generalist social work within a community context. The course socializes students to the social work profession, with emphasis on the ecosystems perspective as an organizing framework for understanding clients/client systems. Professional values and the National Association of Social Work Code of Ethics are introduced, as well as the importance of self-reflection that incorporates an understanding of one's own personal values. Attention is given to practice skills applicable in work with diverse individuals, families, groups, organizations, and communities, with emphasis on beginning relationship skills in engagement and assessment. Students will apply knowledge and skills learned by working in task groups to conduct an assessment of a neighborhood or community.

5203 Social Work Research

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor or graduate advisor.

This foundation research course explores the role of research in culturally competent social work practice that emphasizes the diversity of clients/client systems, strengths, problems, needs and injustices. The course focuses on research methods and the use of ethical scientific methods used by social workers for evidence-based practice and practice-based evidence.

5233 Global Context of Social Work

(3-0) 3 hours credit. Prerequisite: Completion of all foundation social work courses or consent of graduate advisor.

This course, particular to the mission of the UTSA Department of Social Work, examines the historical, political, and cultural contexts of contemporary global social issues and the mutually reinforcing relationship between the local and the global. The course critically examines the economic, political, social, and cultural dimensions of globalization and the upheavals they produce for nations and people. Specific models of intervention and select approaches to social development seen as more compatible with social work's commitment to social justice are examined to determine their respective strengths and weaknesses in response to contemporary social issues. In addition, the course raises critical questions about social work's past and present ability to address the growing challenges of an increasingly complex integrated and interdependent world.

5243 Advanced Social Work Research: 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 5433.

This advanced research course prepares students to integrate research methods in the assessment, planning, intervention, and evaluation of practice/program effectiveness. Attention is given to the conduct, ethics, and application of research and evaluation principles when addressing social and economic justice issues with clients/client systems.

5303 Foundations of Social Work I

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work, completion of SWK 5113 and concurrent enrollment in SWK 5403.

This foundation course is the second course in a three-course sequence that focuses on the development of knowledge, skills, and values needed to practice generalist social work with individuals, families, groups, organizations, and communities. The course is taken concurrently with SWK 5403 Foundation Field Practicum I and Integrative Seminar. This course incorporates ecosystems, strengths and empowerment perspectives, focusing on knowledge and skills needed to facilitate generalist practice with diverse clients/client systems, with an emphasis on engagement, assessment, evaluation, problem formulation, and contracting. Students apply concepts and skills learned in this course in work with clients/client systems in their field practicum setting. Specific attention is given to understanding human service agencies within a community and diversity context and planning a client group. (Formerly titled "Social Work Methods I.")

5313 Foundations of Social Work 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 is the third course in a three-course sequence that focuses on the development of knowledge, skills, and values needed to practice generalist social work with individuals, families, groups, organizations, and communities. The course focuses on knowledge and skills needed to facilitate work with diverse clients/client systems, with an emphasis on middle and end stages of the helping process. Specific attention is given to evaluating practice, planning and implementing an organizational or community change effort, and facilitating a client group. Students apply concepts and skills learned in this course in work with clients/client systems in their field practicum settings. An integrative seminar that emphasizes integration of theory and practice meets weekly. (Formerly titled "Social Work Methods II.")

5403 Foundation Field Practicum I and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work, completion of SWK 5113, and concurrent enrollment in SWK 5303.

This foundation field practicum course is designed to serve as the integration of professional knowledge, values, and skills in 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 from a generalist social work perspective which includes skill in working with individuals, families, small groups, communities, and organizations. The student completes a minimum of 225 clock hours at an assigned field practicum site affiliated with UTSA. The student will continue in this same practicum setting for SWK 5413. An integrative seminar that emphasizes integration of theory and practice meets weekly. Students must earn a minimum grade of "B" in both the field and the integrative seminar components of this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

5413 Foundation 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 field practicum course builds on knowledge and skills gained in SWK 5403, with a focus on demonstrating competencies from a generalist social work perspective and skill development with diverse clients/client systems. The student's assignment from SWK 5403 continues at the same setting. The student completes a minimum of 225 clock hours. An integrative seminar that emphasizes integration of theory and practice meets weekly. Students must earn a minimum grade of "B" in both the field and the integrative seminar components of this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

5423 Advanced Field Practicum III and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation coursework and the majority of advanced courses.

Building on foundation or BSW field experiences, this advanced field practicum course provides a supervised practicum at an assigned practicum site and a weekly integrative seminar. The minimum 225-clock-hour internship addresses the continued independent learning and application of theory to culturally competent practice at an advanced curriculum level. The internship may be designed as a block with all hours completed in one semester (450 clock hours) when taken concurrently with both SWK 5243 Advanced Social Work Research and SWK 5433 Advanced Field Practicum IV and Integrative Seminar. The integrative seminar is designed to integrate classroom theory and real-world practice. It also serves as the bridge between program goals and advanced competencies. Students must earn a minimum grade of "B" in both the field and the integrative seminar components of this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade. (It is expected that SWK 5433 Advanced Field Practicum IV and Integrative Seminar will be completed at the same practicum site and taken during the student's final two semesters prior to graduation.)

5433 Advanced Field Practicum IV and Integrative Seminar

3 hours credit. Prerequisites: Graduate standing in social work, completion of all foundation coursework and the majority of advanced courses, and concurrent enrollment in SWK 5243.

Building on field experiences in SWK 5423, this course provides a continuation of a supervised practicum at the same assigned practicum site as in SWK 5423 and a weekly integrative seminar. This course serves as the capstone course for the social work program. The minimum 225-clock-hour internship addresses the continued independent learning and application of theory to culturally competent practice at an advanced curriculum level. The internship can be designed as a block of one semester (450 clock hours) when taken concurrently with SWK 5423 Advanced Field Practicum III and Integrative Seminar. The integrative seminar is designed to integrate classroom theory and real world culturally competent practice. It also serves as the bridge between program goals and advanced competencies. Students demonstrate program competency mastery through completion of an independent capstone course paper. Students must earn a minimum grade of "B" in both the field and the integrative seminar components of this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

5443 Advanced Social Work Methods: Individuals

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses; concurrent enrollment in SWK 5423 is recommended.

This advanced practice methods course covers the differential application of contemporary practice paradigms, theories, and approaches in relation to multidimensional contextual practice with individuals. The aim of this course is to develop students' practice knowledge, skills, and capacity for autonomous culturally competent practice. Using this framework, students develop knowledge and skills in the differential selection, adaptation, application, and evaluation of select practice strategies and techniques for working with diverse individuals who are experiencing problems, needs, and injustices of varying onset, magnitude, and duration. (Formerly titled "Advanced Social Work Methods: Individual and Family Practice.")

5463 Advanced Social Work Methods: Groups

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced practice methods course covers the differential application of contemporary practice paradigms, theories, and approaches in relation to multidimensional contextual practice with groups. The aim of this course is to develop students' practice knowledge, skills, and capacity for autonomous culturally competent practice. Using this framework, students develop knowledge and skills in the differential selection, adaptation, application, and evaluation of select practice strategies and techniques for working in groups with diverse individuals across the life span. The course emphasizes the ways that setting, age, diversity, and problems inform the differential selection of group type and format, membership, time limits, and practice approaches.

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 course in social welfare policy is for students who have already achieved a basic understanding of the history, mission, and philosophy of the profession, and the historical and contemporary patterns of service provision. The course focuses on the knowledge, values, and skills needed to be an effective social welfare policy advocate. Students develop and analyze alternative strategies for culturally competent social welfare policy advocacy, incorporating a multidimensional contextual perspective with a focus on social justice, diversity and underserved populations.

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, and environmental factors, and social justice issues in the assessment process.

5493 Advanced Social Work Methods: Community Practice

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced course in community practice is for students who have already achieved a foundational understanding of the structure and dynamics of organizations and communities. The course focuses on the knowledge, values, and skills needed to engage in effective community practice, incorporating a multidimensional contextual perspective with a focus on social justice, diversity, and underserved populations. The course incorporates content on organizations within a community practice context. (Formerly titled "Advanced Social Work Methods: Community Organization and Social Development.")

