

GRADUATE CATALOG 2015–2017

July 2015

UTSA[®]

The University of Texas at San Antonio[™]

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Graduate Catalog

2015–2017

The University of Texas at San Antonio

Published July 2015

The online version of The University of Texas at San Antonio Graduate Catalog is the official version. This catalog was last updated on May 5, 2016 (p. 3).

Disclaimer

The provisions of this document do not constitute a contract, expressed or implied, between any applicant, student, or faculty member and The University of Texas at San Antonio or The University of Texas System. This document is a general information publication, and it does not contain all regulations that relate to students.

The University of Texas at San Antonio reserves the right to withdraw courses at any time and to change fees, tuition, rules, calendar, curriculum, degree programs, degree requirements, graduation procedures, and any other requirement affecting students. The policies, regulations, and procedures stated in this catalog are subject to change without prior notice, and changes become effective whenever the appropriate authorities so determine and may apply to both prospective students and those already enrolled. University policies are required to be consistent with policies adopted by the Board of Regents of The University of Texas System and are in compliance with state and federal laws.

Students are held individually responsible for meeting all requirements as determined by The University of Texas at San Antonio and The University of Texas System. Failure to read and comply with policies, regulations, and procedures will not exempt a student from whatever penalties he or she may incur.

Students should refer to the *UTSA Information Bulletin* for additional policies, procedures, and information directly related to their enrollment at UTSA.

Update: May 5, 2016: Master of Science in Business and Master of Science in Data Analytics degree programs added to College of Business (p. 88a).

Update: April 4, 2016: Changes to program requirements for Graduate Certificate in Historic Preservation (p. 41), Department of Architecture.

General Information

The University's Main Campus address is The University of Texas at San Antonio, One UTSA Circle, San Antonio, TX 78249. The main telephone number is (210) 458-4011. The address of the Downtown Campus is 501 César E. Chávez Boulevard, San Antonio, Texas 78207. The main telephone number is (210) 458-2700. Visit UTSA on the Web at www.utsa.edu.

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.

Statement of Equal Educational Opportunity

No person shall be excluded from participation in, denied the benefits of, or be subject to discrimination under any program or activity sponsored or conducted by The University of Texas System or any of its component institutions on any basis prohibited by applicable law, including, but not limited to, race, color, national origin, religion, gender, age, veteran status, or disability. Discrimination on the basis of sexual orientation, gender identity and gender expression are also prohibited pursuant to University policy.

Accreditation

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.

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.

Students seeking admission to a graduate program should visit the Graduate School's admissions Web site at <http://graduateschool.utsa.edu> for application forms and instructions.

Select Graduate Admission Program

The Select Graduate Admission Program (SGAP) allows graduate programs to recommend for admission outstanding University undergraduate students with excellent academic records in their junior or senior year to remain at the University of Texas at San Antonio for a graduate degree. Graduate programs may nominate a select number of outstanding undergraduate students.

Undergraduate candidates may be extended an offer of admission, conditional upon completion of the baccalaureate degree.

Additional information about the Select Graduate Admission Program is available at <http://graduateschool.utsa.edu> in the Graduate School, and from the Graduate Advisor of Record of each graduate program.

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 in the admission section.

Graduate Degree-Seeking Student Admission

University-Wide Admission Requirements

In order to be considered for unconditional admission to a graduate program, an applicant must submit a graduate application along with a nonrefundable application fee and meet the following criteria:

1. Earned 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. A minimum grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours for graduate degree-seeking or the last 30 semester credit hours for special graduate and non-degree-seeking.
3. Completed at least 18 semester credit hours (12 of which must be at the upper-division level) or foreign institution equivalent coursework 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. Unless otherwise specified, an official GRE or GMAT score must be submitted.
6. An applicant from a country where the first language is not English, unless a bachelor's degree or higher was earned in an English-speaking country, must have a minimum score of 550 on paper-based Test of English as a Foreign Language (TOEFL), 79 on internet-based TOEFL, or 6.5 on the International English Language Testing System (IELTS).
7. Meet additional admission criteria set forth by the graduate program of interest (see Graduate Program Requirements and Course Descriptions).

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 are required to reapply and pay a nonrefundable application fee for the next available term, by the application deadline. Any subsequent application for admission must be in accordance with current admission requirements and deadlines. 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.)

Admission Classifications

Graduate applicants are admitted to the Graduate School in one of three classifications: graduate degree-seeking, special graduate (non-degree), or non-degree-seeking. Additionally, provisional limitations of conditional or conditional on academic probation may be used in conjunction with admission.

Graduate Degree-Seeking

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

An applicant who has met the University-wide admission criteria and admitted unconditionally upon recommendation of the Graduate Program Committee and approval by the Dean of the Graduate School.

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 upon recommendation of the Graduate Program Committee and approval by the Dean of the Graduate School.

Notification of condition(s) along with time limitations imposed by the Graduate Program Committee will be included in the notification of admission. If student does not adhere to the conditions, he or she will be automatically dismissed from the University. The dismissal cannot be petitioned by the department.

Conditional Admission on Academic Probation

An applicant who has insufficient preparation in his or her intended graduate degree program and does not meet the criteria for conditional admission 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 will result in academic dismissal. The dismissal cannot be petitioned by the department.

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 Student Admission

In order to be considered as a special graduate (non-degree-seeking) to a graduate program, an applicant must submit a graduate application along with a nonrefundable application fee and meet the following criteria:

1. Earned 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. A minimum grade point average of at least 3.0 (on a 4.0 scale) in the last 30 semester credit hours for special graduate.
3. Be in good standing at the last institution attended.
4. Unless otherwise specified, an official GRE or GMAT score must be submitted.
5. An applicant from a country where the first language is not English, unless a bachelor's degree or higher was earned in an English-speaking country, must have a minimum score of 550 on paper-based Test of English as a Foreign Language (TOEFL), 79 on internet-based TOEFL, or 6.5 on the International English Language Testing System (IELTS).
6. Meet additional admission criteria set forth by the graduate program of interest (see Graduate Program Requirements and Course Descriptions).

Special graduate students are advised that:

1. In order to be eligible to enroll in a master's-level course, students must meet the necessary prerequisites, space must be available, and students must obtain 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.
2. Students who wish to enroll in an undergraduate-level course must obtain prior approval by completing the Permission For Enrolling in Undergraduate Courses While a Graduate Student Form.
3. 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.

4. 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.
5. To continue 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 Undergraduate Student Admission (<http://catalog.utsa.edu/informationbulletin/admission/undergraduate/specialundergraduatestudents>) 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 Student Admission

In order to be considered as a non-degree-seeking student, an applicant must submit a graduate application along with a nonrefundable application fee and meet the following criteria:

1. Earned 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. A minimum grade point average of at least 3.0 (on a 4.0 scale) in the last 30 semester credit hours.
3. Be in good standing at the last institution attended.
4. Unless otherwise specified, an official GRE or GMAT score must be submitted.
5. An applicant from a country where the first language is not English, unless a bachelor's degree or higher was earned in an English-speaking country, must have a minimum score of 550 on paper-based Test of English as a Foreign Language (TOEFL), 79 on internet-based TOEFL, or 6.5 on the International English Language Testing System (IELTS).
6. Meet additional admission criteria set forth by the graduate program of interest (see Graduate Program Requirements and Course Descriptions).

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 a graduate degree-seeking student.

- In order to be eligible to enroll in a master's-level course, students must meet the necessary prerequisites, space must be available, and students must obtain 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.
- Students who wish to enroll in an undergraduate-level course must obtain prior approval by completing the Permission For Enrolling in Undergraduate Courses While a Graduate Student Form.
- 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.
- To continue as a non-degree-seeking 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 Non-Degree-Seeking Graduate Student

An applicant who is denied admission as a non-degree-seeking 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 Undergraduate Student Admission (<http://catalog.utsa.edu/informationbulletin/admission/undergraduate/specialundergraduatestudents>) 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.

International Graduate Student Admission

Non-U.S. citizens or nonpermanent residents will be considered international applicants.

Applicants must meet the following criteria:

- An application, nonrefundable application fee (\$80 online), and official supporting credentials should be on file in the Graduate School by the appropriate application deadline.
- Meet the University-wide admission criteria as a degree-seeking applicant.
- 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 (<http://graduateschool.utsa.edu>). Scores must be sent directly to the Graduate School from the ETS or IELTS testing center, copies of scores are not accepted as official. At the time the student enrolls, the official test score must be less than two (2) years old. Our institution code is 6919.

	TOEFL Internet	TOEFL Paper	IELTS
English Language Assessment Program (ELAP) Exempt	100	600	7
Graduate Admission Qualification ¹	79	550	6.5

- ¹ The minimum score required on the TOEFL or IELTS. Individual degree programs may have higher TOEFL or IELTS requirements for their various programs. Consult the Graduate School Web site (<http://graduateschool.utsa.edu>) 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 official language spoken; or for noncitizens of the United States earning a bachelor's degree or higher in the United States or other countries where English is the official language.

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

- American Samoa
- Australia
- Bahamas
- Barbados
- Belize
- Canada (except Quebec)
- Dominica
- Grand Cayman
- Grenada
- Guyana
- Ireland
- Jamaica
- Liberia
- New Zealand
- Sierra Leone
- Trinidad/Tobago
- United Kingdom
- 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.

- If attendance under the F-1 (student) visa is anticipated, students will be required to submit a financial statement guaranteeing the ability to pay all expenses while a student at UTSA. 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.

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 (<http://www.collegeforalltexas.com/index.cfm?objectid=6D10C9BD-DD24-153F-90B91DA6C20D1C97>), 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 at the Graduate Level

An applicant who desires to work on teacher certification in BBL EC-6 Generalist or ESL EC-6 Generalist 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 Bicultural-Bilingual studies or the M.A. in Teaching English as a Second Language for teacher certification. A student who is simultaneously seeking a master's degree should apply for admission to the master's degree program.

Students interested in graduate teacher certification programs in BBL EC-6 Generalist and ESL EC-6 Generalist must complete an application to the Graduate School in the College of Education and Human Development, 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 Bicultural-Bilingual Studies or the M.A. in Teaching English as a Second Language, and also meet the TExES state requirements for certification to complete their program.

Information and application materials for graduate teacher certification in the two certification areas identified above are located on the COEHD Web site (<http://education.utsa.edu/>) and are submitted to the Department of Bicultural-Bilingual Studies. Upon review of the application for teacher certification by the department coordinator, 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 the Texas Higher Education Assessment (THEA). A legal ID is required to be certified as a teacher in the state of Texas. For further information on these and other requirements, please review the application materials located on the COEHD Web page (<http://education.utsa.edu>).

Criminal History Checks

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. 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. An Independent School District (ISD) or other school field-based entity may deny placement of students with a criminal background. 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. If the offense is one that will preclude field work altogether, the student will be dismissed from the Teacher Certification Program. 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. A legal ID is required to be certified as a teacher in the state of Texas.

Fitness to Teach Policy

The College of Education and Human Development (COEHD) has a responsibility to the educational community to ensure that individuals whom the University recommends to the State of Texas for teaching certification are fit to join the teaching profession. All teacher candidates in the UTSA Teacher Certification Program are expected to demonstrate that they are prepared to teach children and youth. This preparation results from the combination of successful completion of University coursework and the demonstration of important human characteristics and dispositions all teachers should possess. The UTSA Fitness to Teach policy addresses these important aspects of teacher preparation. The Fitness to Teach policy (http://education.utsa.edu/certification_program/fitness_to_teach_policy) can be accessed from the COEHD Web site.

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.

Information summarizing education certificate and endorsement requirements is available from the College of Education and Human Development Advising and Certification Center and online at the COEHD Web site under Certification Programs (http://education.utsa.edu/certification_program).

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

Credentials, Application Deadlines, and Fees

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 application 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.

Credentials

Transcripts

Students must list on the application for graduate admission all community colleges, colleges and universities attended. An official transcript from each institution attended must be sent to the Graduate School. Official transcripts (i.e., one bearing the official seal of the school and the Registrar's signature) from the institution conferring the last degree must be on file at the Graduate School prior to enrollment. An applicant with a University of Texas at San Antonio undergraduate degree does not need to provide a transcript.

Declaration of Previous 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.

Graduate Admissions Tests

Graduate programs at UTSA use selective entrance requirements in their admission of students. In addition to the University-wide admission, each graduate degree program specifies additional admission requirements, which may include scores on the Graduate Record Examination (GRE®) aptitude test, the Graduate Management Admission Test (GMAT®) or other standardized examinations.

Information on the GRE may be obtained from the Educational Testing Service, www.gre.org (<http://www.gre.org>), P.O. Box 6000, Princeton, NJ 08541-6000 or by calling 1-866-473-4373. GMAT information may be obtained from the Graduate Management Admission Council, www.mba.com (<http://www.mba.com>) or 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, LSAT, 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.

Deadlines

Graduate application deadlines vary by program. The Graduate School application, forms, deadlines, and program admission requirements are available on the Graduate School website (<http://graduateschool.utsa.edu>) or from the Graduate School. It is the applicant's responsibility to ensure that his/her application meets the

deadline set by the graduate program. Applicants should also note some programs grant admission only for specific semesters.

Students enrolling in cooperative or joint programs between UTSA and other institutions must satisfy admission requirements (including deadline dates) of the other institutions as well as those of UTSA.

Master's Application Deadlines

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.

Master application deadlines may vary by program. Some master's programs may have priority application deadlines. Please contact the appropriate academic program or visit the Graduate School website (<http://graduateschool.utsa.edu>).

Doctoral Application Deadlines

Doctoral application deadlines may vary by program. It is the applicant's responsibility to ensure that his/her application meets the deadline set by the doctoral program. Applicants should also note that most programs grant admission only for the Fall semester, but some do offer Spring admission. Consult the Graduate School website (<http://graduateschool.utsa.edu>) for Spring application deadlines and application requirements.

Graduate Nonrefundable Application Fees

Domestic applicants	\$50
International applicants	\$90

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, and pay a nonrefundable application fee (see application fee table), by the application deadline.

Doctoral Level

UTSA doctoral students must be enrolled every semester unless specified otherwise by the Graduate Program Committee. Doctoral students who have not been in attendance for one semester and do not have an approved leave of absence must submit an application for graduate admission, and pay 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

- Registration (p. 11)
- Records and Classification of Students (p. 13)
- Courses (p. 14)
- Grades (p. 15)
- Academic Standing (p. 17)
- Graduation (p. 18)
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Registration

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.

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.

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.

Audit forms are accepted the first day of class through the 12th day of class (census day). No forms will be accepted past this date. 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, with the exception of the Learning Management System (i.e., Blackboard).

All auditors must submit a signed Audit Course Form (<http://utsa.edu/registrar/forms.html#registration>) to the Enrollment Services Center, no sooner than the first day of class. 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 through the Community Borrowing Program. More information is available at <http://lib.utsa.edu> or at the UTSA Library front desk on the third floor of the John Peace Library building.