5513 Culturally Competent Practice with Diverse Populations

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of graduate advisor; must be completed prior to enrollment in advanced coursework unless an advanced standing or transfer student.

This course examines the dynamics of diversity and social justice and their relationships to social work practice with diverse and oppressed populations. Critical self-reflection about one's own intersecting cultural identities and the impact on discourse and work with others is emphasized. Frameworks for understanding populations served by social workers, incorporating strengths, resiliency, oppression and discrimination are also explored. The course incorporates ethnographic perspectives in working with clients/client systems.

5523 Advanced Social Work Methods: Children and Families

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses.

This advanced practice methods course covers the differential application of contemporary practice paradigms, theories, and approaches in relation to multidimensional contextual practice with children and families. The course examines pertinent ethical issues, varying approaches used in contemporary social work intervention, and current research in working with children and families. Factors leading to family systems change, goal setting, intervention applicability, the structure of the intervention process, the social worker's role, and techniques of marital/family interventions and interventions in working with children and adolescents are incorporated in this course.

5633 Transformational Leadership in Social Work

(3-0) 3 hours credit. Prerequisites: Graduate standing in social work and completion of all foundation courses or consent of graduate advisor.

This advanced course focuses on the social responsibility of culturally competent social workers to serve as transformational leaders as they collaborate across disciplines within an interprofessional context in order to better serve families and communities. The course introduces students to transformational models of leadership, with an emphasis on the knowledge and skills needed for effective culturally competent practice in human service organizational settings. (Formerly titled "Transformational Leadership." May not be counted for credit if student has already taken SWK 5453 or SWK 5633 under previous title.)

6951-3 Independent Study

1 to 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 instructor, graduate advisor, and department chair.

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 (form available) from the instructor, graduate advisor, and department chair.

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.

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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. 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.

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 a maximum of 3 semester credit hours in graduate seminar (BIO 7051).
- An additional 18 semester credit hours of graduate credit as approved by the Graduate Advisor of Record. This may include up to 6 semester credit hours of upper-division (3000–4000 level) undergraduate coursework (requires prior approval of the Graduate Advisor), and a maximum of 6 hours, in total, of BIO 5973 Directed Research or BIO 6953 Independent Study. For students electing the nonthesis option, a total 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 the student's Graduate Committee. For nonthesis students, this examination must be given in the semester prior to the semester during which degree requirements are to be completed. Students who do not achieve the criteria (or necessary expectations) to pass the exam will be required to enroll in the Critical Thinking & Writing for the Biological Sciences course (BIO 6963) in the following semester and retake the examination. 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, and immunology. 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.

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, incoming 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, an undergraduate course in immunology, with a laboratory component, is 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 (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 the number of students admitted each year may be limited.

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 (12 semester credit hours):

BIO	5001	Ethical Conduct in Research
BIO	5113	Principles of Biochemistry
BIO	5123	Principles of Molecular Biology
BIO	5133	Principles of Cell Biology
BIO	5762	Fundamentals of Immunology for Biotechnology

B. 3 semester credit hours in basic laboratory techniques are required:

BIO	5033	Biotechnology Laboratory
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C. A minimum of 3 semester credit hours of additional organized laboratory experience are required from the following:

BIO	5143	Advanced Molecular Biology Laboratory – DNA Techniques
BIO	5153	Advanced Molecular Biology Laboratory – RNA Techniques
BIO	5163	Recombinant Protein Biotechnology Laboratory
BIO	7571-3	Experimental Techniques in Biology

D. Biotechnology electives

Students must obtain their remaining credit hours from the following list of electives. Depending upon 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.

BIO	5063	Environmental Microbiology
BIO	5233	Medicinal Plants
BIO	5363	Microbial Genetics and Recombinant DNA
BIO	5403	Advanced Comparative Animal Physiology
BIO	5443	Neurochemistry
BIO	5453	Neuroendocrinology
BIO	5523	Enzymes
BIO	5543	Pharmacology and Toxicology
BIO	5553	Toxicology
BIO	5563	Proteomics
BIO	5583	Molecular Neuropharmacology
BIO	5623	Bioinformatics for Biotechnology
BIO	5643	Bioinformatics and Computational Biology
BIO	5653	Biology of Disease
BIO	5723	Topics in Biodefense
BIO	5733	Advanced Medical Mycology
BIO	5743	Advanced Virology
BIO	5773	Applied Fungal Molecular Biology
BIO	5783	Introduction to Good Manufacturing Practices and Good Laboratory Practices
BIO	5833	Membrane Structure and Function
BIO	5971-3	Directed Research
BIO	6123	Plant Molecular Biology
BIO	6233	Quantitative Biology
BIO	6243	Gene Regulation
BIO	6253	Biodegradation of Organics in Soil and Groundwater
BIO	6513	Drug Development
BIO	6523	Cell and Tissue Engineering
BIO	6533	Topics in Biotechnology
BIO	6543	Vaccine Development
BIO	6553	Fermentation Science
BIO	6563	Food Science and Biotechnology
BIO	6773	Host-Parasite Interactions
BIO	6803	Advanced Immunology and Immunochemistry
BIO	6873	Microbial Physiology and Energetics
BIO	6883	Bacterial Pathogenesis
BIO	6963	Critical Thinking & Writing for the Biological Sciences
BIO	6973	Special Problems
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
MOT	5323	Biotechnology Industry
STA	6913	Bioinformatics and Data Mining I: Microarray Data Analysis

Biotechnology Internship. The internship will require prior arrangement with biotechnology-based companies and approval of the Graduate Advisor of Record. Students may not take an internship if they select the thesis option.

BIO 7563,6,9 Practicum in Biotechnology

Thesis Option. Students electing the thesis option must complete 6 semester credit hours of BIO 6983 Master's Thesis.

Comprehensive Examination. As specified by University regulations, degree candidates must pass a comprehensive examination administered by their Comprehensive Examination Committee. Only tenured or tenure-track faculty members can chair the Committee, and no more than one member of the Committee may be nontenure-track faculty or from another institution. For nonthesis students, this examination must be given in the semester prior to the semester during which degree requirements are to be completed. Students who do not achieve the criteria (or necessary expectations) to pass the exam will be required to enroll in the Critical Thinking & Writing for the Biological Sciences course (BIO 6963) in the following semester and retake the examination.

Master of Science Degree in Environmental Science

The College of Sciences 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, engineering, or some other related scientific discipline. Additionally, it is required that applicants will have taken coursework in the following areas: 1) one semester in general statistics; 2) one semester of organic chemistry; and 3) one semester of environmental science or ecology. Applicants lacking these requirements will be asked to complete these deficiencies within the first 12 credit hours. Applicant's evaluations will be considered on a case-by-case basis.

Applicants whose native language is not English must score at least 550 (paper version) or 79 (Internet version) on the Test of English as a Foreign Language (TOEFL), or 6.5 on the International English Language Testing System (IELTS). Applicants must submit a minimum of two letters of recommendation from persons familiar with the applicant's academic record, a personal statement of research interest as well as professional and academic goals, a résumé, and scores from the Graduate Record Examination (GRE). A score of 1000 on the GRE general test (combination of verbal and quantitative sections) is considered competitive. All supporting documents should be sent to the Graduate School. 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 Graduate Advisor of Record (GAR) for the Environmental Science program.

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 areas of research expertise of the current Environmental Science faculty include aquatic biology and chemistry, ecology, environmental quality and remediation, and environmental management. 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.

General 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:

ES	5013	Survey Topics in Environmental Science*
ES	5023	Environmental Statistics
ES	5503	Environmental Policy and Law
ES	5981	Graduate Seminar in Environmental Science and Engineering
ES	6941	Environmental Science Colloquium

*This course must be taken in the first two semesters of the program.

1. A minimum of 20 semester credit hours of graduate credit in organized classes must be earned within the College of Sciences in consultation with the student's Graduate Committee; 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 (ES 5981 Graduate Seminar in Environmental Science and Engineering or ES 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 ES 6953 Independent Study. Students electing the thesis option must complete 6 semester hours of ES 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:

ES	6983	Master's Thesis
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Thesis Option. Candidates for the Master of Science degree electing the thesis option must first pass a research proposal examination in front of their Graduate Committee. The student should schedule the research proposal examination during the second semester but no later than the third semester of graduate work. The research proposal examination will be oral and will cover a written document that includes the thesis topic, objectives, and research proposed by the student, and will take one to two hours to complete. The research proposal examination may only be taken twice. If it is not passed the first time it may be scheduled again in the following semester. Finally, candidates in the thesis option must successfully defend their thesis before their Graduate Committee. The thesis defense will take two to three hours to complete. The thesis defense is normally scheduled in the last semester before the degree requirements are to be completed. Part of the thesis defense will be a public presentation in an open, advertised forum.

Nonthesis Option Requirements. A nonthesis option is available for those who want the opportunity to earn the Master of Science degree primarily through organized coursework. Nonthesis students should consult the Graduate Advisor of Record on their program of study during the first semester of residence. 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 written examination will be given at a predetermined time during each Fall and Spring semester. In addition, an oral examination will be administered by the student's Graduate Committee. The oral examination will focus on academic material that the student is expected to have mastered during his or her course of study. The examinations are taken after the student has completed at least 30 semester credit hours of coursework. The written and oral examination may only be taken twice. If it is not passed the first time, it may be scheduled again in the following semester. If ES 6961 Comprehensive Examination is taken, it does not contribute toward the 36-semester-credit-hour minimum (refer to the Course Descriptions section).

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 or Nonthesis Committee. Only tenured or tenure-track faculty members can chair these committees, and no more than one member can be a nontenure-track faculty member or be from another university.

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 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. In addition, the Cell and Molecular Biology concentration offers a specialized track in Molecular Microbiology and Immunology. 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 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations).

Admission Requirements. Applicants must have a Bachelor of Arts or a Bachelor of Science degree, preferably in biology, from an accredited university and a minimum grade point average of 3.0 in upper-division and graduate work. 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 94 semester credit hours beyond the baccalaureate degree for the concentration in Neurobiology, and a minimum of 85 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 (19 semester credit hours required):

BIO	5001	Ethical Conduct in Research
BIO	5423	Neuroanatomy
BIO	5433	Neurophysiology
BIO	5443	Neurochemistry
BIO	6233	Quantitative Biology
BIO	7113	Supervised Teaching in Biology
BIO	7571-3	Experimental Techniques in Biology – Research Rotation (3 semester credit hours required)

B. Colloquia and seminars (19 semester credit hours minimum):

BIO	7041	Biology Colloquium
BIO	7051	Seminar in Life Sciences*

*Enrollment in 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	Doctoral Dissertation (for Ph.D. candidates)

D. Electives (12 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 (10 semester credit hours minimum—a minimum of 1 credit hour each semester throughout tenure in the program):

BIO	7041	Biology Colloquium
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C. Doctoral research (45 semester credit hours minimum):

BIO	7212/7213	Doctoral Research
BIO	7311-3	Doctoral Dissertation

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 and the Cell and Molecular Biology Doctoral Studies Committee, and must be submitted to the Dean of the Graduate School for final approval.

Molecular Microbiology and Immunology Track

The primary objective of the track in Molecular Microbiology and Immunology is to provide graduates with advanced academic and research training in all aspects of Microbiology and Immunology, especially in those areas that pertain to infectious diseases. This track will provide expertise in bacteriology, virology, parasitology, mycology, immunology, vaccinology, biodefense, and molecular genetics. The information derived from research in this area has an enormous impact on biology and medicine.

Students in this track follow the regular core curriculum for the concentration in Cell and Molecular Biology; however, their Doctoral Dissertation topic, proposal and research need to be in an area related to Microbiology and Immunology. Likewise, students are also encouraged to select the majority of their elective courses and colloquia from those offered that are broadly

related to the field of Microbiology and Immunology. The overall program of study for this track may differ by no more than 12 semester credit hours from the program of study for the regular concentration in Cell and Molecular Biology and must be approved by the student's Dissertation Advisor and the Cell and Molecular Biology Doctoral Studies Committee.

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 1) the Doctoral Studies committee; 2) the Department Chair; 3) the Dean of the College; and 4) the Dean of the Graduate School. The Dissertation Committee guides and critiques the candidate's research. The Committee is composed of four program 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, which is approved by relevant Doctoral Studies Committee, the Department Chair, and the Dean of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements.

Doctor of Philosophy Degree in Environmental Science and Engineering

UTSA offers a graduate-studies program leading to the Ph.D. degree in Environmental Science and Engineering. This program is administered by the Department of Civil and Environmental Engineering. Most of the participating graduate faculty are in the College of Sciences (including Department of Geological Sciences) and College of Engineering (Department of Civil and Environmental Engineering); additional faculty in this interdisciplinary program are from other colleges. Please refer to page 244 of this catalog for details about this program.

COURSE DESCRIPTIONS BIOLOGY (BIO)

5001 Ethical Conduct in Research

(1-0) 1 hour credit. Prerequisite: Graduate standing.

This course provides a basic overview of the requirements for ethical conduct within the research laboratory. The grade report for this course is either "CR" (satisfactory completion) or "NC" (unsatisfactory completion). (Credit cannot be earned for both BIO 5001 and BIO 7413.)

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 ES 5013. Credit cannot be earned for both BIO 5013 and ES 5013.)

5033 Biotechnology Laboratory

(0-6) 3 hours credit. Prerequisite: Graduate standing.

An organized course offering an introduction to routine procedures employed in the modern research laboratory.

- 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 ES 5063. Credit cannot be earned for both BIO 5063 and ES 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 ES 5073. Credit cannot be earned for both BIO 5073 and ES 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 can be earned for only one of the following: BIO 5123, 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 – DNA Techniques**
(0-6) 3 hours credit. Prerequisite: BIO 3913 or an equivalent. BIO 5033 recommended.
An introduction to advanced techniques of molecular biology dealing with manipulations and analyses of DNA, including preparation and analysis of genomic DNA, genomic cloning, the polymerase chain reaction (PCR), Southern blotting, DNA sequencing and computational analysis of DNA sequence data.
- 5153 Advanced Molecular Biology Laboratory – RNA Techniques**
(0-6) 3 hours credit. Prerequisite: BIO 3913 or an equivalent. BIO 5033 recommended.
An introduction to advanced techniques of molecular biology dealing with manipulations and analyses of RNA, including preparation and analysis of cellular RNA, cDNA cloning, the reverse transcriptase-polymerase chain reaction (RT-PCR), Northern blotting, and recovery and characterization of gene-specific cDNAs.
- 5163 Recombinant Protein Biotechnology Laboratory**
(0-6) 3 hours credit. Prerequisite: Satisfactory completion of BIO 5033.
Small- to large-scale growth of microorganisms and eukaryotic cells followed by downstream processing of supernatants and/or cell pellets, protein purification and protein analysis. (Formerly BIO 7542 and BIO 7543. Credit cannot be earned for both BIO 5163 and BIO 7542 or BIO 7543.)
- 5233 Medicinal Plants**
(3-0) 3 hours credit. Prerequisite: Graduate standing in Biology or Chemistry.
An overview of plant secondary metabolism, and the ethnobotany, biochemistry, and pharmacology of some of our most important plant-derived pharmaceuticals.

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 ES 5243. Credit cannot be earned for both BIO 5243 and ES 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 ES 5263. Credit cannot be earned for both BIO 5263 and ES 5263.)

5273 Global Change Biology

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

Historical, present-day and future predictions of global changes in biological communities and species will be examined. Gas exchange, mating systems, phenological changes, pollination and pollinators as well as other species interactions, species diversity and species distribution will be examined. Both intrinsic and extrinsic factors influencing the changes will be scrutinized.

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.

5363 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 5373. Credit cannot be earned for both BIO 5363 and BIO 5373.)

5403 Advanced Comparative Animal Physiology

(3-0) 3 hours credit. Prerequisite: BIO 3413 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. Prerequisite: BIO 3433 or an equivalent. BIO 3513 or an equivalent recommended.