Nonstudent auditors who want UTSA parking privileges must register their vehicles and purchase a parking permit. To purchase a parking permit, nonstudent auditors should go to the Parking and Transportation Services office in the Multidisciplinary Studies Building (MS 1.01.52) 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.

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 e-mail 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.

Registration Procedures

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.

Appeals to add a course after Census Date must have final approvals and be processed through Enrollment Services no later than one month after Census Date for long Fall and Spring semesters or one week after Census Date for shorter terms of Summer, Fall and Spring semesters. 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 a three-week mini-semester.

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

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 ten-week Summer term. 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 (<http://utsa.edu/registrar>).

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.

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 a 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.

Medical and/or Mental Health Withdrawal from the University

For a Medical Withdrawal from the University, students are advised to contact Student Health Services for more information at 210-458-4142.

For a Mental Health Withdrawal from the University, students are advised to contact Counseling Services for more information at 210-458-4140.

Records and Classification of Students

Classification Terms

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

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

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

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

Certification Center for an official analysis of the requirements that must be met before he or she can be recommended for certification.

Time Status Terms

Graduate Time Status	Number of Credit Hours Enrolled Fall/Spring	Number of Credit Hours Enrolled 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 through ASAP. 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 are required to submit a new Graduate School application along with a nonrefundable application fee by the application deadline and follow the policy as specified in Chapter 1, Admission, of the UTSA Graduate Catalog.

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 (<http://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 (p. 15)
- Repeating Courses (p. 16)
- Grade Reports (p. 16)
- Change of Grades (p. 16)
- Academic Grade and Grievance Procedure (p. 16)
- Class Participation Policy (p. 17)
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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+," "A," "A-," "B+," "B," "B-," "C+," "C," "C-," "D+," "D," "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+," "A," "A-," "B+," "B," "B-," "C+," "C," "C-," "D+," "D," "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+	4.00	Outstanding
A	4.00	Outstanding
A-	3.67	Above Average
B+	3.33	Above Average
B	3.00	Above Average
B-	2.67	Average
C+	2.33	Average
C	2.00	Average
C-	1.67	Below Average
D+	1.33	Below Average (See Graduate Academic Probation)
D	1.00	Below Average (See Graduate Academic Probation)

D-	0.67	Below Average (See Graduate Academic Probation)
F	0	Failure(See Graduate Academic Dismissal)
CR	0	Credit. Indicates successful credit by examination (see Credit by Examination) or through faculty evaluation of selected internships and practica.
NC	0	No Credit. Indicates unsatisfactory progress.
W	0	Withdrawal. Indicates that the student was passing at the time of withdrawal or drop.
IN	0	Incomplete. Assigned at the discretion of the instructor; see details below.
NR	0	No report. 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	Expelled
RP	0	Research in Progress. Used to denote research in progress only for 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. The instructor is responsible for filing a Change of Grade form with the Office of the Registrar when all work is finished.

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.

Grade Reports

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 a 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+," "A," "A-," "B+," "B," "B-," "C+," "C," "C-," "D+," "D," "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.

Academic Grade and 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 to

the next higher level must be submitted on the Student Academic and Grade Grievance Form and submitted within thirty (30) calendar days of the decision of the previous administrative level. 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.

Under 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."

Student Study Days

At the end of each Fall and Spring Semester, the 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, mandatory review sessions are to be held, or for any other class-related activities, other than office hours. Voluntary review sessions at which no new material is presented may be conducted by faculty on these days. There are no Student Study Days during the Summer Semester.

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+," "D," or "D-" in any course in a term and a grade point average of 3.0 or higher.
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 an overall 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.
5. When a student at the graduate level is unable to pass an oral or written exam (such as the Comprehensive Examination or Qualifying Examination) required for the degree after the maximum of two attempts. Some programs may have more stringent requirements.

6. When a student at the graduate level fails to make satisfactory progress toward the degree, as defined by University regulations and the regulations of the graduate program in which the student is enrolled.

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. A student who has been dismissed may not graduate without first being reinstated.

Graduation

Graduation Dates

Degrees are awarded at the end of each Fall, Spring, and Summer semester. All degree requirements must be completed on or before the end of the term. 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

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.

Transfer of Credit

Students are expected to complete the majority of all coursework at UTSA. Transfer credit of no more than 3 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. 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 Master's Degree."
2. Student must be in a current master's degree or graduate certificate program.
3. Student must be in good academic standing.
4. The courses must have been completed with a grade of "B" (3.0) or better.
5. Coursework must be from an accredited university and have not been used in another degree program.
6. An official transcript from the institution where the coursework was completed must be submitted.
7. All coursework must have been completed no more than six years before the degree was awarded.
8. Coursework is subject to approval of the appropriate Graduate Program Committee and academic College in which the program is administered.
9. Courses must be defined as graduate-level work at the institution where the credit was earned.
10. International transcripts must be evaluated by a UTSA approved foreign credential evaluation service agency.

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 Applied Behavior Analysis

Department of Educational Psychology

The Certificate in Applied Behavior Analysis provides students with focused training in the area of applied behavior analysis as it relates to educational psychology and special education. The certificate provides educators with specialized skills in the application of behavior analysis

to support the social behavior needs of students. See Department of Educational Psychology 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 the Business of Health

College of Business

The Certificate in the Business of Health is designed to equip healthcare and business professionals with the knowledge and skills needed to lead in today's rapidly-changing healthcare environment. The program includes coursework in areas such as healthcare organization and management, Medicare regulation and payment systems, legal and tax strategies for healthcare organizations and professionals, and healthcare economics and policy, among others. See College of Business 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 Language Acquisition and Bilingual Psychoeducational Assessment

Department of Educational Psychology

The Certificate in Language Acquisition and Bilingual Psychoeducational Assessment (LABPA) is designed to meet the needs of prospective students interested in developing skills in bilingual psychoeducational assessment and foundational knowledge in language acquisition and the bilingualism continuum, with an emphasis on Spanish-speaking English Language Learners (ELLs). The purpose is to increase the utilization of best practices in bilingual psychoeducational assessment based upon an understanding of language acquisition. Best practices incorporate knowledge of tests of cognitive and achievement abilities, of tests of language proficiency, and bilingualism and language acquisition. The goal is to improve the educational experience, educational planning, provision of special education services, and overall well-being of ELL children, and youth in general.

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 Operations and Supply Chain Management

Department of Management Science and Statistics

The Graduate Certificate in Operations and Supply Chain Management is a 12-semester-credit-hour program offered by the Department of Management Science and Statistics. The Graduate Certificate in Operations and Supply Chain Management (OSCM) is designed to provide specialized training to help expand students' area of expertise, learn about new developments in their fields, augment their professional skills and provide credentials that help advance their careers. It certifies to employers that students awarded the certificate have completed coursework that help them understand a myriad of issues, challenges, problems, and decision tools that relate to the internal and external flow of materials and requisite knowledge. Production/operations management, logistics management, and procurement topics are included to resolve the myriad of complex problems. Moreover, this certificate program will help students discover cutting edge techniques and best practices to leverage their operations and supply chain complexities to achieve competitive advantage. See Department of Management Science and Statistics section in this catalog for more information.

Graduate Certificate in Real Estate Finance and Development

Department of Finance

The Certificate in Real Estate Finance and Development will benefit professionals in the real estate and construction community who desire knowledge in real estate finance and development. See Department of Finance section in this catalog for more information.

Graduate Certificate in Rhetoric and Composition

Department of English

The Certificate in Rhetoric and Composition offers coursework in advanced, interdisciplinary study of language and language instruction, encompassing theoretical, applied, and pedagogical aspects of discourse. The certificate will also enhance students' employment credentials as college and university writing instructors or as professional writers in corporate, nonprofit, and educational settings. See Department of English 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 Technology Entrepreneurship and Management

Department of Information Systems and Cyber Security

The Certificate in Technology Entrepreneurship and Management is designed for current graduate students in technology and science-related disciplines who wish to expand their skills at translating new technologies into new products and companies. See Department of Information Systems and Cyber Security 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.

Graduate Certificate in Voice Pedagogy

Department of Music

The Certificate in Voice Pedagogy is designed for the active private voice teacher who is interested in continuing their education through a program that is focused on practical courses in their field. This certificate has an exclusive focus on the pedagogical aspects of singing. See Department of Music 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

- Degree Requirements (p. 24)
- Transfer of Credit (p. 26)

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 and Master of Accountancy.
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 an overall 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 thesis or nonthesis master's degree 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.

To satisfy the comprehensive examination requirement, candidates for the M.B.A. degree are required to complete MGT 5903 Strategic

Management and Policy with a grade of "B" (3.0) or better, candidates for the M.B.A. degree in International Business are required to complete MGT 5903 Strategic Management and Policy with a grade of "B" (3.0) or better, candidates for the Master of Accountancy degree are required to complete ACC 6993 Integrative Seminar in Accounting with a grade of "B" (3.0) or better, candidates for the Master of Science degree in Information Technology are required to complete IS 6813 Strategic Management of Information Technology with a grade of "B" (3.0) or better, and candidates for the Master of Social Work degree are required to complete SWK 5433 Advanced Field Practicum IV and Integrative Seminar with a grade of "B" (3.0) or better.

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 academic 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 must 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 submission is approved by the Dean of the Graduate School.

Requirements for Thesis

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

1. Secure the approval of the supervising professor, who is also Chair of the Thesis Committee. The Thesis Committee consists of the Thesis Chair and two additional members of the Graduate Faculty appointed by the College Dean. The student is expected to work closely with the Thesis Chair in selecting the thesis topic and in completing other details of their study.
2. Submit a preliminary draft for approval by the Thesis Chair no later than 45 calendar days before final examinations of the semester in which the degree is to be awarded. The first draft should demonstrate the student's understanding of the preparation guidelines and the University's required formatting; 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.
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 website at <http://graduateschool.utsa.edu>. The final submission must conform with both the Guide for the Preparation of a Master's Thesis and Format Template at the time of submission to the Graduate School.
6. The final copy must be electronically submitted to ProQuest/UMI for both publishing and purchasing bound copies. Copyright is optional and may be arranged by the student and will be at their expense.
7. Copies of theses and dissertations are available to the general public through both the UTSA Library and ProQuest/UMI.
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, academic Dean 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, academic Dean and the Dean of the Graduate School.

It should be further understood that:

1. The same courses cannot be applied toward two different degrees, except as prescribed by a dual degree program.
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

Students are expected to complete the majority of all coursework 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. 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 Master's Degree."
2. Student must be in a current master's degree program.
3. Student must be in good academic standing.
4. The courses must have been completed with a grade of "B" (3.0) or better.
5. Coursework must be from an accredited university and have not been used in another degree program.
6. An official transcript from the institution where the coursework was completed must be submitted.
7. All coursework must have been completed no more than six years before the degree was awarded.
8. Coursework is subject to approval of the appropriate Graduate Program Committee and academic College in which the program is administered.
9. Courses must be defined as graduate-level work at the institution where the credit was earned.
10. International transcripts must be evaluated by a UTSA approved foreign credential evaluation service agency.

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" (3.0) and must have been completed no more than six years before the degree was awarded. Competency based coursework or credit only courses will not be accepted.

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.

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.

The purpose of a dual degree program is to allow students to undertake complementary programs of graduate study simultaneously through curricular arrangements that allow dual credit for a specified set of courses. Dual degree programs lead to two separate diplomas. In most cases, the dual degree program allows you to complete both degrees in a shorter period of time than if you pursued the individual degrees

separately. Students must complete the dual degree program within 6 years of the first semester of enrollment.

programs, the student will have the option of completing the other degree following the normal requirements of that individual graduate program.

Dual Degree Program

Double-Counting Credit Hours

Students in dual degree programs may double-count a limited number of credit hours toward the requirements of both degrees. Double-counting of credit hours for two certificate programs is not permitted. Double-counted courses must be taken within six years prior to graduation.

1. No more than 12 hours may be used jointly when the total number of hours required for both degrees is less than 72 hours;
2. No more than 18 semester credit hours may be used jointly when the total number of hours required for both degrees is 72 hours or more.

Admission Requirements

Students must apply and be admitted as degree-seeking to each graduate program separately, and abide by all program requirements. Admission to these programs requires the submission of two completed application forms, one for each program. Each program's entrance requirements must be met in addition to University-wide requirements, and students must be accepted to both programs. As a matter of note, admission requirements established by the Graduate School or by either degree program may not be waived. For example, if one program in the dual degree program requires GRE scores and the other does not, the applicant must take the standardized exam to be considered for admission to the dual degree. Students in a graduate program that later become interested in the dual degree option must contact the Graduate Advisor of Record prior to completing 24 semester credit hours in the program.

Academic Requirements

All grades earned in dual degree status are used for purposes of determining University and program academic good standing, academic probation, and graduate requirements. In addition, students participating in a dual degree program are subject to the policies and procedures of each respective program. A student in a dual degree program who fails to make satisfactory academic progress and is placed on academic probation or is dismissed from the University must consult with both program Graduate Advisors of Record about the future course of action (See Graduate Catalog, General Academic Regulations section). Students who are dismissed from either program are dismissed from the University and are no longer considered to be in a dual degree program.

A student who has been dismissed academically may only petition for reinstatement to the program in which they were in good standing when dismissed. If readmitted, the student may enroll in and, if applicable to the program for which the student is eligible to be readmitted, use courses for credit toward the degree program in which they were in good standing when dismissed. Students may not take courses in the program which prompted their dismissal and may not use such courses for dual degree credit. If a student is dismissed from a dual degree program, the student may not be retained or readmitted into the dual degree program.

Other Requirements

Dual degrees are only conferred simultaneously. Students may not be awarded an individual degree while in a dual degree program. Should a dual degree student choose to withdraw from one of the two degree

Doctoral Degree Regulations

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- Completing the Degree (p. 30)
- Degree Requirements (p. 28)
- Graduate Program Committee Requirements (p. 29)
- Transfer of Credit (p. 29)

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 an overall 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.

Milestones Agreement Form

Doctoral programs in The University of Texas System are required to use the Milestones Agreement form to develop an agreement between each student entering a doctoral program and the department administering the program. The Milestones Agreement form will address time-to-completion and meeting program expectations. Students entering a doctoral program are required to sign the Milestones Agreement form and to work with program faculty on a regular basis in order to assess progress toward the milestones identified by their program.

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. Continuous registration as a doctoral student is required unless a formal leave of absence is granted by the dean of the college in which the student's program is administered. A leave of absence may be granted for military duty or medical reasons. A leave of absence may be granted for other reasons if additional approval is obtained by the Vice Provost and Dean of the Graduate School. No degree examinations may be taken while a student is on a leave of absence. 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 each semester will be considered to have withdrawn and will be dropped from the program and from candidacy for the degree. Approval of a Petition for Reinstatement will be required for reinstatement. For more information, visit the Graduate School Web site at <http://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" (3.0) 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.
8. International transcripts must be evaluated by a UTSA approved foreign credential evaluation service agency.