An introduction to the biochemical basis of synaptic transmission, and the pathological changes in synaptic transmission 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. Prerequisite: BIO 3433 (or PSY 3103) recommended, or consent of instructor.
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 5433 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. Prerequisite: BIO 3433 (or PSY 3103) recommended, or consent of instructor.
The electrophysiological 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.
- 5553 Toxicology**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
The molecular mechanisms by which varied environmental toxins impact human physiological systems will be presented, including the metabolic aspects involved in chemical biotransformation. Processes by which chemical exposures induce cancers and genetic and/or developmental anomalies will be addressed. Risk assessment, food production safety issues and biological aspects of regulatory toxicology will also be discussed.
- 5563 Proteomics**
(3-0) 3 hours credit. Prerequisite: BIO 3513 or an equivalent.
Protein chemistry, sequences, methods, technology, domains, folding, post-translational modifications, and biomarkers. (Formerly BIO 5593. Credit cannot be earned for both BIO 5563 and BIO 5593.)

- 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.
- 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. Prerequisites: BIO 2313 or STA 1993, or an equivalent; enrollment in Biology Ph.D. program required, 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 Advanced 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. (Formerly titled "Biochemical Virology.")
- 5762 Fundamentals of Immunology for Biotechnology**
(2-0) 2 hours credit.
An integrated examination of the principles of immunology pertaining 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 6951-3 (Independent Study), will apply to the Master's degree.

6113 Advanced Plant Physiology

(3-0) 3 hours credit. Prerequisite: BIO 3343 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 ES 6113. Credit cannot be earned for both BIO 6113 and ES 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 ES 6133. Credit cannot be earned for both BIO 6133 and ES 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 ES 6213. Credit cannot be earned for both BIO 6213 and ES 6213.)

6233 Quantitative Biology

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

An introduction of quantitative analysis of biological data and design of experiments. Topics include probability theory and distributions; descriptive statistics; hypothesis testing and confidence intervals for means, variances, and proportions; chi-square statistic; categorical data analysis; linear correlation and regression model; analysis of variance; and nonparametric methods.

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 ES 6253. Credit cannot be earned for both BIO 6253 and ES 6253.)

6313 Molecular Biology and Biophysics of Ion Channels

(3-0) 3 hours credit. Prerequisites: BIO 5433 and BIO 5443, or permission 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 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 permission 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.
- 6883 Bacterial Pathogenesis**
(3-0) 3 hours credit. Prerequisites: BIO 3713 and BIO 4743 or consent of instructor.
This course will present a selection of topics in the field of bacterial pathogenesis. Lectures will cover regulation of virulence; colonization and host tissue damage; vaccines, antibiotics and novel antimicrobials; evasion of the immune system; intracellular pathogens; pathogenic mechanisms of Gram-negative and Gram-positive bacteria; pathogenic mycobacteriology; and experimental tools in bacterial pathogenesis.
- 6951-3 Independent Study**
1 to 3 hours credit. Prerequisites: Graduate standing and permission in writing 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 5971-3 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).
- 6963 Critical Thinking & Writing for the Biological Sciences**
(3-0) 3 hours credit. Prerequisites: Consent of the instructor and of the Graduate Advisor of Record.
This course introduces students to writing and critiquing research proposals, manuscripts, abstracts, and scientific presentations.
- 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 applied 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.

Oral presentations, discussions, critical evaluation of students' research in progress, or discussions of current journal articles or reviews of recent scientific advances. May be repeated for credit. 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 ES 6941. Unless topic varies, credit cannot be earned for both BIO 7041 and ES 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.

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 colloquium) or "NC" (unsatisfactory participation in the colloquium). 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. The student will be responsible for all aspects of leading a discussion section or laboratory course. Approval by the chair of the appropriate Doctoral Studies committee required.

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, but no more than 52 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 and completion of at least 18 semester credit hours of BIO 7211-6.

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. (Credit cannot be earned for both BIO 5001 and BIO 7413.)

7513 Advanced Biochemistry

(3-0) 3 hours credit. Prerequisites: BIO 5113 and BIO 5123.

Topics in biochemical structure, regulation, signaling, and analysis.

7563,6,9 Practicum in Biotechnology

3, 6, or 9 hours credit. Prerequisites: Enrollment in Master's in Biotechnology program and at least 18 hours credit including satisfactory completion of BIO 5033 and one other organized laboratory course.

An internship in a Biotechnology company. 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.)

COURSE DESCRIPTIONS ENVIRONMENTAL SCIENCE (ES)

5013 Survey Topics in Environmental Science

(3-0) 3 hours credit. Prerequisite: Graduate standing.

Analysis of the basic concepts and new scientific developments in the Earth's changing environment systems and their links to human activities. Case studies will cover a range of relevant topics to promote a thorough understanding of the emergent issues in environmental sciences. Emphasis will be placed on developing both written and verbal scientific presentation skills. (Formerly EES 5013. Same as BIO 5013. Credit can be earned for only one of the following: BIO 5013, EES 5013, or ES 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 EES 5023. Same as GEO 5023. Credit can be earned for only one of the following: EES 5023, ES 5023, or GEO 5023.)

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 EES 5043. Same as CE 6113 and GEO 5043. Credit can be earned for only one of the following: CE 6113, EES 5043, ES 5043, or GEO 5043.)

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. (Formerly EES 5063. Same as BIO 5063. Credit can be earned for only one of the following: BIO 5063, EES 5063, or ES 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. (Formerly EES 5073. Same as BIO 5073. Credit can be earned for only one of the following: BIO 5073, EES 5073, or ES 5073.)

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 EES 5103 and ES 6203. Credit can be earned for only one of the following: EES 5103, ES 5103, or ES 6203.)

5113 Freshwater Ecology

(3-0) 3 hours credit. Prerequisite: Graduate standing in biology or environmental science, or consent of instructor.

This course examines the physical, chemical, and biological factors that determine biodiversity and the distribution of freshwater ecosystems. Key ecological and hydrogeomorphology concepts and their application to environmental concerns are covered. Field trip required.

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 EES 5123 and ES 6873. Credit can be earned for only one of the following: EES 5123, 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 EES 5213. Credit cannot be earned for both EES 5213 and ES 5213.)

5233 Experimental Design and Analysis

(3-0) 3 hours credit. Prerequisite: ES 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 EES 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 EES 5243. Same as BIO 5243. Credit can be earned for only one of the following: BIO 5243, EES 5243, or ES 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. (Formerly EES 5253. Credit cannot be earned for both EES 5253 and ES 5253.)

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 EES 5263. Same as BIO 5263. Credit can be earned for only one of the following: BIO 5263, EES 5263, or ES 5263.)

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 EES 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 EES 5503. Same as PAD 5483. Credit can be earned for only one of the following: EES 5503, ES 5503, or PAD 5483.)

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. (Formerly EES 5743. Credit cannot be earned for both EES 5743 and ES 5743.)

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 EES 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. The grade report for this course is either "CR" (satisfactory) or "NC" (unsatisfactory). (Formerly EES 5981 and ES 5991.)

6003 Risk and Decision Analysis

(3-0) 3 hours credit. Prerequisite: ES 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 EES 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 EES 6013. Credit cannot be earned for both EES 6013 and ES 6013.)

6033 Multivariate Analysis in Environmental Science and Engineering

(3-0) 3 hours credit. Prerequisites: ES 5023 and ES 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, discriminant analysis, multivariate normal distributions, mean vectors and covariance matrix and tests of covariance matrices. (Formerly EES 6033. Credit can be earned for only one of the following: CE 6033, EES 6033, or ES 6033.)

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 EES 6103 and ES 5203. Credit can be earned for only one of the following: EES 6103, ES 5203, or ES 6103.)

6113 Advanced Plant Physiology

(3-0) 3 hours credit. Prerequisite: BIO 4203 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 EES 6113. Same as BIO 6113. Credit can be earned for only one of the following: BIO 6113, EES 6113, or ES 6113.)

6123 Environmental Quality

(2-3) 3 hours credit. Prerequisites: CHE 2603 or equivalent, and ES 3053 or ES 4003, 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 EES 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 EES 6133. Same as BIO 6133. Credit can be earned for only one of the following: BIO 6133, EES 6133, or ES 6133.)