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 a post-baccalaureate doctoral degree program, 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 courses counted toward a master's degree may be counted towards a doctoral degree requiring a master's degree for admission.

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

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.

Earning a Master's Degree During Course of Doctoral Program

While in a doctoral program, a student may earn a master's degree provided the following conditions are satisfied:

1. A student must be admitted to candidacy.
2. A student is eligible to receive a master's degree upon completion of University-wide requirements and any additional degree requirements specific to the program.
3. The Doctoral Studies Committee, Department Chair, and the Graduate Associate Dean of the College must recommend student for the degree.
4. The student must apply for graduation by the published deadline the semester prior to awarding the doctoral degree.
5. All required coursework in the doctoral program at the time of admission to candidacy must have been taken within the previous six years.

If the master's degree requires a thesis, the degree cannot be awarded on the basis of the doctoral qualifying examination. Furthermore, the Graduate School will not approve for an additional master's degree in the same field in which an individual has previously received a master's degree.

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.

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. A majority of the dissertation committee must consist of graduate faculty or adjunct faculty in the student's program.

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.

A student must be enrolled for dissertation hours during the semester the student plans to defend the dissertation.

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 formatting and deadlines, visit the Graduate School Web site at <http://graduateschool.utsa.edu>. Dissertations received after the posted deadline will not be accepted. Students must electronically submit their complete dissertation to ProQuest/UMI for both publishing and purchasing bound copies.

The format of the dissertation must follow University regulations or it will not be accepted. The final submission must adhere to the most current dissertation formatting guidelines at time of submission. Formatting requirements are posted on the Graduate School website. With written recommendation from the dissertation supervisor, the student may request that the Graduate School embargo the dissertation for one or more years in order to protect the patent or other rights.

Registration of copyright at the author's expense may be arranged, if desired and appropriate through ProQuest/UMI when uploading the final submission.

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 and Course Descriptions

College of Architecture, Construction and Planning

- Master of Science Degree in Urban and Regional Planning (p. 35)
- Graduate Certificate in Urban and Regional Planning (p. 36)

Department of Architecture

- Master of Architecture Degree - The Professional Program (p. 38)
- Master of Science Degree in Architecture – The Research Program (p. 38)
- Graduate Certificate in Historic Preservation (p. 41)

College of Business

- Master of Business Administration Degree (p. 47)
- Master of Business Administration Degree – Business of Health Concentration (p. 47)
- Executive Master of Business Administration (p. 47)
- Dual Master of Business Administration Degree and Master of Public Health Degree Program (p. 47)
- Doctor of Philosophy Degree in Business Administration (p. 47)
- Graduate Certificate in the Business of Health (p. 51)
- Master of Science degree in Business (New) (p. 88a)
- Master of Science degree in Data Analytics (New) (p. 88a)

Department of Accounting

- Five-Year (150-Hour) Professional Accounting Program (p. 53)
- Master of Accountancy Degree (p. 53)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Accounting (p. 53)

Department of Economics

- Master of Business Administration Degree – Business Economics Concentration (p. 57)
- Master of Arts Degree in Economics (p. 57)
 - General Economics Concentration
 - Financial Economics Concentration
 - Business Data Analysis and Forecasting Concentration

Department of Finance

- Master of Business Administration Degree (p. 61)
 - Finance Concentration
 - Real Estate Finance and Development Concentration
- Master of Science Degree in Finance (p. 61)
 - Real Estate Finance and Development Concentration
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Finance (p. 61)

- Graduate Certificate in Real Estate Finance and Development (p. 63)

Department of Information Systems and Cyber Security

- Master of Business Administration Degree (p. 67)
 - Cyber Security Concentration
 - Information Systems Concentration
 - Management of Technology Concentration
 - Project Management Concentration
- Master of Science Degree in Information Technology (p. 67)
 - Cyber Security Concentration
- Master of Science Degree in Management of Technology (p. 67)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Information Technology (p. 67)
- Graduate Certificate in Technology Entrepreneurship and Management (p. 70)

Department of Management

- Master of Business Administration Degree – Entrepreneurship Concentration (p. 74)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Organization and Management Studies (p. 74)

Department of Management Science and Statistics

- Master of Business Administration Degree – Management Science Concentration (p. 78)
- Master of Science Degree in Applied Statistics (p. 78)
- Doctor of Philosophy Degree in Applied Statistics (p. 78)
- Graduate Certificate in Operations and Supply Chain Management (p. 80)

Department of Marketing

- Master of Business Administration Degree – Marketing Management Concentration (p. 86)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Marketing (p. 86)

College of Education and Human Development

Department of Bicultural-Bilingual Studies

- Master of Arts Degree in Bicultural-Bilingual Studies (p. 89)
- Master of Arts Degree in Teaching English as a Second Language (p. 89)
- Doctor of Philosophy Degree in Culture, Literacy and Language (p. 89)
- Graduate Certificate in Bilingual Reading Specialist (p. 94)
- Graduate Certificate in Teaching English as a Second Language (p. 94)

Department of Counseling

- Master of Science in Clinical Mental Health Counseling (p. 100)
- Master of Education in School Counseling (p. 100)
- Doctor of Philosophy in Counselor Education and Supervision (p. 100)

Department of Educational Leadership and Policy Studies

- Master of Education Degree in Educational Leadership and Policy Studies (p. 107)
- Doctor of Education Degree in Educational Leadership (p. 107)
- Graduate Certificate in Higher Education Administration (p. 109)

Department of Educational Psychology

- Master of Arts Degree in School Psychology (p. 114)
- Graduate Certificate in Applied Behavior Analysis (p. 116)
- Graduate Certificate in Language Acquisition and Bilingual Psychoeducational Assessment (p. 116)

Department of Interdisciplinary Learning and Teaching

- Master of Arts in Education (p. 120)
 - Curriculum and Instruction Concentration
 - Early Childhood and Elementary Education Concentration
 - Instructional Technology Concentration
 - Literacy Education Concentration
 - Special Education Concentration
 - Teacher Certification Concentrations within the Master of Arts Degree in Education
- Doctor of Philosophy in Interdisciplinary Learning and Teaching (p. 120)

Department of Kinesiology, Health, and Nutrition

- Master of Science degree in Health and Kinesiology (p. 134)
- Master of Dietetics Studies (p. 134)

College of Engineering

Department of Biomedical Engineering

- Master of Science in Biomedical Engineering (p. 141)
- Doctor of Philosophy in Biomedical Engineering (p. 141)

Department of Civil and Environmental Engineering

- Master of Science Degree in Civil Engineering (p. 151)
- Master of Civil Engineering Degree (p. 151)
- Doctor of Philosophy Degree in Environmental Science and Engineering (p. 151)

Department of Electrical and Computer Engineering

- Master of Science Degree in Electrical Engineering (p. 157)
- Master of Science Degree in Computer Engineering (p. 157)
- Master of Science Degree in Advanced Materials Engineering (p. 157)
- Doctor of Philosophy Degree in Electrical Engineering (p. 157)

Department of Mechanical Engineering

- Master of Science Degree in Advanced Manufacturing and Enterprise Engineering (p. 173)
- Master of Science Degree in Mechanical Engineering (p. 173)
- Doctor of Philosophy Degree in Mechanical Engineering (p. 173)

College of Liberal and Fine Arts

Department of Anthropology

- Master of Arts Degree in Anthropology (p. 182)
- Doctor of Philosophy Degree in Anthropology (p. 182)

Department of Art and Art History

- Master of Fine Arts Degree in Arts (p. 189)
- Master of Arts Degree in Art History (p. 189)

Department of Communication

- Master of Arts Degree in Communication (p. 192)

Department of English

- Master of Arts Degree in English (p. 196)
- Doctor of Philosophy Degree in English (p. 196)
- Graduate Certificate in Creative Writing (p. 198)
- Graduate Certificate in Rhetoric and Composition (p. 198)

Department of History

- Master of Arts Degree in History (p. 200)

Department of Modern Languages and Literatures

- Master of Arts Degree in Spanish (p. 203)
- Graduate Certificate in Spanish Translation Studies (p. 204)

Department of Music

- Master of Music Degree (p. 207)
- Graduate Certificate in Keyboard Pedagogy (p. 208)
- Graduate Certificate in Keyboard Performance (p. 208)
- Graduate Certificate in Voice Pedagogy (p. 208)

Department of Philosophy and Classics

- Master of Arts Degree in Philosophy (p. 211)

Department of Political Science and Geography

- Master of Arts Degree in Geography (p. 213)
- Master of Arts Degree in Political Science (p. 213)

Department of Psychology

- Master of Science Degree in Psychology (p. 222)
- Doctor of Philosophy Degree in Psychology (p. 222)

Department of Sociology

- Master of Science Degree in Sociology (p. 227)

College of Public Policy

Department of Criminal Justice

- Master of Science Degree in Criminal Justice and Criminology (p. 231)

Department of Demography

- Doctor of Philosophy Degree in Applied Demography (p. 233)

Department of Public Administration

- Master of Public Administration Degree (p. 238)
- Graduate Certificate in Nonprofit Administration and Leadership (p. 239)

Department of Social Work

- Master of Social Work (p. 242)

College of Sciences

Department of Biology

- Master of Science Degree in Biology (p. 248)
- Master of Science Degree in Biotechnology (p. 248)
- Master of Science Degree in Environmental Science (p. 258)
- Doctor of Philosophy Degree in Biology (p. 248)

Department of Chemistry

- Master of Science Degree in Chemistry (p. 263)
- Doctor of Philosophy Degree in Chemistry (p. 263)

Department of Computer Science

- Master of Science Degree in Computer Science (p. 269)
- Doctor of Philosophy Degree in Computer Science (p. 269)

Department of Geological Sciences

- Master of Science Degree in Geology (p. 274)
- Certificate of Professional Development in Geographic Information Science (p. 275)

Department of Mathematics

- Master of Science Degree in Applied Mathematics—Industrial Mathematics (p. 278)
- Master of Science Degree in Mathematics (p. 278)
- Master of Science Degree in Mathematics Education (p. 278)

Department of Physics and Astronomy

- Master of Science Degree in Physics (p. 282)
- Doctor of Philosophy Degree in Physics (p. 282)

The Graduate School

- Doctor of Philosophy Degree in Translational Science (p. 289)

College of Architecture, Construction and Planning

The College of Architecture, Construction and Planning offers the following graduate degrees and certificates:

- Master of Architecture Degree - The Professional Program
- Master of Science Degree in Architecture - The Research Program
- Master of Science Degree in Urban and Regional Planning
- Graduate Certificate in Historic Preservation
- Graduate Certificate in Urban and Regional Planning

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 complete 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, Construction and Planning 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. 18 semester credit hours of the following required courses:	18
URP 5323	Community Planning and Design
URP 5333	Introduction to Urban and Regional Planning
URP 5343	History and Theory of Urban and Regional Planning
URP 5363	Urban Planning Methods I
URP 5393	Urban Planning Methods II
URP 5453	Urban and Regional Sustainability

2. 9 semester credit hours of public administration courses in the College of Public Policy:

PAD 5103	Planning and Land Use Law
PAD 5473	Land Use Policy
PAD 5513	Urban and Regional Economic Development

B. 15 semester credit hours of electives, chosen in consultation with and approved by the Urban and Regional Planning Graduate Advisor of Record to meet degree candidates' individual needs. Students can select an area of specialization 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 specialization areas include: historic preservation; housing and sustainable community development; environmental, transportation, and infrastructure planning; and urban policy and management.

To satisfy the major area coursework for the historic preservation specialization, a student must complete 9 semester credit hours of specialized electives:

ARC 5203	History and Theory of Preservation
ARC 5423	Legal and Economic Aspects of Preservation
ARC 6423	Architectural Conservation Theory

To satisfy the major area coursework for the housing and sustainable community development specialization, a student must complete 9 semester credit hours from the following specialized electives:

URP 5313	Housing Design and Neighborhood Planning
URP 5373	Planning and Design of Suburbs
URP 5383	Planning and Housing for Rural Communities
URP 5443	Community Development

To satisfy the major area coursework for the environmental, transportation, and infrastructure planning specialization, a student must complete 9 semester credit hours from the following specialized electives:

URP 5353	Structure and Function of Cities and Regions
URP 5433	Transportation Planning
URP 5463	Environmental Planning and Assessment
URP 5473	Introduction to Health Planning

To satisfy the major area coursework for the urban policy and management specialization, a student must complete 9 semester credit hours from the following public administration courses from the Department of Public Administration in the College of Public Policy:

PAD 5003	Introduction to Public Service Leadership and Management
PAD 5313	Public Policy Analysis
PAD 5323	Public Policy Process
PAD 5343	Human Resource Management in the Public Sector

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

Thesis Option Requirements. All candidates for the Master of Science degree in Urban and Regional Planning with a 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.

D. Degree candidates in the thesis option and nonthesis option are required to pass a written comprehensive examination, and enroll in URP 6961 Comprehensive Examination if no other courses are being taken that term.

Total Credit Hours 48

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, Construction and 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 Program Requirements

The Urban and Regional Planning Certificate curriculum consists of 9 semester credit hours of required planning courses and 6 elective hours. 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: 9

URP 5323	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 graduate elective courses approved by the Urban and Regional Planning Graduate Advisor 6

Total Credit Hours 15

Urban and Regional Planning (URP) Courses

URP 5313. Housing Design and Neighborhood Planning. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An examination of the evolution of housing and neighborhood design and planning with emphasis on sustainable planning and design methods, and solutions. (Formerly ARC 5313. Credit cannot be earned for both URP 5313 and ARC 5313.)

URP 5323. Community Planning and Design. (3-0) 3 Credit Hours.

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.)

URP 5333. Introduction to Urban and Regional Planning. (3-0) 3 Credit Hours.

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.)

URP 5343. History and Theory of Urban and Regional Planning. (3-0) 3 Credit Hours.

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.)

URP 5353. Structure and Function of Cities and Regions. (3-0) 3 Credit Hours.

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.)

URP 5363. Urban Planning Methods I. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Introduction to research tools and methods used in planning. Topics include: demographic and employment analysis and forecasting, 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.) (Formerly titled “Intermediate Urban Planning Methods.”)

URP 5373. Planning and Design of Suburbs. (3-0) 3 Credit Hours.

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.)

URP 5383. Planning and Housing for Rural Communities. (3-0) 3 Credit Hours.

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.)

URP 5393. Urban Planning Methods II. (3-0) 3 Credit Hours.

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. (Formerly titled "Advanced Urban Planning Methods.")

URP 5413. Planning Practice, Law, and Ethics. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. This course covers the fundamentals of the administrative and legal aspects of regulating land use at various levels of government. Participants will gain an understanding of the changing legal framework of regulations, such as zoning, urban renewal, eminent domain, inverse condemnation, landmark preservation, growth management, and environmental laws. The course describes the institutions that undertake planning and the roles and practices planners employ in them. Key ethical and moral considerations that planners face in applying these laws and practicing community and environmental planning are also addressed. (Same as PAD 5103. Credit cannot be earned for both URP 5413 and PAD 5103.)