6203 Aqueous Geochemistry

(2-3) 3 hours credit. Prerequisites: CHE 2603 or equivalent, and ES 3053 or ES 4003, 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 EES 6203. Same as GEO 6203. Credit can be earned for only one of the following: EES 6203, ES 6203, or 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 EES 6213. Same as BIO 6213. Credit can be earned for only one of the following: BIO 6213, EES 6213, or ES 6213.)

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. (Formerly EES 6253. Same as BIO 6253. Credit can be earned for only one of the following: BIO 6253, EES 6253, or ES 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. (Formerly EES 6273. Credit can be earned for only one of the following: CE 6273, EES 6273, or ES 6273.)

- 6703 Environmental Biotechnology**
(3-0) 3 hours credit. Prerequisites: ES 5063 or ES 5263, and ES 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. (Formerly EES 6703. Credit cannot be earned for both EES 6703 and ES 6703.)
- 6723 Advanced Environmental Regulations**
(3-0) 3 hours credit. Prerequisite: ES 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. (Formerly EES 6723. Credit can be earned for only one of the following: CE 6723, EES 6723, or ES 6723.)
- 6763 Environmental Phytoremediation**
(2-3) 3 hours credit. Prerequisites: CHE 2603 or equivalent, and ES 3053 or ES 4003, 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. (Formerly EES 6763. Credit cannot be earned for both EES 6763 and ES 6763.)
- 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 EES 6813. Same as GEO 6813. Credit can be earned for only for one of the following: EES 6813, ES 6813, or GEO 6813.)
- 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 EES 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 EES 6941. Same as BIO 7041. Unless topic varies, credit can be earned for only one of the following: BIO 7041, EES 6941, or ES 6941.)
- 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 EES 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 EES 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 EES 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 EES 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 EES 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. (Formerly EES 7211-3.)

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. (Formerly EES 7311-3.)

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, biochemistry, bioinorganic 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 or dissertation development through coursework and research. Additional cooperative projects and programs are available with other area research institutions.

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.

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.

The complete set of requirements for the M.S. degree in Chemistry is described in the Chemistry M.S. Program Handbook which can be accessed at <http://utsa.edu/chem/graduates.html>.

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 Graduate School 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 61 and 100 (Internet version). See Chapter 1, 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. The student must have a grade point average of 3.0 or greater (on a 4.0 scale) in the core lecture courses and elective courses combined.

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.

Registration for CHE 5922 Research and Teaching Practice and Ethics is required for all students who are Teaching Assistants.

- B. A minimum of 6 semester credit hours of electives in chemistry, as approved by the M.S. Research Advisor and 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. The student must have a grade point average of 3.0 or greater (on a 4.0 scale) in the core lecture courses and elective courses combined.

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	6991-6	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.

Registration for CHE 5922 Research and Teaching Practice and Ethics is required for all students who are Teaching Assistants.

- B. 6 semester credit hours of elective organized coursework. These courses must be approved by the M.S. Research Advisor and the Graduate Advisor of Record.

- C. Students must submit an acceptable final written report and pass an oral presentation, 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 (Ph.D.) 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 complete set of requirements for the Ph.D. in Chemistry is described in the Chemistry Ph.D. Program Handbook (<http://utsa.edu/chem/graduates.html>). The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations, in this catalog).

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. At least 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 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 550 and 600 (paper version) or 79 and 100 (Internet version). See Chapter 1, 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/or Graduate Seminar in Chemistry 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. Other requirements include (but are not limited to) submission of a satisfactory research proposal in an area outside the dissertation research, the written dissertation, and the final oral examination. The final oral examination consists of a public presentation of the dissertation and a closed oral defense which are evaluated by the student's Doctoral Studies Committee. 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	5922	Research and Teaching Practice and Ethics
CHE	6991-8	Directed Research (minimum 16 hours)
CHE	7921-8	Doctoral Research (minimum 23 hours)
CHE	7931-8	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 Doctoral Research Advisor, Doctoral Studies 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 Qualifying Examination. The Qualifying Examination is divided into written and oral portions. A Dissertation Research Proposal (DRP) constitutes the written portion, and defense of the DRP constitutes the oral portion. The oral portion must be presented no later than one month following submission of the written portion. The student's performance on both the written and oral portions is evaluated by the student's Doctoral Studies Committee.

COURSE DESCRIPTIONS

CHEMISTRY

(CHE)

5263 Advanced Analytical Chemistry

(3-0) 3 hours credit. Prerequisites: CHE 3213 and CHE 4213, or equivalents.

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 3823 and CHE 3831, 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 3823 and CHE 3831, 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.
- 5922 Research and Teaching Practice and Ethics**
2 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). (Formerly CHE 5923. Credit cannot be earned for both CHE 5922 and CHE 5923.)
- 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. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).

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.

6991-8 Directed Research

1 to 8 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 16 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 bio-organometallic 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 3643 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 3643 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).

7921-8 Doctoral Research

1 to 8 hours credit. Prerequisite: Graduate standing in Chemistry.

Doctoral research and preparation. May be repeated for credit, but not more than 23 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress.

7931-8 Doctoral Dissertation

1 to 8 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 7921-8 or CHE 7931-8, 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 2, General Academic Regulations, and Chapter 4, 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 6981-3 Master's Thesis or complete 6 hours of additional graduate coursework in the Department of Computer Science.

D. Final oral examination:

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. 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. 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 2, General Academic Regulations, and Chapter 5, 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 5 of this catalog) for other requirements.

Qualifying Examination. Before a student can register for CS 7211-6 Doctoral Research or CS 7311-6 Doctoral Dissertation, the student must pass the Doctoral Qualifying Examination. The rules and procedures governing the Doctoral Qualifying Examination are described in the Computer Science Ph.D. Program Handbook.

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 3873.
 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 2233 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 2233 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 3853.

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 3853.

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 2123 and any statistics course.

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.
- 6981-3 Master’s Thesis**
 1 to 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 GEOLOGICAL SCIENCES

Master of Science Degree in Geology

The Master of Science degree program in Geology offers opportunities for advanced study and research designed to prepare students for roles in industry, government, research institutes, or educational institutions.

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 with sufficient coursework in the geosciences. Background or remedial courses may be required to remove deficiencies. Applicants lacking these requirements will be asked to complete the deficiencies early in their program. Applicant's evaluations will be considered on a case-by-case basis.

Applicants must submit three letters of recommendation from persons familiar with the applicant's academic record, a personal statement of research interest, undergraduate transcripts, and 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. All supporting documents should be sent to the Graduate School. Incomplete applications will not be considered until all required items are in an applicant's file.

The graduate faculty and Graduate Advisor of Record 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, Department of Geological Sciences.

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. Each student must decide if they are going to complete the thesis or nonthesis option because that will determine the type of committee appointed. The Committee should be appointed once a thesis supervisor and topic have been determined. University rules for the supervising committee must be followed. Only tenured or tenure-track faculty members can chair these committees, and no more than one member can be a nontenure-track faculty member or be from another institution.

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.

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.

Thesis Option Requirements. All candidates for the Master of Science in Geology with thesis option must complete a minimum of 9 semester credit hours of the following:

GEO	5103	Current Topics in the Geosciences	3 hours
GEO	6983	Master's Thesis	6 hours

A minimum of 24 semester credit hours of graduate credit in organized classes with the approval of the Graduate Advisor of Record is also required. This may include up to 6 hours of GEO 6953 Independent Study. Under special circumstances, students may take up to 6 semester credit hours of upper-division undergraduate coursework in the College of Sciences or College of Engineering with approval of the Graduate Advisor of Record. Candidates for the Master of Science degree electing the thesis option must also pass a final oral comprehensive examination in which they successfully defend their thesis before their

Graduate Committee. The thesis defense will take two to three hours to complete. The thesis defense is normally scheduled in the last semester before the degree requirements are to be completed. Part of the thesis defense will be a public presentation in an open, advertised forum.

Nonthesis Option in Geology

Degree Requirements. The Master of Science degree in Geology requires the successful completion of a minimum of 39 semester credit hours.