URP 5423. Graphic Communication for Planners. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. This course is designed for graduate students in urban planning who are interested in graphic communications. The course goal is to obtain skills in graphic production that enable planners to communicate their ideas and plans to the public.

URP 5433. Transportation Planning. (3-0) 3 Credit Hours.

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.

URP 5443. Community Development. (3-0) 3 Credit Hours.

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 and regional areas.

URP 5453. Urban and Regional Sustainability. (3-0) 3 Credit Hours.

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.

URP 5463. Environmental Planning and Assessment. (3-0) 3 Credit Hours.

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.

URP 5473. Introduction to Health Planning. (3-0) 3 Credit Hours.

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.

URP 5483. Planning Workshop. (2-2) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. A seminar/workshop involving an application of theory and practice relating to an urban or regional scale project. May be repeated for credit.

URP 5493. Planning and Economic Development. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An introduction to economic development as a critical element of neighborhood, community, regional, and national planning. The course addresses current economic development practices and theory.

URP 6933. Planning Professional Report. (3-0) 3 Credit Hours.

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.

URP 6943. Professional Internship. (0-0) 3 Credit Hours.

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.

URP 6951. Independent Study. (0-0) 1 Credit Hour.

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.

URP 6952. Independent Study. (0-0) 2 Credit Hours.

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.

URP 6953. Independent Study. (0-0) 3 Credit Hours.

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.

URP 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

URP 6973. Special Topics. (3-0) 3 Credit Hours.

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.

URP 6976. Special Topics. (6-0) 6 Credit Hours.

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.

URP 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

URP 6983. Master's Thesis. (0-0) 3 Credit Hours.

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

The Department of Architecture supports the education of future professionals in the practice of architecture and interior design. The graduate programs of the Department of Architecture are directed to a terminal degree for qualification for professional licensure and architectural study for post-professionals and allied professionals. For its graduate programs, the Department and College of Architecture take advantage of their unique location within downtown San Antonio, as well as South Texas and the borderlands of the western United States and Mexico.

- Master of Architecture Degree - The Professional Program (p. 38)
- Master of Science Degree in Architecture – The Research Program (p. 40)

Master of Architecture Degree – The Professional Program

The Department of Architecture offers the Master of Architecture (M.Arch.) as a first professional degree (terminal 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.

Master of Architecture degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree that, when earned sequentially, constitute an accredited professional education. However, the preprofessional 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 semester credit hours).
- M.Arch. 3 (non-preprofessional degree + (up to) 39 preparatory graduate semester credit hours + 52 graduate semester credit hours = (up to) 91 graduate semester credit hours).

Next accreditation visit for M.Arch program: 2016

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 complete 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, that clearly and succinctly outlines the applicant's goals for graduate study, including anticipated focus of study and 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, Construction and Planning Web site (<http://architecture.utsa.edu/academic-programs/department-of-architecture>) for applicable 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 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. Required coursework consists of:

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

ARC 5133	Professional Architectural Practice and Ethics
ARC 5173	Architectural Theory and Criticism
ARC 5193	Principles of Global Architecture: Place, Context & Culture
ARC 5733	Advanced Building Technology and Sustainability
ARC 6126	Advanced Design Studio
ARC 6136	Advanced Topics Studio
ARC 6146	Advanced Technical Studio
ARC 6931	Master's Project Preparation
ARC 6996	Master's Project

B. One 3-semester-credit-hour elective, chosen from the following list of courses: 3

ARC 5163	Current Issues and Topics in Contemporary Architecture
ARC 5203	History and Theory of Preservation
ARC 5533	Contemporary Materials in Architecture and Design
ARC 5603	Advanced Seminar in Architectural History
ARC 5713	Environmental Architecture and Sustainability
ARC 5813	History and Theory of Urban Form
ARC 6823	Study Abroad: Advanced Architectural History/Theory

C. 12 semester credit hours of electives. No more than 6 semester credit hours of electives from outside of the College of Architecture, Construction and Planning will apply toward the Master of Architecture degree. 12

Total Credit Hours 52

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) 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 complete 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, that clearly and succinctly outlines the applicant's goals for graduate study, including anticipated focus of study and impact on subsequent professional practice
- 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, Construction and Planning Web site (<http://architecture.utsa.edu/academic-programs/department-of-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.

The M.Arch. 3 program in architecture consists of Preparatory Studies, Performance Evaluation, and M.Arch. 2 program.

A. Preparatory Studies

Up to 39 semester credit hours consisting of the following: 39

ARC 5003	Architectural Principles
ARC 5156	Introductory Design Studio I
ARC 5166	Introductory Design Studio II
ARC 5176	Introductory Design Studio III
ARC 5623	History of Modern Architecture
ARC 5913	Introduction to Construction Materials and Concepts
ARC 5923	Principles of Structures
ARC 5933	Structures
ARC 5943	Principles of Environmental Systems
ARC 5953	Environmental Systems

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 M.Arch. Graduate Program Committee. Normally, failure to pass the performance evaluation requires additional coursework or other work to remedy deficiencies or areas of weakness before entering the M.Arch. 2 program sequence.

C. M.Arch. 2 Program Sequence

Degree candidates must complete the 52 semester credit hours of the M.Arch. 2 sequence. 52

Total Credit Hours 91

Master of Science Degree in Architecture – The Research Program

The Master of Science in Architecture (M.S. Arch.) program is a research-oriented program intended to support post-professional work, professional consulting, teaching, and future graduate studies. Within the degree, UTSA offers two formal concentrations (Historic Preservation and Sustainable Architecture) but students are able to focus on any topic related to faculty expertise.

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 complete 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 that clearly and succinctly outlines the applicant's goals for graduate study
- 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 sent directly to the UTSA Graduate School at One UTSA Circle, San Antonio, TX 78249. Please consult the College of Architecture, Construction and Planning Web site (<http://architecture.utsa.edu/academic-programs/department-of-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.

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

A. 12 semester credit hours of the following required courses, including 6 semester credit hours of Master's Thesis: 12

ARC 6323	Master's Thesis Preparation
ARC 6433	Research Methods
ARC 6983	Master's Thesis
or ARC 6981	Master's Thesis

B. Comprehensive Examination

C. Electives (21 semester credit hours). To be selected in consultation with Thesis Committee chair. 21

Total Credit Hours 33

M.S. Arch. Degree Concentrations

M.S. Arch. Degree - Concentration in Sustainable Architecture

A. 12 semester credit hours of the following required courses, including 6 semester credit hours of Master's Thesis: 12

ARC 6323	Master's Thesis Preparation
ARC 6433	Research Methods
ARC 6983	Master's Thesis
or ARC 6981	Master's Thesis

B. Comprehensive Examination

C. Required Concentration Electives (6 semester credit hours): 6

ARC 5713	Environmental Architecture and Sustainability
ARC 5733	Advanced Building Technology and Sustainability

D. Prescribed electives (6 semester credit hours) chosen from the following list: 6

ARC 5723	Applications in Sustainable Design
ARC 5743	Building Performance Modeling and Simulation
ARC 5753	Advanced Daylighting Design and Analysis
ARC 5763	Post-Occupancy Evaluation of Buildings
ARC 5773	Environmental Life Cycle Assessment of Buildings

E. Electives (9 semester credit hours). To be selected in consultation with Thesis Committee chair. 9

Total Credit Hours 33

M.S. Arch. Degree - Concentration in Historic Preservation

A. 12 semester credit hours of the following required courses, including 6 semester credit hours of Master's Thesis: 12

ARC 6323	Master's Thesis Preparation
ARC 6433	Research Methods
ARC 6983	Master's Thesis
or ARC 6981	Master's Thesis

B. Comprehensive Examination

C. Required Concentration Electives (9 semester credit hours): 9

ARC 5203	History and Theory of Preservation
ARC 5423	Legal and Economic Aspects of Preservation
ARC 6413	Preservation Technology

D. Prescribed electives (6 semester credit hours) chosen from the following list: 6

ARC 5233	Architectural Surveys and Measured Drawings
ARC 5403	Historic Preservation Seminar
ARC 5613	American Architecture
ARC 6003	Morphology of the Architecture of the Southwest
ARC 6423	Architectural Conservation Theory

E. Electives (6 semester credit hours). To be selected in consultation with Thesis Committee chair. 6

Total Credit Hours 33

Comprehensive Examination

A candidate for the Master of Science in Architecture must, in addition to other requirements, pass a comprehensive examination. Comprehensive examinations are given only to students who:

- have satisfied all admission conditions
- are in good academic standing
- have a Thesis Chair and committee and an approved thesis topic.

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, Construction and 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 as a special (non-degree-seeking) graduate student. Special graduate student applicants are required to submit a personal statement, and 2 letters of recommendation. 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 Program Requirements

The Certificate requires 15 semester credit hours of coursework. Two courses are required and an additional 9 semester credit hours of coursework selected from the list of approved courses or other courses approved in consultation with the Certificate Program Coordinator. 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 required courses:	6
ARC 5203	History and Theory of Preservation
ARC 6423	Architectural Conservation Theory
B. 9 semester credit hours (consisting of either the studio or nonstudio option) of approved elective courses selected from the following list (or any additional elective approved in consultation with the Certificate Program Coordinator):	9
ARC 5233	Architectural Surveys and Measured Drawings
ARC 5403	Historic Preservation Seminar
ARC 5423	Legal and Economic Aspects of Preservation
ARC 5813	History and Theory of Urban Form
ARC 6003	Morphology of the Architecture of the Southwest
ARC 6013	Theories and Philosophies of Regionalism
ARC 6136	Advanced Topics Studio (with studio option)
ARC 6413	Preservation Technology
ARC 6433	Research Methods
ARC 6443	International Charters, Guidelines and Historic Site Management
ARC 6453	Cultural Landscape Conservation Theory
ARC 6463	Heritage Tourism Planning and Design
ARC 6473	Material Assessment and Conservation
ARC 6513	Sustainable Tourism Development

Total Credit Hours

15

Architecture (ARC) Courses

ARC 5003. Architectural Principles. (2-2) 3 Credit Hours.

Prerequisites: Graduate standing, permission of the architecture Graduate Advisor of Record, and enrollment in the M.Arch. 3 program. An introduction to the basic principles and skills associated with architectural design for graduate students enrolled in the M.Arch. 3 program.

ARC 5113. Design and Leadership. (3-0) 3 Credit Hours.

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.

ARC 5133. Professional Architectural Practice and Ethics. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. A study of national, international and legal business practices and conventions relating to the building industry. Course material considers project delivery options, construction methodologies and corresponding administration systems, liability, contract documents, and ethics as practices that inform the professional practice of architecture. (Formerly titled "Professional Practice and Construction in a Global Setting.")

ARC 5156. Introductory Design Studio I. (0-14) 6 Credit Hours.

Prerequisites: Graduate standing, permission of the architecture Graduate Advisor of Record and enrollment in the M.Arch. 3 program. Architectural design as a theoretically informed and creative process. Provides students the opportunity to acquire fundamental design skills for the creative and practical design of architectural environments. Projects consider spatial experience, contextual response, building form and structure and the development of representational skills. (Formerly ARC 5196. Credit cannot be earned for both ARC 5156 and ARC 5196.)

ARC 5163. Current Issues and Topics in Contemporary Architecture. (3-0) 3 Credit Hours.

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.

ARC 5166. Introductory Design Studio II. (0-14) 6 Credit Hours.

Prerequisites: Graduate standing, permission of the architecture Graduate Advisor of Record, and enrollment in the M.Arch. 3 program. Provides students the opportunity to acquire design skills in the application of building technology and material use through the consideration of building structure and envelope. Projects consider spatial experience, programming, organizational concepts, building-to-site relations, and tectonics.

ARC 5173. Architectural Theory and Criticism. (3-0) 3 Credit Hours.

A survey of contemporary architectural theory and criticism from 1950 to the present. May be repeated for credit once when topics vary. (Formerly COA 5173. Credit cannot be earned for both ARC 5173 and COA 5173.).

ARC 5176. Introductory Design Studio III. (0-14) 6 Credit Hours.

Prerequisites: Graduate standing, permission of the architecture Graduate Advisor of Record, and enrollment in the M.Arch. 3 program. Architectural design as a theoretically informed and creative process. Provides students the opportunity to acquire design skills in the application of building technology and material use through the consideration of building structure and envelope. Projects of increasing complexity considering architectural order, precedent, urban and non-urban contexts, building performance, structure and detailing. Continues investigation of traditional and digital media.

ARC 5193. Principles of Global Architecture: Place, Context & Culture. (3-0) 3 Credit Hours.

Prerequisite: Graduate Standing or consent of instructor. A study of global, historical, and cross-cultural architectural principles. Consideration is given to the political, social, ecological, economical, and/or technological context that informs the work as well as the diverse social and spatial patterns, values, and needs of those who occupy and use buildings.

ARC 5203. History and Theory of Preservation. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An introduction to the history, philosophy, and methodology of historic preservation and restoration.

ARC 5233. Architectural Surveys and Measured Drawings. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and ARC 5203, or consent of instructor. A survey of documentation and interpretation of sites and buildings and graphic recording techniques.

ARC 5403. Historic Preservation Seminar. (3-0) 3 Credit Hours.

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.

ARC 5423. Legal and Economic Aspects of Preservation. (3-0) 3 Credit Hours.

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.

ARC 5533. Contemporary Materials in Architecture and Design. (1-4) 3 Credit Hours.

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.

ARC 5543. Advanced Digital Design and Fabrication Technologies in Architecture. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An in-depth examination of contemporary digital design and fabrication technologies in architecture and other design disciplines.

ARC 5603. Advanced Seminar in Architectural History. (3-0) 3 Credit Hours.

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.

ARC 5613. American Architecture. (3-0) 3 Credit Hours.

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.

ARC 5623. History of Modern Architecture. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing or consent of instructor, and enrollment in the M.Arch. 3 program. Study of the social, aesthetic, theoretical, technical, cultural, Western and non-Western, and professional forces that form, shape, and constitute architecture of the modern era.

ARC 5643. Modern Architecture of Mexico. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. A survey of the architecture and urbanism of Mexico from Independence in 1821 to the present.

ARC 5653. Pre-Columbian and Colonial Architecture of Mexico. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. A survey of the architecture and urbanism of Mexico during the pre-Columbian and Colonial eras.

ARC 5663. The Architecture and Cities of Northern Mexico. (3-0) 3 Credit Hours.

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.

ARC 5713. Environmental Architecture and Sustainability. (3-0) 3 Credit Hours.

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.).

ARC 5723. Applications in Sustainable Design. (3-0) 3 Credit Hours.

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.

ARC 5733. Advanced Building Technology and Sustainability. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An advanced study of building technology, sustainability, and building performance. Includes consideration of sustainable techniques, technologies, building enclosure, and environmental systems for new and existing buildings. Addresses issues of systems integration and performance optimization. (Credit cannot be earned for both ARC 5513 and ARC 5733.).