Nonthesis Option Requirements. A nonthesis option is available for those who want the opportunity to earn the Master of Science degree in Geology primarily through organized coursework. Nonthesis students should consult the Graduate Advisor of Record on their program of study during the first semester of residence. Candidates are required to complete a minimum of 9 semester credit hours of the following:

GEO	5103	Current Topics in the Geosciences	3 hours
GEO	5973	Directed Research	3 hours
GEO	6953	Independent Study	3 hours

An additional 30 semester hours of graduate credit as approved by the Graduate Advisor of Record is required. Under special circumstances, students may take up to 6 semester credit hours of approved upper-division undergraduate coursework within the College of Sciences or College of Engineering with approval of the Graduate Advisor of Record. Candidates are required to pass a written comprehensive examination that covers several major areas of geology. This examination is taken after the student has completed at least 30 semester credit hours of coursework. If GEO 6961 Comprehensive Examination is taken, it does not contribute toward the 39-semester-credit-hour minimum.

Certificate of Professional Development in Geographic Information Science

The purpose of the Professional Certificate in Geographic Information Science is to train individuals from a broad range of academic disciplines to be competent users of Geographic Information Science and the related tools of Remote Sensing and Web-based GIS data publication and sharing. Although the program is generally oriented toward geological sciences professionals, individuals with business, social science, medical, engineering, computer science, criminal science or education backgrounds will benefit from this professional certificate. Individuals completing this certificate will gain a practical and hands-on knowledge of Geospatial Science. All courses taken in the Professional Certificate in Geographic Information Science program may be applied toward a Master's degree in Geology or Environmental Science, a Doctoral degree in Environmental Science and Engineering, or other graduate degree with approval of the Graduate Advisor of Record of the degree program.

Description of Certificate Program. The Certificate in 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 in Geographic Information Science program. Candidates for the certificate should ideally complete the program within one year, but not more than two years. Students will receive program guidance from the GIS Certificate Advisor.

Certificate Curriculum. To complete the certificate program, students are to take the following four graduate courses addressing Geographic Information Science, and a fifth course, chosen in consultation with and approved by the student's GIS Certificate Advisor, which will serve as a "capstone" course in which the student will apply at an advanced level what has been learned in the other four required courses. The student will be expected to complete work related to Geographic Information Science that would be in addition to the regular assigned studies in that fifth course.

GEO	5033	Geographical Information Systems	
		or	
CE	5293	Geographic Information Systems (GIS)	
GEO	5053	Remote Sensing	
GEO	6513	Advanced GIS	
GEO	6543	Internet Served GIS	

Doctor of Philosophy Degree in Environmental Science and Engineering

UTSA offers a graduate-studies program leading to the Ph.D. degree in Environmental Science and Engineering. This program is administered by the Department of Civil and Environmental Engineering. Most of the participating graduate faculty are in the College of Sciences (including the Department of Geological Sciences) and College of Engineering (Department of Civil and Environmental Engineering); additional faculty in this interdisciplinary program are from other colleges. Please refer to page 244 of this catalog for details about this program.

COURSE DESCRIPTIONS GEOLOGICAL SCIENCES (GEO)

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 EES 5023. Same as ES 5023. Credit can be earned for only one of the following: EES 5023, ES 5023, or GEO 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 EES 5033 and ES 5033. Same as CE 5293. Credit can be earned for only one of the following: CE 5293, EES 5033, ES 5033, or GEO 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 EES 5043. Same as CE 6113 and ES 5043. Credit can be earned for only one of the following: CE 6113, EES 5043, ES 5043, or GEO 5043.)

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 EES 5053 and ES 5053. Credit can be earned for only one of the following: EES 5053, ES 5053, or GEO 5053.)

5083 Remote Sensing Image Processing and Analysis

(2-2) 3 hours credit. Prerequisite: GEO 4093 or GEO 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. (Formerly EES 5083. Credit cannot be earned for both EES 5083 and GEO 5083.)

- 5093 Remote Sensing in Hydrology**
(2-2) 3 hours credit. Prerequisite: GEO 4093 or GEO 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. (Formerly EES 5093. Credit cannot be earned for both EES 5093 and GEO 5093.)
- 5103 Current Topics in the Geosciences**
(3-0) 3 hours credit. Prerequisite: Graduate standing in geology or consent of instructor.
Evaluation of current research trends and methodology in the geosciences.
- 5223 Advanced Environmental Geology**
(3-0) 3 hours credit. Prerequisites: GEO 4063 and ES 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 EES 5223 and GEO 5203. Credit can be earned for only one of the following: EES 5223, GEO 5203, or GEO 5223.)
- 5303 Petroleum Geology**
(3-0) 3 hours credit. Prerequisites: GEO 3103 and GEO 3153, or consent of instructor.
Integrated study of the generation, migration, and entrapment of petroleum. Survey of surface and subsurface geological and geophysical techniques for exploration and production. Case studies of petroleum systems including economic aspects of the petroleum industry.
- 5404 Dynamics of Geomorphic Landscapes**
(3-3) 4 hours credit. Prerequisite: GEO 4113 or GRG 3723, or consent of instructor.
Mechanics of surficial processes. Application of geomorphic principles to select environmental issues. Field trip required. (Formerly EES 5304, EES 5404, and GEO 5304. Credit can be earned for only one of the following: EES 5304, EES 5404, GEO 5304, or GEO 5404.)
- 5414 Fluvial Geomorphology**
(3-3) 4 hours credit. Prerequisite: GEO 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 trip required. (Formerly EES 5414. Credit cannot be earned for both EES 5414 and GEO 5414.)
- 5424 Landscape Evolution**
(3-3) 4 hours credit. Prerequisite: GEO 5404, or consent of instructor.
Introduction to landscape evolution with an emphasis on interactions between climate tectonics, and geomorphic processes. (Formerly EES 5424. Credit cannot be earned for both EES 5424 and GEO 5424.)
- 5454 Advanced Paleontology**
(3-3) 4 hours credit. Prerequisite: BIO 3063 or GEO 3153, 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 EES 5454. Credit cannot be earned for both EES 5454 and GEO 5454.)
- 5483 Environmental Hydrogeology**
(3-0) 3 hours credit.
Focuses on the physical and chemical processes that control natural variation in the chemical and isotopic composition of groundwater, fate and transport of groundwater contaminants, and modeling of groundwater quality using publicly available computer programs. Field trips required. (Formerly EES 5483. Credit cannot be for both EES 5483 and GEO 5483.)

5504 Advanced Stratigraphy

(3-3) 4 hours credit. Prerequisites: GEO 3123 and GEO 3153, 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 EES 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 EES 5603. Credit cannot be earned for both EES 5603 and GEO 5603.)

5713 Groundwater Modeling

(3-0) 3 hours credit. Prerequisite: GEO 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 flow of subsurface fluids may be included. (Formerly EES 5703 and EES 5713. Credit can be earned for only one of the following: EES 5703, EES 5713, or GEO 5713.)

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 EES 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, EES 5863, and GEO 5853. Credit can be earned for only one of the following: EES 5853, EES 5863, GEO 5853, or GEO 5863.)

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 EES 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 EES 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 EES 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 EES 5971-3.)

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 EES 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. (Formerly EES 6001.)

6011 Seminar in Geospatial Science and Applications

(1-0) 1 hour credit.

Seminar will focus on literature review of cutting-edge research in remote sensing, GIS, geoinformatics, and their applications to water resources, surface hydrology and cryosphere.

6021 Seminar in Polar Marine Science

(1-0) 1 hour credit.

Seminar will focus on literature review of cutting-edge research in polar marine system—defined as the sea ice covers of the Antarctic, Arctic, and sub-Arctic seas—and will cover the characteristics of growth, structure and properties of sea ice, geophysics of sea ice, air-ice-ocean interaction and polar marine biology.

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 EES 6183. Credit cannot be earned for both EES 6183 and GEO 6183.)

6203 Aqueous Geochemistry

(2-3) 3 hours credit. Prerequisites: CHE 2603 or equivalent, and ES 3053 or ES 4003, 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 EES 6203. Same as ES 6203. Credit can be earned for only one of the following: EES 6203, ES 6203, or GEO 6203.)

6243 Paleoecology

(3-0) 3 hours credit. Prerequisite: BIO 3063 or GEO 3153, or consent of instructor.

Study of fossil organisms in relation to their 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. (Formerly EES 6243. Credit cannot be earned for both EES 6243 and GEO 6243.)