ARC 5743. Building Performance Modeling and Simulation. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An introduction to the integration of building performance modeling and simulation into the design process to improve building performance in new and existing buildings. Includes consideration of building energy consumption patterns, conservation strategies, solar shading, solar access, and integration of electric lighting and daylighting.

ARC 5753. Advanced Daylighting Design and Analysis. (3-0) 3 Credit Hours.

A study of the design, analysis methods, and technologies of architectural daylighting. Includes issues of the visual environment, daylight availability, lighting and energy use, lighting and thermal comfort, and the integration of electric lighting and daylighting.

ARC 5763. Post-Occupancy Evaluation of Buildings. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An introduction to the principles, types, and methods of post-occupancy evaluation of new and existing buildings. Includes a study of the POE model, implementation of POE, methods of measuring performance, user behavior, and the use of POE as a tool for understanding patterns of use in buildings.

ARC 5773. Environmental Life Cycle Assessment of Buildings. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An introduction to the principles, and assessment methods used in the environmental LCA of new and existing buildings. Includes a study of the relationship between product life cycle and environmental impact, resource conservation, and pollution prevention; interpretation of LCA results, integration of LCA in building design and environmental rating systems.

ARC 5813. History and Theory of Urban Form. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Considers the origins and characteristics of cities, their current condition, and emerging theories of urban design.

ARC 5913. Introduction to Construction Materials and Concepts. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing or consent of instructor, and enrollment in the M.Arch. 3 program. Introduction to concepts and skills fundamental to structures, construction, building enclosure, sustainability, and interior environments along with the analysis and selection of materials, components, and assemblies. Provides an introduction to the historical role of materials in architectural and interior design.

ARC 5923. Principles of Structures. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing or consent of instructor, and enrollment in the M.Arch. 3 program. Introduction to architectural structures including the principles and systems of structural materials that consider the spatial, structural, sustainable, and aesthetic qualities possible in the articulation of structure through architectural design. (Formerly titled "Introduction to Structures I.").

ARC 5933. Structures. (2-2) 3 Credit Hours.

Prerequisites: Graduate standing or consent of instructor, and enrollment in the M.Arch. 3 program. Continued introduction to architectural structures that considers the physical principles that govern classical statics and strength of materials, the graphical and mathematical design of structural systems and the role of structural articulation in the design of buildings. (Formerly titled "Introduction to Structures II.").

ARC 5943. Principles of Environmental Systems. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing or consent of instructor, and enrollment in the M.Arch. 3 program. Environmentally responsive design of buildings and the natural and artificial systems that support them, including heating, ventilation, cooling, water, and waste management. (Formerly titled "Introduction to Environmental Systems I.").

ARC 5953. Environmental Systems. (2-2) 3 Credit Hours.

Prerequisites: Graduate standing or consent of instructor, and enrollment in the M.Arch. 3 program. Light and sound as design considerations in building design including the natural and artificial systems that support them. Course deals with illumination, electrical design, and acoustics. (Formerly titled "Introduction to Environmental Systems II.").

ARC 6003. Morphology of the Architecture of the Southwest. (3-0) 3 Credit Hours.

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.).

ARC 6013. Theories and Philosophies of Regionalism. (3-0) 3 Credit Hours.

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.).

ARC 6023. Vernacular Architecture. (3-0) 3 Credit Hours.

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.

ARC 6103. Design Process and Human Perception. (3-0) 3 Credit Hours.

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.

ARC 6126. Advanced Design Studio. (0-14) 6 Credit Hours.

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

ARC 6136. Advanced Topics Studio. (0-14) 6 Credit Hours.

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. (Formerly titled "Advanced Design Studio II.").

ARC 6146. Advanced Technical Studio. (0-14) 6 Credit Hours.

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. (Formerly titled "Advanced Design Studio III.").

ARC 6223. Digital Design. (2-2) 3 Credit Hours.

Prerequisite: ARC 2513 or consent of instructor. Project-driven lecture/laboratory course exploring advanced issues associated with 3-D modeling, animation, photo-realistic visualization, and computer-aided manufacturing. Considers the role these processes play in architectural and interior design.

ARC 6243. Advanced Design Visualization. (0-6) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Advanced exploration of graphic processes and techniques utilized in the design of the built environment.

ARC 6323. Master's Thesis Preparation. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An advanced study aimed at supporting the development of a Master's thesis.

ARC 6413. Preservation Technology. (1-4) 3 Credit Hours.

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.

ARC 6423. Architectural Conservation Theory. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An advanced study and critical analysis of current design theory and techniques for conservation of historic sites.

ARC 6433. Research Methods. (3-0) 3 Credit Hours.

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. (Formerly COA 6433. Credit cannot be earned for both ARC 6433 and COA 6433.)

ARC 6443. International Charters, Guidelines and Historic Site Management. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. A survey of international charters, guidelines and laws applicable to the management of cultural heritage sites globally. Includes study of documentation, planning, community engagement, public interpretation, design/conservation treatments, and universal values, as well as UNESCO World Heritage process and purpose.

ARC 6453. Cultural Landscape Conservation Theory. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Advanced study and critical analysis of contemporary design theory, methods and values for conservation of cultural landscapes and historic urban landscapes.

ARC 6463. Heritage Tourism Planning and Design. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Course introduces the theory, practice and current issues of cultural heritage tourism planning and design as a socio-cultural phenomenon. Topics include motives and behaviors of heritage tourists, resources and attractions, plus public interpretation and management policy. Explores connection of cultural heritage tourism to sustainable community development.

ARC 6473. Material Assessment and Conservation. (3-0) 3 Credit Hours.

Prerequisite: ARC 6413. An in-depth study of traditional building material and finishes in construction, use, application and installation techniques, methods of evaluation and study of material deterioration, current practices for remediation and replacement.

ARC 6513. Sustainable Tourism Development. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. An advanced study of the environmental, economic, and socio-cultural aspects of sustainable tourism development, and the basic concepts and theories of sustainability in tourist destinations. Topics include sense of place, identity, community participation, sustainable design of city spaces and tourist places. Emphasize on sustainable tourism potentials, tourism futures and marketing tourism destinations.

ARC 6523. Architecture, Spectacle and Tourism. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Course includes consideration of the relationship between politics, popular culture, and the built environment, tourism consumption, experience and commodification, place image and tourism, sense of place – genius loci, new politics of spectacle, and tourism places, spaces and change.

ARC 6816. Study Abroad: Advanced Design Studio. (0-14) 6 Credit Hours.

Prerequisite: Consent of instructor. An advanced architecture design studio associated with a study abroad program.

ARC 6823. Study Abroad: Advanced Architectural History/Theory. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. An advanced study in architectural history/theory associated with a study abroad program; involves field trips.

ARC 6833. Study Abroad: Advanced Architectural Representation. (0-6) 3 Credit Hours.

Prerequisite: Consent of instructor. A graduate-level drawing and other media course associated with a study abroad program; involves field trips.

ARC 6931. Master's Project Preparation. (0-4) 1 Credit Hour.

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.)

ARC 6943. Professional Internship. (0-0) 3 Credit Hours.

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.

ARC 6951. Independent Study. (0-0) 1 Credit Hour.

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.

ARC 6952. Independent Study. (0-0) 2 Credit Hours.

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.

ARC 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ARC 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

ARC 6973. Special Topics. (3-0) 3 Credit Hours.

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.

ARC 6976. Special Topics. (6-0) 6 Credit Hours.

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.

ARC 6981. Master's Thesis. (0-0) 1 Credit Hour.

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. (Formerly COA 6981.).

ARC 6983. Master's Thesis. (0-0) 3 Credit Hours.

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. (Formerly COA 6983.).

ARC 6991. Master's Project. (0-2) 1 Credit Hour.

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.

ARC 6996. Master's Project. (0-14) 6 Credit Hours.

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.

College of Architecture-Foundations (COA) Courses

COA 6813. Study Abroad: Seminar. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. An advanced study associated with a study abroad program; involves field trips. Content varies. May be repeated for credit.

COA 6823. International Topics Seminar. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. An advanced study of international architecture; May include field trips and international travel. Content varies. May be repeated for credit when topic varies.

COA 6951. Independent Study. (0-0) 1 Credit Hour.

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.

COA 6952. Independent Study. (0-0) 2 Credit Hours.

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.

COA 6953. Independent Study. (0-0) 3 Credit Hours.

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.

COA 6973. Special Topics. (3-0) 3 Credit Hours.

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 COA 6973 or 12 hours of COA 6976 will apply to the Master of Science degree.

COA 6976. Special Topics. (6-0) 6 Credit Hours.

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 COA 6973 or 12 hours of COA 6976 will apply to the Master of Science degree.

Department of Construction Science

Construction Science and Management (CSM) Courses

CSM 5133. Construction Practice in a Global Setting. (3-0) 3 Credit Hours.

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.

CSM 5223. Building Information Modeling for Construction Management. (3-0) 3 Credit Hours.

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

CSM 5243. Sustainable Construction and Delivery. (3-0) 3 Credit Hours.

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

CSM 5413. Advanced Topics in Construction Systems. (1-4) 3 Credit Hours.

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.)

CSM 5423. Advanced Topics in Project Controls and Scheduling. (3-0) 3 Credit Hours.

Advanced techniques used in scheduling and planning processes in construction project control, including resource allocations and schedule recovery.

CSM 5433. Construction Safety Planning and Management. (3-0) 3 Credit Hours.

Current construction safety and health issues. Development of site-specific plans and methodology to provide hazard reduction on job sites.

CSM 5633. Advanced Construction Management. (3-0) 3 Credit Hours.

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.

CSM 6943. Construction Internship. (0-0) 3 Credit Hours.

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.

CSM 6951. Independent Study. (0-0) 1 Credit Hour.

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.

CSM 6953. Independent Study. (0-0) 3 Credit Hours.

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.

CSM 6973. Special Topics. (3-0) 3 Credit Hours.

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.

CSM 6976. Special Topics. (6-0) 6 Credit Hours.

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

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.

College-wide Programs

- Executive Master of Business Administration degree
- Master of Business Administration degree. Options include the general M.B.A., and all concentrations: Business Economics, Business of Health, Entrepreneurship, Finance, Cyber Security, Information Systems, Management Science, Management of Technology, Marketing Management, Project Management, and Real Estate Finance and Development.
- Master of Business Administration degree and Master of Public Health dual degree program
- Doctor of Philosophy degree in Business Administration, including all emphases: Accounting, Finance, Information Technology, Marketing, and Organization and Management Studies
- Graduate Certificate in the Business of Health
- ** • Master of Science degree in Business (New) (p. 88a)
- Master of Science degree in Data Analytics (New) (p. 88a)

Department of Accounting

- Five-Year (150-Hour) Professional Accounting Program
- Master of Accountancy degree
- Doctor of Philosophy degree in Business Administration with an Emphasis in Accounting

Department of Economics

- Master of Business Administration degree – Business Economics Concentration
- Master of Arts degree in Economics – General Economics Concentration
- Master of Arts degree in Economics – Financial Economics Concentration
- Master of Arts degree in Economics – Business Data Analysis and Forecasting Concentration

Department of Finance

- Master of Business Administration degree – Finance Concentration
- Master of Business Administration degree – Real Estate Finance and Development Concentration
- Master of Science degree in Finance
- Master of Science degree in Finance – Real Estate Finance and Development Concentration
- Doctor of Philosophy degree in Business Administration with an Emphasis in Finance
- Graduate Certificate in Real Estate Finance and Development

Department of Information Systems and Cyber Security

- Master of Business Administration degree – Cyber Security Concentration
- Master of Business Administration degree – Information Systems Concentration
- Master of Business Administration degree – Management of Technology Concentration
- Master of Business Administration degree – Project Management Concentration
- Master of Science degree in Information Technology
- Master of Science degree in Information Technology – Cyber Security Concentration
- Master of Science degree in Management of Technology
- Doctor of Philosophy degree in Business Administration with an Emphasis in Information Technology
- Graduate Certificate in Technology Entrepreneurship and Management

Department of Management

- Master of Business Administration degree – Entrepreneurship Concentration
- Doctor of Philosophy degree in Business Administration with an Emphasis in Organization and Management Studies

Department of Management Science and Statistics

- Master of Business Administration degree – Management Science Concentration
- Master of Science degree in Applied Statistics
- Doctor of Philosophy degree in Applied Statistics
- Graduate Certificate in Operations and Supply Chain Management

Department of Marketing

- Master of Business Administration degree – Marketing Management Concentration
 - Doctor of Philosophy degree in Business Administration with an Emphasis in Marketing
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- Master of Business Administration Degree (p. 47)
 - Master of Business Administration Degree – Business of Health Concentration (p. 49)
 - Executive Master of Business Administration (p. 49)
 - Dual Master of Business Administration Degree and Master of Public Health Degree Program (p. 49)
 - Doctor of Philosophy Degree in Business Administration (p. 50)

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	3
BLW 5003	Legal Environment of Business	3
ECO 5003	Economic Theory and Policy	3
IS 5003	Introduction to Information Systems	3
MS 5003	Quantitative Methods for Business Analysis	3

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	3
ECO 5023	Managerial Economics	3
FIN 5023	Financial Management	3
MGT 5043	Management and Behavior in Organizations	3
MGT 5253	Ethics and Globalization	3
MGT 5903	Strategic Management and Policy (Students who earn a grade of "B" (3.0) or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of "B-," "C+," or "C" may still satisfy the requirement by successfully passing a comprehensive examination as set out in this catalog.)	3
MKT 5023	Marketing Management	3
MS 5023	Decision Analysis and Production Management	3
Total Credit Hours		24

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, Entrepreneurship and Technology Management, Finance, Information Systems and Cyber Security, 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. Concentration courses are not restricted to students in the concentration area.

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, Entrepreneurship, Finance, Information Assurance, Information Systems, Management Science, Management of Technology, Marketing Management, Project Management and Real

Estate Finance. 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 healthcare 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

BOH 6763	Legal and Tax Strategies for Healthcare Organizations	3
BOH 6773	Seminar in Medicare Regulation	3
BOH 6123 or MGT 6123	Healthcare Strategic Management	3

B. Elective courses

Select one of the following:		3
BOH 6783	Accounting for Healthcare Organizations	
BOH 6553	Legal, Ethical, and Social Issues of Healthcare Management	
or BLW 6553	Legal, Ethical, and Social Issues of Healthcare Management	
BOH 6543 or ECO 6543	Healthcare Economics and Policy	
BOH 6133	Organizational and Managerial Issues in Healthcare Delivery	
or MGT 6133	Organizational and Managerial Issues in Healthcare Delivery	
BOH 6923 or MGT 6923	Healthcare Management Internship	

Total Credit Hours **12**

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 rising leaders who have significant managerial experience. This five-semester plan of study features cohort classes, lock-step weekend class scheduling, and an emphasis on acquiring advanced skills and knowledge needed to solve the pressing concerns of today's fast-paced economy. 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 professional experience and life accomplishments.
- 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.
- 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.

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 healthcare 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. 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 (<http://sph.uth.tmc.edu/campuses/san-antonio/>) 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 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 84 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 may be directed to take additional background or leveling courses (See sections A, B, and C of the Program of Study below) 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 includes 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 84 semester credit hours beyond the bachelor's degree. Candidates who enter the program with prior graduate business coursework may be waived from some or all 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 (9 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):¹
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.

D. Seminar in teaching methods:

GBA 7103	Doctoral Teaching Seminar	3
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E. Statistics and Research Methodology

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:²

ECO 6013	Microeconomic Theory
ECO 6103	Econometrics and Business Forecasting
ECO 6113	Mathematical Economics
GBA 7013	Research Methods I
GBA 7023	Research Methods II
MS 7033	Applications in Causal Structural Modeling
STA 6923	Advanced Statistical Learning/Data Mining
STA 7013	Advanced Applied Business Statistical Methods
STA 7023	Applied Linear Statistical Models
STA 7033	Multivariate Statistical Analysis

F. Major Area Coursework:

1. Four Ph.D.-level courses in major area.	12
2. Three directed electives approved by the Doctoral Studies Committee from among graduate-level courses in major area.	9

G. One free elective

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. 3

H. Doctoral Research

This requirement is met by doctoral research coursework. 9

I. Dissertation Research

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. 12

Total Credit Hours 84-87

- 1 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). Students without the approved Statistics/Quantitative background requirement will take all 18 credit hours of the Statistics and Research Methodology requirement.
- 2 If the Statistics/Quantitative background requirement (section C) 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.

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.

Graduate Certificate in the Business of Health

The Graduate Certificate in the Business of Health is a 12-semester-credit-hour program designed to equip healthcare and business professionals with the knowledge and skills needed to lead in today's rapidly-changing healthcare environment. The influence of political, social, legal, regulatory, environmental and technological issues on healthcare management decisions is central to our practical, state-of-the-art classes.

Students who are currently enrolled in a graduate degree program at UTSA are eligible for admission to this certificate program. Students who have previously completed a master's degree, equivalent-level professional degree (such as JD, MD, DDS, etc.) or higher (such as Ph.D., etc.) are not required to submit a graduate admission test for admission to this certificate program. Students who are currently enrolled in a post-baccalaureate degree program are required to submit their graduate admission test results (such as from the DAT, GMAT, GRE, LSAT, MCAT, OAT, PCAT, etc.) if they have taken an admissions test for their current program. The GMAT requirement for students who do not have an advanced degree, or who have not taken a graduate admission test may be waived for this program. The decision will be made on a case-by-case basis.

To earn the Business of Health certificate, students must complete 12 semester credit hours:

BOH 6123	Healthcare Strategic Management	3
or MGT 6123	Healthcare Strategic Management	
BOH 6763	Legal and Tax Strategies for Healthcare Organizations	3
or ACC 6763	Legal and Tax Strategies for Not-For-Profit Organizations	
BOH 6773	Seminar in Medicare Regulation	3
or ACC 6773	Seminar in Medicare Regulation	
And one course chosen from the following:		3
BOH 6133	Organizational and Managerial Issues in Healthcare Delivery	
or MGT 6133	Organizational and Managerial Issues in Healthcare Delivery	
BOH 6543	Healthcare Economics and Policy	

or ECO 6543	Healthcare Economics and Policy
BOH 6553	Legal, Ethical, and Social Issues of Healthcare Management
or BLW 6553	Legal, Ethical, and Social Issues of Healthcare Management
BOH 6783	Accounting for Healthcare Organizations
or ACC 6783	Accounting for Healthcare Organizations
BOH 6923	Healthcare Management Internship
or MGT 6923	Healthcare Management Internship
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Total Credit Hours	12

Business of Health (BOH) Courses

BOH 6123. Healthcare Strategic Management. (3-0) 3 Credit Hours.

Prerequisite: MGT 5003, an equivalent, or consent of instructor. Strategic management of healthcare organizations involves both making good decisions about where you want your organization to go and deciding how to get there. This course will focus on both direction issues and execution issues. Students will do case studies of current healthcare organizations. (Same as MGT 6123. Credit cannot be earned for both MGT 6123 and BOH 6123.).

BOH 6133. Organizational and Managerial Issues in Healthcare Delivery. (3-0) 3 Credit Hours.

Prerequisite: MGT 5003, an equivalent, or consent of instructor. An analysis of the organizational and managerial implications of clinical issues in the delivery of healthcare. Students have the opportunity to examine quality of care issues and concerns related to patient care that affect how healthcare organizations are managed. (Same as MGT 6133. Credit cannot be earned for both MGT 6133 and BOH 6133.).

BOH 6543. Healthcare Economics and Policy. (3-0) 3 Credit Hours.

Prerequisite: ECO 5003, an equivalent, or consent of instructor. The application of economic principles and modeling to the healthcare marketplace. Students will be given the opportunity to apply theoretical and empirical economic analysis to business and public policy issues in the healthcare industry. (Same as ECO 6543. Credit cannot be earned for both ECO 6543 and BOH 6543.).

BOH 6553. Legal, Ethical, and Social Issues of Healthcare Management. (3-0) 3 Credit Hours.

Prerequisite: BLW 5003, an equivalent, or consent of instructor. Introduction to problems, issues, and trends in organized healthcare delivery with a particular focus on related legal and ethical issues. (Same as BLW 6553. Credit cannot be earned for both BLW 6553 and BOH 6553.).

BOH 6763. Legal and Tax Strategies for Healthcare Organizations. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003, an equivalent, or consent of 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. (Same as ACC 6763. Credit cannot be earned for both ACC 6763 and BOH 6763.).

BOH 6773. Seminar in Medicare Regulation. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003, an equivalent, or consent of 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. (Same as ACC 6773. Credit cannot be earned for both ACC 6773 and BOH 6773.).

BOH 6783. Accounting for Healthcare Organizations. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003, an equivalent, or consent of 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. (Same as ACC 6783. Credit cannot be earned for both ACC 6783 and BOH 6783.).

BOH 6923. Healthcare Management Internship. (0-0) 3 Credit Hours.

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 healthcare management. Individual conferences and written reports required. (Same as MGT 6923. Credit cannot be earned for both MGT 6923 and BOH 6923.).

General Business Administration (GBA) Courses

GBA 6971. Special Topics in General Business Administration. (1-0) 1 Credit Hour.

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.

GBA 6972. Special Topics in General Business Administration. (2-0) 2 Credit Hours.

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.

GBA 6973. Special Topics in General Business Administration. (3-0) 3 Credit Hours.

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.

GBA 7013. Research Methods I. (3-0) 3 Credit Hours.

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.

GBA 7023. Research Methods II. (3-0) 3 Credit Hours.

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

GBA 7103. Doctoral Teaching Seminar. (3-0) 3 Credit Hours.

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 (p. 53)
- Master of Accountancy Degree (p. 53)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Accounting (p. 54)

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 leveling 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 leveling 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 leveling courses. MACY leveling 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 leveling 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	3
ACC 2033	Principles of Accounting II	3
ACC 3023	Intermediate Accounting I	3
ACC 3033	Intermediate Accounting II	3
ACC 3043	Federal Income Taxation	3
ACC 3113	Accounting Information Systems	3
ACC 4013	Principles of Auditing	3
BLW 3013	Business Law	3
ECO 2013	Introductory Macroeconomics	3
ECO 2023	Introductory Microeconomics	3
FIN 3014	Principles of Business Finance	4
IS 3003	Principles of Information Systems for Management	3
MGT 3013	Introduction to Organization Theory, Behavior, and Management	3
MKT 3013	Principles of Marketing	3
MS 3043	Business Statistics with Computer Applications II	3

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

ACC 6003	Managerial Accounting Theory	3
ACC 6013	Financial Accounting Theory	3

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

ACC 6993	Integrative Seminar in Accounting (Students who earn a grade of "B" or better in this course will satisfy the comprehensive examination requirement.)	3
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Total Credit Hours **30**

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 Ph.D. in Business

Administration requirements (p. 47) in 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 9 hours of directed electives.

A. Ph.D. level courses

Select 12 credits from the following:		12
ACC 7013	Seminar in Empirical 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

ACC 7043	Archival-Based Research Methods in Accounting	3
Graduate-level courses in major area as approved by the Doctoral Studies Committee		6

Total Credit Hours **21**

Accounting (ACC) Courses

ACC 5003. Financial Accounting Concepts. (3-0) 3 Credit Hours.

An intensive study of accounting as a tool to communicate financial information for planning, analyzing, and controlling business enterprises directed toward decision making.

ACC 5023. Accounting Analysis for Decision Making. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003 or an equivalent. The study of accounting and its uses by management in the decision-making process.

ACC 5163. Ethics and Accountant's Professional Responsibility. (3-0) 3 Credit Hours.

A study of the role of a professional accountant; codes of accountants; ethical decision making; and the legal, regulatory and social environment in which an accountant makes decisions. This is a non-accounting graduate course.

ACC 5513. Fundamentals of Information Assurance. (3-0) 3 Credit Hours.

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.)

ACC 5813. Advanced Auditing. (3-0) 3 Credit Hours.

Prerequisite: ACC 4013 or an equivalent. A study of specialized areas of auditing. Topics may vary depending upon current professional controversies.

ACC 5823. Governmental and Not-for-Profit Accounting. (3-0) 3 Credit Hours.

Prerequisite: ACC 3023 or an equivalent. A study of accounting principles and practices of state and local governments and not-for-profit organizations.

ACC 5863. Advanced Financial Accounting. (3-0) 3 Credit Hours.

Prerequisite: ACC 3033 or an equivalent. A study of specialized areas of financial accounting. Topics may vary depending upon current professional controversies.

ACC 5883. Fraud Examination and Forensic Accounting. (3-0) 3 Credit Hours.

Prerequisite: ACC 4013 or an equivalent. A study of fraud, including risk factors, prevention techniques, characteristics of common schemes, fraud detection processes and tools, and the use of accounting, auditing and other procedures in fraud investigation and resolution.

ACC 5913. Corporate Valuation. (3-0) 3 Credit Hours.

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.).

ACC 5923. Systems Auditing. (3-0) 3 Credit Hours.

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.

ACC 5943. Financial Statement Analysis. (3-0) 3 Credit Hours.

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.).

ACC 6003. Managerial Accounting Theory. (3-0) 3 Credit Hours.

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.

ACC 6013. Financial Accounting Theory. (3-0) 3 Credit Hours.

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.

ACC 6043. Tax Research. (3-0) 3 Credit Hours.

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.

ACC 6053. Estate, Trust, and Gift Taxation. (3-0) 3 Credit Hours.

Prerequisite: ACC 3043 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.

ACC 6073. Advanced Corporate Taxation. (3-0) 3 Credit Hours.

Prerequisite: ACC 3043 or an equivalent. A study of federal income taxation of corporations and shareholders, which includes formation, distributions, penalty taxes, reorganization, and consolidations.

ACC 6083. Special Topics in Tax Practice. (3-0) 3 Credit Hours.

Prerequisite: ACC 3043 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.

ACC 6103. International Taxation. (3-0) 3 Credit Hours.

Prerequisite: ACC 3043 or an equivalent. A study of the issues involved in the taxation of multinational corporations and international trade partners.

ACC 6113. Flow Through Entities. (3-0) 3 Credit Hours.

Prerequisite: ACC 3043 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.

ACC 6203. Seminar in International Accounting. (3-0) 3 Credit Hours.

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.

ACC 6703. Introduction to Data Mining. (3-0) 3 Credit Hours.

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.).

ACC 6763. Legal and Tax Strategies for Not-For-Profit Organizations. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003, 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. (Same as BOH 6763. Credit cannot be earned for both ACC 6763 and BOH 6763.).

ACC 6773. Seminar in Medicare Regulation. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003, 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. (Same as BOH 6773. Credit cannot be earned for both ACC 6773 and BOH 6773.).

ACC 6783. Accounting for Healthcare Organizations. (3-0) 3 Credit Hours.

Prerequisite: ACC 5003, 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. (Same as BOH 6783. Credit cannot be earned for both ACC 6783 and BOH 6783.).

ACC 6943. Accounting Internship. (0-0) 3 Credit Hours.

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.).

ACC 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ACC 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

ACC 6973. Special Problems. (3-0) 3 Credit Hours.

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.

ACC 6993. Integrative Seminar in Accounting. (3-0) 3 Credit Hours.

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.

ACC 7013. Seminar in Empirical Research in Accounting. (3-0) 3 Credit Hours.

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.

ACC 7043. Archival-Based Research Methods in Accounting. (3-0) 3 Credit Hours.

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.

ACC 7053. Current Topics in Accounting Research. (3-0) 3 Credit Hours.

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.

ACC 7113. Seminar in Financial Accounting Theory. (3-0) 3 Credit Hours.

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.

ACC 7123. Seminar in Managerial Accounting Theory. (3-0) 3 Credit Hours.

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.

ACC 7211. Doctoral Research. (0-0) 1 Credit Hour.

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

ACC 7212. Doctoral Research. (0-0) 2 Credit Hours.

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

ACC 7213. Doctoral Research. (0-0) 3 Credit Hours.

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

ACC 7215. Doctoral Research. (0-0) 5 Credit Hours.

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

ACC 7216. Doctoral Research. (0-0) 6 Credit Hours.

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

ACC 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

ACC 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

ACC 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

ACC 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

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.

ACC 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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.

Business Law (BLW) Courses**BLW 5003. Legal Environment of Business. (3-0) 3 Credit Hours.**

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.

BLW 6553. Legal, Ethical, and Social Issues of Healthcare Management. (3-0) 3 Credit Hours.

Prerequisite: BLW 5003, an equivalent, or consent of instructor. Introduction to problems, issues, and trends in organized healthcare delivery with a particular focus on related legal and ethical issues. (Same as BOH 6553. Credit cannot be earned for both BLW 6553 and BOH 6553.)

BLW 6953. Independent Study. (0-0) 3 Credit Hours.

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.

BLW 6973. Special Problems. (3-0) 3 Credit Hours.

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

Department of 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	3
ECO 6103	Econometrics and Business Forecasting	3

Graduate Economics elective courses

6

Total Credit Hours**12**

Master of Arts Degree in Economics

The Master of Arts degree in Economics (M.A.E.) incorporates the traditional social sciences-oriented master's program in economics with modern quantitative methods and applied analytical tools. The focus of the program is on application and practice of the economic theory.