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 EES 6304. Credit cannot be earned for both EES 6304 and GEO 6304.)

6344 Micropaleontology

(3-3) 4 hours credit. Prerequisite: BIO 3063 or GEO 3153, 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. Field trips required. (Formerly EES 6344. Credit cannot be earned for both EES 6344 and GEO 6344.)

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 EES 6403. Credit cannot be earned for both EES 6403 and GEO 6403.)

6503 GPS Mapping

(2-2) 3 hours credit. Prerequisite: CE 5293 or GEO 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 EES 6503 and ES 6503. Credit can be earned for only one of the following: EES 6503, ES 6503, or GEO 6503.)

6513 Advanced GIS

(2-2) 3 hours credit. Prerequisite: CE 5293 or GEO 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, including spatial analysis, spatial statistics, geostatistical analysis, 3-D analysis, and geoprocessing. The emphasis of this course is on understanding the underlying principles of those tools and on how to apply them to solve real-world problems. (Formerly EES 6513 and ES 6513. Credit can be earned for only one of the following: EES 6513, ES 6513, or GEO 6513.)

6523 GIS for Water Resources

(3-0) 3 hours credit. Prerequisites: GEO 4623 and GEO 6513, 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. (Formerly EES 6523. Credit cannot be earned for both EES 6523 and GEO 6523.)

6543 Internet Served GIS

(2-2) 3 hours credit. Prerequisite: CE 5293 or GEO 5033, or consent of instructor.

Distributed Geographic Information (DGI) using a Geographic Information System (GIS). 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 EES 6543 and ES 6543. Credit can be earned for only one of the following: EES 6543, ES 6543, or GEO 6543.)

6613 Subsurface Remediation

(3-0) 3 hours credit. Prerequisites: GEO 4623 and GEO 5483, 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. (Formerly EES 6613. Credit cannot be earned for both EES 6613 and GEO 6613.)

- 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 EES 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 EES 6813. Same as ES 6813. Credit can be earned for only one of the following: EES 6813, ES 6813, or GEO 6813.)
- 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 EES 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 EES 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, will apply to a Master's degree. Field trips may be required. (Formerly EES 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 EES 6983.)

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	5103	Introduction to Mathematical Analysis
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 site at <http://utsa.edu/cos/>.

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, 18 semester credit hours of graduate mathematics courses and 9 semester credit hours of advanced courses in the Colleges of Sciences or Engineering 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, Linear Algebra, and an upper-division course in mathematics. The applicant must submit three letters of reference from qualified scientists, mathematicians, or supervisors that can certify their ability to pursue studies in applied mathematics at the Master’s level.

Degree Requirements. Degree candidates are required to successfully complete 36 semester credit hours. However, not more than 12 combined credit hours of Directed Research, Independent Study, and AIM 6943 may be counted toward the degree. Students admitted to the program must consult the Graduate Advisor of Record for their individual study plans and get approval before enrollment in each course.

Candidates for the degree must complete:

A. 6 semester credit hours of required courses:

AIM	5113	Introduction to Industrial Mathematics
MAT	5283	Linear Algebra and Matrix Theory

B. 12 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. 9 semester credit hours of electives: Upon completion of 12 semester credit hours in mathematics, a student is eligible to enroll in advanced courses selected from disciplines in the Colleges of Sciences or 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 either an employment letter from a company or a one-page pre-internship 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 without approval of the Graduate Advisor of Record and the Graduate Review Committee.

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. (Credit cannot be earned for both MAT 5103 and MAT 5203.)

5123 Introduction to Cryptography

(3-0) 3 hours credit. Prerequisite: MAT 4213.

Congruences and residue class rings, Fermat's Little Theorem, the Euler phi-function, the Chinese Remainder Theorem, complexity, symmetric-key cryptosystems, cyclic groups, primitive roots, discrete logarithms, one-way functions, public-key cryptosystems, digital signatures, finite fields, and elliptic curves.

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.

Topics may include: Metrizable topological spaces, function spaces, covering spaces, homotopy theory and fundamental groups, classification of surfaces, and others.

5263 Algebraic Topology

(3-0) 3 hours credit. Prerequisite: MAT 4273 or MAT 5243.

Fundamental ideas of algebraic topology, homotopy and simplicial complexes, fundamental group, covering spaces, and duality theorems.

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.

5323 Mathematical Modeling

(3-0) 3 hours credit. Prerequisite: MAT 3633 or equivalent.

Techniques of mathematical modeling for applications, including ordinary and partial differential equations, stochastic models, discrete models and optimization, modeling error and uncertainty quantification.

5333 Wavelet Analysis

(3-0) 3 hours credit. Prerequisite: MAT 5213, MAT 5283, or consent of instructor.

Inner products and Hilbert spaces, time-frequency analysis, the integral wavelet transform, multiresolutional analysis, dyadic wavelets, classification of wavelets, wavelet decompositions and reconstructions, wavelet packets, multivariate wavelets, and curvelets.

5343 Differential Geometry

(3-0) 3 hours credit. Prerequisite: MAT 5283 or equivalent.

Multilinear algebra, differentiable manifolds, exterior differential forms, affine connections, Riemannian geometry, and curvature equations.

5353 Mathematics of Image Processing

(3-0) 3 hours credit. Prerequisite: MAT 5213, MAT 5283, or consent of instructor.

Topics include image acquisition, denoising and enhancement, transformations, linear and nonlinear filters, image compression, segmentation and edge detection, morphology, and pattern recognition.

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 2214, 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 1224, 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 and 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. May be repeated for credit, but no more than 6 credit hours will apply toward the Master’s degree.

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.

Graduate students will be able to choose from among several areas of specialization in experimental and theoretical physics, including condensed matter, advanced materials, nanomaterials, biophysics, laser spectroscopy, astrophysics, theoretical particle physics and cosmology, mathematical physics, and computational physics. Areas of expertise among the Adjoint Faculty at Southwest Research Institute span Space Physics, including space weather, ionospheric-thermospheric-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 experimentation, 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 general Graduate Record Examination (GRE). 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 550 and 600 (paper version) or 79 and 100 (Internet version). See Chapter 1, 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	5403	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.

Students must attend the Research Seminar for three (3) full semesters during their graduate studies. However, no more than 3 semester credit hours may be applied to the M.S. degree.

- B. 9 semester credit hours of advanced electives, including graduate courses offered by other departments, as approved by the Graduate Advisor of Record and by the comprehensive examination committee, or up to 6 hours of credit of undergraduate courses if the courses are appropriate for the student's program of study, if they were not taken as an undergraduate, and if they are approved by the Graduate Advisor of Record.
- C. Students must successfully defend their thesis research results before their comprehensive examination 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 (15 semester credit hours):

PHY	5103	Classical Mechanics I
PHY	5203	Electrodynamics I
PHY	5303	Statistical Mechanics
PHY	5403	Quantum Mechanics I
PHY	7013	Research Seminar

Students must attend the Research Seminar for three (3) full semesters during their graduate studies. However, no more than 3 semester credit hours may be applied to the M.S. degree.

- B. 15 semester credit hours of advanced electives including graduate courses offered by other departments, as approved by the Graduate Advisor of Record and by the comprehensive examination committee, or up to 6 credit hours of advanced undergraduate courses if appropriate for their program of study, if not taken as an undergraduate, and if 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 and The University of Texas at Brownsville, offers opportunities for advanced study and research leading to the Doctor of Philosophy (Ph.D.) 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 2, General Academic Regulations, and Chapter 5, 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 general Graduate Record Examination (GRE). 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 550 and 600 (paper version) or 79 and 100 (Internet version). See Chapter 1, 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 (12 semester credit hours) and Advanced Electives (27 semester credit hours) including graduate courses offered by other departments with the approval of the student's Graduate Advisor and the student's Dissertation Committee. Research hours, including Research Seminar (3 semester credit hours), Directed and Doctoral Research (27 semester credit hours) and Dissertation (12 semester credit hours), totaling at least 42 semester credit hours, complete the Program of Study.