The program is designed to serve the need for a terminal graduate degree for professional economists and also to lay the groundwork for students who wish to pursue the Ph.D. degree. There are three degree concentrations – general economics, financial economics, and business data analysis and forecasting, to choose from. The concentration of general economics is designed to prepare students for further graduate studies in economics, while the concentrations of financial economics, and business data analysis and forecasting are designed to prepare students for professional careers in related private industries. No thesis is required for the degree. Only students in the concentration of general economics may choose a thesis option and this option requires previous outstanding research and coursework. The program and admission are supervised by the Economics Graduate Program Committee, which includes the Economics Graduate Director. 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
- a statement of purpose

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. Importantly, all graduate students are expected to meet the foundation requirements which represent three bodies of knowledge that need to be acquired prior to entering the program. Whether a student meets the foundation requirements is most likely to be determined by the courses taken in his/her previous studies. Students who are admitted to the program but do not meet the foundation requirements are required to make up the foundation requirements (mandated by the Economics Admission Graduate Committee) prior to or during the first year of the program.

Foundation Requirements

The three foundation areas are:

- Economic Theory: Undergraduate level of economic theory, including Intermediate Microeconomics and Intermediate Macroeconomics
- Mathematics: An ability to apply calculus and linear algebra to equilibrium and optimization models in economics

- Statistics: A basic knowledge of statistics, including hypothesis testing, sampling and probability distribution

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

Students must earn 12 of the 33 semester credit hours from the core courses required for the program. These remaining 21 semester credit hours may include the credits that students can earn from an internship and a directed research project or a Master's Thesis.

Internships. Students are encouraged to pursue an internship (in the U.S. or overseas) that would substitute for an elective course (3 semester credit hours) upon approval by the Graduate Advisor.

Directed Research Project. Students are encouraged to undertake a research project in their area of concentration. To do so, students confer with a faculty advisor with whom they share a specific research interest to develop practical and relevant ideas for research that can be conducted as a course of independent study and substitute for an elective course (3 semester credit hours).

Master's Thesis. The Master's Thesis option requires previous outstanding research and coursework. This option allows students to take the last two semesters of the program to write the thesis. The option of writing a Master's Thesis can substitute for two elective courses (6 semester credit hours). The faculty advisor supervises the writing of the research paper/project that involves a command of relevant economic theory, statistical methods and field-research methodology. The Master's Thesis will be copyrighted and made available to the public in the UTSA library.

The program allows students to do both an internship and a directed research paper (6 semester credit hours in total), or both an internship and a Master's Thesis (9 semester credit hours in total), but not a directed research paper and a Master's Thesis.

Comprehensive Examination. Students must pass a comprehensive examination administered by a graduate committee. This examination is normally taken in the semester before, or during the semester, in which degree requirements are completed. The student informs the Economics Graduate Advisor of the intent to take the examination during the first month of the appropriate semester 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.

Master of Arts Degree in Economics - General Economics Concentration

This concentration can be used for preparing students for Ph.D. studies in Economics at other universities as the core courses in the program mirror the majority of first year Ph.D. courses in Economics at a slightly lower level. Others may use this option to prepare for careers as economists in the government/public sector.

Students who select this concentration will collaborate with a Graduate Advisor to design a plan of study. Students who select this concentration must complete the 12 semester credit hours of the core courses in the M.A.E. and 21 semester credit hours of elective graduate courses.

A. 12 semester credit hours of required core courses:

12

ECO 6013	Microeconomic Theory
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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. All of the required courses offered in the Financial Economics or Business Data Analysis and Forecasting concentrations can be chosen as the elective courses for the General Economics Concentration. Upon the Graduate Advisor's approval, a student may choose more than 9 semester credit hours of elective noneconomics courses that are the required courses of the other two concentrations. These 21 semester credit hours can also include the credit hours that students would earn from an internship and a directed research project or a Master's Thesis. Economics elective courses are economics graduate courses not in the student's required core courses, including:		21
ECO 6203	Government and Business	
ECO 6303	Applied Econometrics	
ECO 6323	International Trade and Finance	
ECO 6403	Financial Economics	
ECO 6543	Healthcare Economics and Policy	
ECO 6553	Urban and Regional Economics	
ECO 6573	Game Theory and Business Strategy	
ECO 6583	Special Topics in Econometrics/Forecasting	
ECO 6951	Independent Study	
ECO 6953	Independent Study	
ECO 6943	Economics Internship	
ECO 6971	Special Topics	
ECO 6973	Special Topics	
ECO 6983	Master's Thesis	

C. Comprehensive Examination. Students must pass a comprehensive examination administered by the Graduate Program Committee in Economics.

Total Credit Hours **33**

Master of Arts Degree in Economics - Financial Economics Concentration

This concentration prepares students who desire to find employment in financial industries in which they solve real-world problems in the world of finance. The focus of this concentration is to equip students with both the qualitative analysis skills in economics and the financial modeling tools in finance. The required courses for this concentration are designed to provide students with the opportunity to study domestic and international financial markets, as well as the principles of financial decision-making in the banking, investment management and corporate financial management professions.

Students who select this concentration must complete the 12 semester credit hours of the core courses in the M.A.E., 15 semester credit hours of required courses for the concentration, and 6 semester credit hours of electives.

A. 12 semester credit hours of required core courses:		12
ECO 6013	Microeconomic Theory	
ECO 6033	Macroeconomic Issues	
ECO 6103	Econometrics and Business Forecasting	
ECO 6113	Mathematical Economics	

B. 15 semester credit hours of required courses:		15
ECO 6403	Financial Economics	
ECO 6583	Special Topics in Econometrics/Forecasting	
FIN 5023	Financial Management	
FIN 5733	Banking and the Financial Services Industry	
FIN 6313	Modeling of Financial Decision Making	

C. 6 semester credit hours of electives from the list below or as approved by the Graduate Advisor. Students in this concentration are encouraged to complete a directed research project in the field of financial economics or to complete an internship in the financial sector. These 6 semester credit hours can include the credit hours that students would earn from an internship and a directed research project (considered as an independent study).

ECO 6203	Government and Business	
ECO 6303	Applied Econometrics	
ECO 6323	International Trade and Finance	
ECO 6543	Healthcare Economics and Policy	
ECO 6553	Urban and Regional Economics	
ECO 6573	Game Theory and Business Strategy	
ECO 6943	Economics Internship	
ECO 6951	Independent Study	
ECO 6953	Independent Study	
ECO 6971	Special Topics	
ECO 6973	Special Topics	

D. Comprehensive Examination. Students must pass a comprehensive examination administered by the Graduate Program Committee in Economics.

Total Credit Hours **33**

Master of Arts Degree in Economics - Business Data Analysis and Forecasting Concentration

This concentration is designed for students who desire to prepare a career in which they apply the theory and techniques of economics to the analysis of practical problems in a variety of fields focusing on the data analysis. The required courses for this concentration are designed to enhance students understanding of the core concepts in microeconomics and macroeconomics, and develop quantitative skills necessary to work in econometrics and economic forecasting.

Students who select this concentration must complete the 12 semester credit hours of the core courses in the M.A.E., 15 semester credit hours of required courses for the concentration, and 6 semester credit hours of electives.

A. 12 semester credit hours of required core courses:		12
ECO 6013	Microeconomic Theory	
ECO 6033	Macroeconomic Issues	
ECO 6103	Econometrics and Business Forecasting	
ECO 6113	Mathematical Economics	
B. 15 semester credit hours of required courses:		15
ECO 6303	Applied Econometrics	
ECO 6583	Special Topics in Econometrics/Forecasting	
MKT 5063	Marketing Research Design and Application	
STA 6033	Advanced Programming and Data Management in SAS	

STA 6923	Advanced Statistical Learning/Data Mining	
C. 6 semester credit hours of electives from the list below or as approved by the Graduate Advisor. Students in this concentration are encouraged to complete a directed research project in the field of financial economics or to complete an internship in the financial sector. These 6 semester credit hours can include the credit hours that students would earn from an internship and a directed research project (considered as an independent study).		6
ECO 6203	Government and Business	
ECO 6323	International Trade and Finance	
ECO 6403	Financial Economics	
ECO 6543	Healthcare Economics and Policy	
ECO 6553	Urban and Regional Economics	
ECO 6573	Game Theory and Business Strategy	
ECO 6943	Economics Internship	
ECO 6951	Independent Study	
ECO 6953	Independent Study	
ECO 6971	Special Topics	
ECO 6973	Special Topics	
D. Comprehensive Examination. Students must pass a comprehensive examination administered by the Graduate Program Committee in Economics.		
Total Credit Hours		33

Economics (ECO) Courses

ECO 5003. Economic Theory and Policy. (3-0) 3 Credit Hours.

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.

ECO 5023. Managerial Economics. (3-0) 3 Credit Hours.

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.

ECO 6013. Microeconomic Theory. (3-0) 3 Credit Hours.

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.

ECO 6033. Macroeconomic Issues. (3-0) 3 Credit Hours.

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.)

ECO 6103. Econometrics and Business Forecasting. (3-0) 3 Credit Hours.

Prerequisites: ECO 5003 and ECO 6113, their equivalents, 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.

ECO 6113. Mathematical Economics. (3-0) 3 Credit Hours.

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.

ECO 6203. Government and Business. (3-0) 3 Credit Hours.

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.

ECO 6213. Public Sector Economics. (3-0) 3 Credit Hours.

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.)

ECO 6303. Applied Econometrics. (3-0) 3 Credit Hours.

Prerequisites: ECO 6013 and ECO 6113, or consent of instructor. Advanced topics in econometrics and their applications. Topics include panel data, discrete and limited dependent variable, nonlinear and dynamic models. (Formerly ECO 7303. Credit cannot be earned for both ECO 6303 and ECO 7303.)

ECO 6323. International Trade and Finance. (3-0) 3 Credit Hours.

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.)

ECO 6403. Financial Economics. (3-0) 3 Credit Hours.

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.

ECO 6523. Labor Economics. (3-0) 3 Credit Hours.

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.)

ECO 6543. Healthcare Economics and Policy. (3-0) 3 Credit Hours.

Prerequisite: ECO 5003, an equivalent, or consent of instructor. The application of economic principles and modeling to the healthcare marketplace. Students will be given the opportunity to apply theoretical and empirical economic analysis to business and public policy issues in the healthcare industry. (Same as BOH 6543. Credit cannot be earned for both BOH 6543 and ECO 6543.)

ECO 6553. Urban and Regional Economics. (3-0) 3 Credit Hours.

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.

ECO 6573. Game Theory and Business Strategy. (3-0) 3 Credit Hours.

Prerequisites: ECO 6013 and ECO 6113, or consent of instructor. A study of strategic decision-making in interactive situations, with an emphasis on economics and business applications, such as oligopolistic firm behavior, pricing, bargaining, incentive contracts, signaling, and auctions. The course serves as an introduction to basic theory of static and dynamic games of complete and incomplete information and the strategic role of commitment, credibility, reputation, unpredictability, and pre-emption are explored.

ECO 6583. Special Topics in Econometrics/Forecasting. (3-0) 3 Credit Hours.

Prerequisites: ECO 6103 and ECO 6113, or consent of instructor. This course discusses advanced econometric and forecasting techniques. Possible topics include, but not limited to, multiple time series analysis, forecast combinations, and big data economic forecasts with emphasis on real-world applications. May be repeated for credit, but not more than 6 semester credit hours will apply to a Master's degree.

ECO 6943. Economics Internship. (0-0) 3 Credit Hours.

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.

ECO 6951. Independent Study. (0-0) 1 Credit Hour.

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.

ECO 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ECO 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

ECO 6971. Special Topics. (1-0) 1 Credit Hour.

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.

ECO 6973. Special Topics. (3-0) 3 Credit Hours.

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.

ECO 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

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 (p. 61)
- Master of Business Administration Degree – Real Estate Finance and Development Concentration (p. 62)
- Master of Science Degree in Finance – General Option (p. 62)
- Master of Science Degree in Finance – Real Estate Finance and Development Concentration (p. 63)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Finance (p. 63)

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	3
9 semester credit hours of graduate Finance elective courses		9
Total Credit Hours		12

Master of Business Administration Degree – Real Estate Finance and Development 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 5403	Real Estate Principles	3
FIN 5423	Real Estate Finance and Investment	3
FIN 5443	Real Estate Construction	3
FIN 5453	Real Estate Development	3
Total Credit Hours		12

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	3
MS 5023	Decision Analysis and Production Management	3

B. 9 semester credit hours of required courses:

FIN 5023	Financial Management	3
FIN 5633	Investment Theory and Problems	3
FIN 6313	Modeling of Financial Decision Making	3

C. 18 semester credit hours of electives, at least 15 of which must be from the set of courses shown below. No more than six semester hours of the real estate set of courses (FIN 5403, FIN 5423, FIN 5443, FIN 5453, FIN 6903) can be applied towards fulfillment of the electives requirement. The Graduate Advisor in Finance must approve any electives chosen outside this set. The electives include:

FIN 5033	Cases in Financial Management	
FIN 5403	Real Estate Principles	
FIN 5423	Real Estate Finance and Investment	
FIN 5443	Real Estate Construction	
FIN 5453	Real Estate Development	
FIN 5723	Fixed Income Analysis	
FIN 5733	Banking and the Financial Services Industry	
FIN 5813	Corporate Valuation	
FIN 5823	Corporate Restructuring	
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 6903	Special Studies in Real Estate	

FIN 6943	Finance Internship
FIN 6953	Independent Study
FIN 6973	Special Problems

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

Total Credit Hours 33

Master of Science Degree in Finance – Real Estate Finance and Development 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	3
MS 5023	Decision Analysis and Production Management	3

B. 21 semester credit hours of required courses:

FIN 5023	Financial Management	3
FIN 5403	Real Estate Principles	3
FIN 5423	Real Estate Finance and Investment	3
FIN 5443	Real Estate Construction	3
FIN 5453	Real Estate Development	3
FIN 5633	Investment Theory and Problems	3
FIN 6313	Modeling of Financial Decision Making	3

C. 6 semester credit hours of electives from the following set of courses or as approved by the Real Estate Finance and Development program executive director:

FIN 5033	Cases in Financial Management	
FIN 5723	Fixed Income Analysis	
FIN 5733	Banking and the Financial Services Industry	
FIN 5813	Corporate Valuation	
FIN 5823	Corporate Restructuring	
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 6903	Special Studies in Real Estate	
FIN 6943	Finance Internship	
FIN 6953	Independent Study	
FIN 6973	Special Problems	
MOT 5243	Essentials of Project and Program Management (Or any real estate related graduate course in ARC, CSM, PAD or URP as approved by the Real Estate Finance and Development program director.)	

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

Total Credit Hours 33

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 Ph.D. in Business Administration requirements (p. 47) in 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: 12

FIN 7013	Financial Theory
FIN 7023	Corporate Finance
FIN 7033	Valuation
FIN 7043	Empirical Finance
FIN 7113	International Financial Markets

B. Three directed electives: 9

FIN 7053	Topics in Financial Research
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6 hours of FIN electives as approved by the Doctoral Studies Committee

Total Credit Hours 21

Graduate Certificate in Real Estate Finance and Development

The Graduate Certificate in Real Estate Finance and Development is a 12-semester-credit-hour graduate option that will benefit professionals in the real estate and construction community who desire knowledge in real estate finance and development. The program is designed for students who have earned a bachelor's degree and wish to obtain a foundation for a career in real estate and development. It is also designed for those who hold a graduate degree but seek to obtain more education or specialization within the industry without committing to further graduate degrees. This certificate is also available to graduate students in Architecture, Urban and Regional Planning, or Public Administration who wish to gain related expertise in Real Estate Finance and Development.