Program of Study

A. Core Curriculum (12 semester credit hours):

PHY	5103	Classical Mechanics I
PHY	5203	Electrodynamics I
PHY	5303	Statistical Mechanics
PHY	5403	Quantum Mechanics I

B. Advanced Physics Electives (27 semester credit hours selected from the following or from graduate courses offered by other departments, e.g., Mathematics, Electrical and Computer Engineering, Chemistry, etc.):

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

Topics courses may be repeated for credit as the topics vary. The student should consult her/his Graduate Advisor if in doubt.

PHY	7403	Topics in Biophysics and Biomedical Physics
PHY	7503	Topics in Experimental Physics
PHY	7603	Topics in Condensed Matter Physics
PHY	7703	Topics in Space Physics

PHY	7803	Topics in Theoretical Physics
PHY	7903	Topics in Astrophysics
PHY	7973	Special Topics in Physics

C. Doctoral Research (42 semester credit hours):

PHY	7001-3	Directed Research (minimum 6 hours; prior to passing qualifying exam)
PHY	7013	Research Seminar (3 hours)
PHY	7101-3	Doctoral Research (minimum 21 hours; after advancement to candidacy)
PHY	7111-3	Doctoral Dissertation (12 hours)

Students must enroll in PHY 7111-3 Doctoral 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.

Students must attend the Research Seminar for a minimum of three (3) full semesters during their graduate studies. However, no more than 3 semester credit hours may be applied to the Ph.D. degree.

The entire program of study, including graduate courses offered by other departments, 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 5 of this catalog) for the other requirements.

Qualifying Examination. The qualifying examination is divided into written and oral portions. The details of the written portion of the examination can be found in the handout for Ph.D. students. The oral portion covers the student's proposed research program and related fundamentals, 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. Additional details are described in the Department's Graduate Student Handbook.

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 mechanics, Lagrangian and Hamiltonian dynamics, dynamics of rigid bodies, central force problem and 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.

- 5403 Quantum Mechanics I**
(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.
Linear vector spaces and linear operators. 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. (Formerly PHY 6003. Credit cannot be earned for both PHY 5403 and PHY 6003.)
- 6103 Classical Mechanics II**
(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5103, or consent of instructor.
Canonical transformations. Hamilton-Jacobi theory, nonlinear dynamics and chaos, instabilities, pattern formation, the three-body problem, dust, planets, and planetary systems, continuous systems.
- 6113 Fluid Mechanics**
(3-0) 3 hours credit. Prerequisite: Graduate standing, PHY 5103, or consent of instructor.
Basics of fluid mechanics, Cartesian tensors, Laminar flow, Eulerian and Lagrangian formulations, continuity and Navier-Stokes equations, vorticity and circulation, Reynolds number, viscous and inviscid flow, boundary layers, convection, instabilities, turbulent flow, shock waves, and applications.
- 6123 Plasma Physics and Magnetohydrodynamics (MHD)**
(3-0) 3 hours credit. Prerequisite: 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 5403, or consent of instructor.
Variational and WKB methods. Time-independent and time-dependent perturbation theory. Scattering theory. Path integration formulation. 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 PHY 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 21 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.

May be repeated for credit as topics vary. 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.

Topic 5: Chemical Physics of Biophysical Processes. Transition and reaction pathways, transition state theory approach, transition path sampling approach, atomistic models of biomolecules and their visualizations, modern techniques of molecular dynamics.

7503 Topics in Experimental Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

May be repeated for credit as topics vary. Topics may include the following:

Topic 1: Microstructural and Physical Property Characterizations. Diffraction physics, X-ray diffraction, electron microscopy, Raman spectroscopy, Rutherford Backscattering Spectrum, transport property characterization, microwave property measurements, dielectric and piezoelectric property measurements, and optical property measurements.

Topic 2: Nonlinear Optics. Quantum optics, light scattering, ultra-fast photonics, fiber optics, lasers, electromagnetically-induced transparency, incoherent interactions, photonic band gaps.

Topic 3: Waves in Complex Media. Transport in random and periodic materials and structures, closed and open systems, diffusion and wave localization, photonic band gaps.

Topic 4: Physics of Thin Films and Applications. Vacuum physics and technology, fundamentals of physical and chemical depositions, kinetic and dynamic growth theory, rf/dc sputtering, MBE, etc.

Topic 5: Molecular Physics and Fundamentals of Spectroscopy. Molecular electronic states, rotation vibration and potential curves of diatomic molecules, spectra of diatomic molecules, rotations and vibration of polyatomic molecules, electronic states of polyatomic molecules, spectra of polyatomic molecules, perturbations in molecular spectra, molecules and clusters, experimental techniques in molecular physics.

7603 Topics in Condensed Matter Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

May be repeated for credit as topics vary. Topics may include the following:

Topic 1: Advanced Condensed Matter Physics. Second quantization for bosons and fermions, phonons and phonon-phonon interactions, Bloch electrons and band theory, density functional theory, electron-phonon interactions, superconductivity, critical phenomena, quantum fluids, spin glasses, quantum wells and quantum dots, quantum Hall effect.

Topic 2: Nanophysics. Quantum nature of the nanostructure, quantum confinement in low-dimensional systems; single electron phenomena and electron states in nanotubes, interference in diffusive transport, nonequilibrium transport and nanodevices. Introduction to nanofabrication and cross-roads between nanotechnology and biotechnology; nanostructure transmission including quantized conductance and transport.

Topic 3: Group Theory Applications in Condensed Matter. Tensors, matrices, point group, space group, and color group representations for symmetry in ferroelectric states and magnetic states, phase transitions, etc.

Topic 4: Surface and Interface Physics. Thermodynamics of multicomponent systems for surface and interface segregation, crystal surface and interface structures and energy, adsorption and nucleation, electronic surface states, scanning probe microscopy, collective phenomena at interfaces, junction and heterostructures.

Topic 5: Stochastic Processes in Physical and Chemical Systems. Stochastic Langevin dynamics, quantum Langevin dynamics, electronic transport and noise characteristics in nanostructures, diffusion and crystal growth, chemical reactions, statistical mechanics of laser systems.

7703 Topics in Space Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

May be repeated for credit as topics vary. 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: Data Analysis Techniques in Space Physics. Space instrumentation and datasets, measurement processes, performance and instrument limitations, data interpretation, statistical data analysis, time series data analysis, Fourier wavelet analysis, correlation and regression, multi-spacecraft data analysis, minimum variance analysis, numerical modeling and simulations.

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.

7803 Topics in Theoretical Physics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

May be repeated for credit as topics vary. 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. Quantum theory of many-body systems, Green's functions at zero and finite temperatures, electron-phonon interactions.

Topic 3: Introduction to Quantum Field Theory. Canonical field quantization, path integral quantization, Feynman diagrams, basics of renormalization, introduction to quantum electrodynamics.

Topic 4: Gauge Theories. Basics of field quantization and Feynman rules, renormalization group, quantum electrodynamics, quantum chromodynamics spontaneous symmetry breaking, electroweak theory. Additional topics may include topological solitons, effective Lagrangians, unified theories, and introduction to supersymmetry.

7903 Topics in Astrophysics

(3-0) 3 hours credit. Prerequisite: Graduate standing or consent of instructor.

May be repeated for credit as topics vary. Topics may include the following:

Topic 1: Stellar Astrophysics. Advanced discussion of one or more topics from: stellar structure, physics of accretion disks, physics of star formation and the interstellar medium, structure of collapsed stars and supernova remnants, radiative transport and photoionization.

Topic 2: Galactic and Extragalactic Astrophysics. Density wave theory and structure of spiral galaxies. Active galaxies, clusters of galaxies, large-scale structure.

Topic 3: 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.

Topic 4: Astrobiology. Conditions necessary for life, extra-solar planets, discovery strategies and techniques for extrasolar planets and results to date. Basic stellar evolution and nucleosynthesis impacts on development of life on Earth.

Topic 5: Astrophysics Fluid Dynamics. Lagrangian, Eulerian, and smooth-particle formulations, rotation, vorticity, circulations, convection, magnetohydrodynamics, shocks, stellar rotation, photon fluid dynamics, relativistic fluids, mass transfer.

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.

graduate
faculty

CHAPTER

7

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CHAPTER

graduate faculty

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