To earn a Graduate Certificate in Real Estate Finance and Development, students must earn 12 semester credit hours as follows:

FIN 5403	Real Estate Principles ¹	3
FIN 5423	Real Estate Finance and Investment	3
FIN 5443	Real Estate Construction	3
FIN 5453	Real Estate Development	3

Total Credit Hours 12

Refer to the course descriptions for course prerequisites.

- 1 If you are enrolled in the Graduate Certificate in Real Estate Finance and Development, the prerequisite for FIN 5403 is as follows: FIN 5013 or FIN 5023 with score of "B-" or higher or consent of program advisor.

Applicants who are currently enrolled in a graduate degree program at UTSA have already met University requirements for admission. However, applicants must also obtain written approval from the certificate program advisor for admission. 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 must also obtain written approval from the certificate program advisor for admission. 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.

Finance (FIN) Courses

FIN 5013. Foundations of Finance for Entrepreneurs. (3-0) 3 Credit Hours.

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.

FIN 5023. Financial Management. (3-0) 3 Credit Hours.

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.

FIN 5033. Cases in Financial Management. (3-0) 3 Credit Hours.

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.

FIN 5403. Real Estate Principles. (3-0) 3 Credit Hours.

Prerequisite or corequisite: FIN 5023. This course provides an overview of the discipline of real estate including both residential and commercial real estate. Topics may include the lease/buy decision, legal and industry aspects of the real estate sector, an overview of real estate capital markets, an introduction to debt and equity financing for real estate, principles of real estate investment decision-making, underwriting real estate transactions, and an introduction to public and private real estate. If enrolled in the Graduate Certificate in Real Estate Finance and Development, the prerequisite for this course is FIN 5013 or FIN 5023 with score of "B-" or higher or consent of program advisor.

FIN 5423. Real Estate Finance and Investment. (3-0) 3 Credit Hours.

Prerequisite: FIN 5403. This course builds upon the principles of FIN 5403 to further study investment and finance concepts applied to real estate lending, development and valuation of real property. 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. The course also examines the major concepts and analytical methods useful for making real estate investment and finance decisions relating to individual and portfolios of properties. It builds upon the modern corporate finance perspective and treats property as one particular class of capital assets.

FIN 5443. Real Estate Construction. (3-0) 3 Credit Hours.

Prerequisite: FIN 5403. This course focuses on construction methods and management with application to real estate development, brokerage and lending. Topics include various construction techniques and processes, and standard metrics for commercial real estate products including industrial, office, multi-family and retail. Specific topics may include cost estimating, construction budgets, construction contracts, assembling and interpreting construction documents, project delivery, and overall management of the construction process.

FIN 5453. Real Estate Development. (3-0) 3 Credit Hours.

Prerequisites: FIN 5423 and FIN 5443 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.

FIN 5633. Investment Theory and Problems. (3-0) 3 Credit Hours.

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.

FIN 5723. Fixed Income Analysis. (3-0) 3 Credit Hours.

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.

FIN 5733. Banking and the Financial Services Industry. (3-0) 3 Credit Hours.

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.

FIN 5813. Corporate Valuation. (3-0) 3 Credit Hours.

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.)

FIN 5823. Corporate Restructuring. (3-0) 3 Credit Hours.

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.

FIN 5833. International Financial Management. (3-0) 3 Credit Hours.

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.

FIN 5853. Entrepreneurial Financial Management. (3-0) 3 Credit Hours.

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.")

FIN 5943. Financial Statement Analysis. (3-0) 3 Credit Hours.

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.)

FIN 6213. Speculative Markets and Securities. (3-0) 3 Credit Hours.

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.

FIN 6223. Corporate Risk Management. (3-0) 3 Credit Hours.

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.

FIN 6313. Modeling of Financial Decision Making. (3-0) 3 Credit Hours.

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.

FIN 6901. Special Studies in Real Estate. (1-0) 1 Credit Hour.

Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study on various real estate topics 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.

FIN 6902. Special Studies in Real Estate. (2-0) 2 Credit Hours.

Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study on various real estate topics 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.

FIN 6903. Special Studies in Real Estate. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study on various real estate topics 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.

FIN 6943. Finance Internship. (0-0) 3 Credit Hours.

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.

FIN 6953. Independent Study. (0-0) 3 Credit Hours.

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.

FIN 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

FIN 6971. Special Problems. (1-0) 1 Credit Hour.

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.

FIN 6973. Special Problems. (3-0) 3 Credit Hours.

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.

FIN 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

FIN 7013. Financial Theory. (3-0) 3 Credit Hours.

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.

FIN 7023. Corporate Finance. (3-0) 3 Credit Hours.

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.

FIN 7033. Valuation. (3-0) 3 Credit Hours.

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.

FIN 7043. Empirical Finance. (3-0) 3 Credit Hours.

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.

FIN 7053. Topics in Financial Research. (0-0) 3 Credit Hours.

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.

FIN 7063. Advanced Research in Finance. (3-0) 3 Credit Hours.

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.

FIN 7113. International Financial Markets. (3-0) 3 Credit Hours.

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.

FIN 7211. Doctoral Research. (0-0) 1 Credit Hour.

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

FIN 7212. Doctoral Research. (0-0) 2 Credit Hours.

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

FIN 7213. Doctoral Research. (0-0) 3 Credit Hours.

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

FIN 7215. Doctoral Research. (0-0) 5 Credit Hours.

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

FIN 7216. Doctoral Research. (0-0) 6 Credit Hours.

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

FIN 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

FIN 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

FIN 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

FIN 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

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.

FIN 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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 Cyber Security

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

- Master of Business Administration Degree – Cyber Security Concentration (p. 67)
- Master of Business Administration Degree – Information Systems Concentration (p. 67)
- Master of Business Administration Degree – Management of Technology Concentration (p. 67)
- Master of Business Administration Degree – Project Management Concentration (p. 68)
- Master of Science Degree in Information Technology (p. 68)
- Master of Science Degree in Information Technology – Cyber Security Concentration (p. 69)
- Master of Science Degree in Management of Technology (p. 69)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Information Technology (p. 70)

Master of Business Administration Degree – Cyber Security Concentration

This concentration is designed to offer the opportunity for qualified students to study business administration while developing special expertise in cyber security. To achieve this end, students can focus their elective courses on cyber security 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 cyber security must complete the 24 semester credit hours of courses containing the M.B.A. Core in addition to 12 semester credit hours of graduate cyber security courses from the following:

IS 5143	Information Technology
IS 5193	Software Engineering Management
IS 5203	Telecommunication Systems
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 6703	Introduction to Data Mining

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 in addition to 12 semester credit hours of graduate information systems courses from the following:

IS 5113	Electronic Commerce and Web Site Design
IS 5143	Information Technology
IS 5193	Software Engineering Management
IS 5203	Telecommunication Systems
IS 6103	Object Oriented Analysis and Design
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 6403	Information Resource Management
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 6813	Strategic Management of Information Technology

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

MOT 5163	Management of Technology	3
MOT 5223	Management of Professional Personnel	3

B. Elective courses 6

Students must complete an additional 6 semester credit hours of graduate Management of Technology courses.

Total Credit Hours 12

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

MOT 5233	Advanced Topics in Project Management	3
MOT 5243	Essentials of Project and Program Management	3

B. Elective courses 6

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, healthcare management, information systems, or technology management. The Graduate Programs Committee must approve the 6 elective hours.

Total Credit Hours 12

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. 9 semester credit hours of required courses:

IS 5143	Information Technology	3
IS 5203	Telecommunication Systems	3
IS 6813	Strategic Management of Information Technology (Students who earn a grade of "B" (3.0) or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of "B-," "C+," or "C" may still satisfy the requirement by successfully passing a comprehensive examination as set out in this catalog.)	3

B. All candidates for the degree must complete an additional 24 semester credit hours of elective courses:

1. 18 semester credit hours selected from the following: 18

CS 5103	Software Engineering	
CS 5443	Database Management Systems	
CS 6543	Networks	
CS 6553	Performance Evaluation	
IS 5113	Electronic Commerce and Web Site Design	
IS 5193	Software Engineering Management	
IS 6103	Object Oriented Analysis and Design	
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 6403	Information Resource Management	
IS 6423	Secure Software Design	
IS 6433	Supervisory Control and Data Acquisition	
IS 6503	Principles of Database Management	
IS 6703	Introduction to Data Mining	

2. 6 semester credit hours selected from the following: 6

MGT 5043	Management and Behavior in Organizations	
MGT 5093	Leadership	

Any of the graduate courses from Management of Technology (MOT) other than MOT 6203 Strategic Management of Technology.

Total Credit Hours 33

Master of Science Degree in Information Technology – Cyber Security Concentration

This concentration is designed to offer the opportunity for qualified graduate students to study information technology while developing the special expertise in cyber security. 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 with a Cyber Security concentration, 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.) with a concentration in Cyber Security must complete the following:

A. 15 semester credit hours of required courses:

IS 5143	Information Technology	3
IS 5203	Telecommunication Systems	3
IS 6303	Introduction to Voice and Data Security	3
IS 6323	Security Risk Analysis	3
IS 6813	Strategic Management of Information Technology (Students who earn a grade of "B" (3.0) or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of "B-," "C+," or "C" may still satisfy the requirement by successfully passing a comprehensive examination as set out in this catalog.)	3

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:	12
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:		6
MGT 5043	Management and Behavior in Organizations	
MGT 5093	Leadership	
Any of the graduate courses from Management of Technology (MOT) other than MOT 6203 Strategic Management of Technology.		
Total Credit Hours		33

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 leadership issues and skills required to stimulate and manage technological innovation and creativity as well as, for the entrepreneurial student, bringing valuable technological ideas, goods, and services to the marketplace. Courses may be available through distance learning.

Program Admission Requirements

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

- 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. All candidates are required to successfully complete the following 21 semester credit hours:

MOT 5053	Technology Commercialization	3
MOT 5163	Management of Technology	3
MOT 5223	Management of Professional Personnel	3
MOT 5243	Essentials of Project and Program Management	3
MOT 5313	Emerging Technologies	3
MOT 5343	Financial Aspects of Management of Technology	3
MOT 6203	Strategic Management of Technology	3

B. All candidates must complete 12 semester credit hours of electives as approved by the M.S. MOT Graduate Advisor of Record

C. Candidates must pass a comprehensive examination administered by the Graduate Programs Committee.

Total Credit Hours **33**

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 Ph.D. in Business Administration requirements (p. 47) in 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 Cyber Security 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. Required courses

IS 7013	Foundations of Information Systems Research	3
IS 7023	Behavioral and Organizational Information Systems Research	3
IS 7033	Topics in Information Systems Technology Research	3
IS 7043	Seminar in Software Development	3

B. Three directed electives (9 semester credit hours) as approved by the Doctoral Studies Committee. 9

Total Credit Hours 21

Graduate Certificate in Technology Entrepreneurship and Management

This certificate program is designed for current graduate students in technology and science-related disciplines who wish to expand their skills at translating new technologies into new products and companies. The program also supports professionals who have earned a bachelor's degree and are currently interested in pursuing advanced education in Technology Entrepreneurship and Management without committing to a full graduate degree program. Students who are currently enrolled in a graduate degree program at UTSA are eligible for admission to this certificate program. Professionals interested in enrolling in this certificate program will be considered on a case by case basis.

Students who wish to earn the Graduate Certificate in Technology Entrepreneurship and Management (TEM) must complete 12 semester credit hours as follows:

MOT 5053	Technology Commercialization	3
MOT 5243	Essentials of Project and Program Management	3
MOT 5253	Starting the High-Tech Firm	3
MOT 5343	Financial Aspects of Management of Technology	3

Total Credit Hours 12

Information Systems (IS) Courses

IS 5003. Introduction to Information Systems. (3-0) 3 Credit Hours.

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.

IS 5113. Electronic Commerce and Web Site Design. (3-0) 3 Credit Hours.

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. Examines the principles of Web site design as it relates to electronic commerce.

IS 5143. Information Technology. (3-0) 3 Credit Hours.

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.

IS 5193. Software Engineering Management. (3-0) 3 Credit Hours.

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.

IS 5203. Telecommunication Systems. (3-0) 3 Credit Hours.

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.

IS 5513. Fundamentals of Information Assurance. (3-0) 3 Credit Hours.

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.)

IS 5523. Fundamentals of Cyber Forensics. (3-0) 3 Credit Hours.

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.).

IS 6103. Object Oriented Analysis and Design. (3-0) 3 Credit Hours.

Prerequisite: IS 4053 or consent of instructor. Integrates the areas of computer technology, systems analysis, and systems design in designing large-scale 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. (Formerly titled "Information Systems Design and Implementation.").

IS 6303. Introduction to Voice and Data Security. (3-0) 3 Credit Hours.

Prerequisite: Completion of or concurrent enrollment in IS 5203. 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.

IS 6323. Security Risk Analysis. (3-0) 3 Credit Hours.

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.

IS 6343. Secure Network Designs. (3-0) 3 Credit Hours.

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.

IS 6353. Security Incident Response. (3-0) 3 Credit Hours.

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.

IS 6363. Computer Forensics. (3-0) 3 Credit Hours.

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.

IS 6373. Cyber Law. (3-0) 3 Credit Hours.

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.

IS 6383. Policy Assurance for Infrastructure Assurance. (3-0) 3 Credit Hours.

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 effect that policies and policy decisions have on the security function. Current case studies will be included.

IS 6403. Information Resource Management. (3-0) 3 Credit Hours.

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.

IS 6423. Secure Software Design. (3-0) 3 Credit Hours.

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.

IS 6433. Supervisory Control and Data Acquisition. (3-0) 3 Credit Hours.

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.

IS 6503. Principles of Database Management. (3-0) 3 Credit Hours.

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.

IS 6703. Introduction to Data Mining. (3-0) 3 Credit Hours.

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.").

IS 6813. Strategic Management of Information Technology. (3-0) 3 Credit Hours.

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.)

IS 6953. Independent Study. (0-0) 3 Credit Hours.

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.

IS 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

IS 6971. Special Problems. (1-0) 1 Credit Hour.

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.

IS 6973. Special Problems. (3-0) 3 Credit Hours.

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.

IS 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

IS 7013. Foundations of Information Systems Research. (3-0) 3 Credit Hours.

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.

IS 7023. Behavioral and Organizational Information Systems Research. (3-0) 3 Credit Hours.

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.

IS 7033. Topics in Information Systems Technology Research. (3-0) 3 Credit Hours.

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.

IS 7043. Seminar in Software Development. (3-0) 3 Credit Hours.

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.

IS 7211. Doctoral Research. (0-0) 1 Credit Hour.

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

IS 7212. Doctoral Research. (0-0) 2 Credit Hours.

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

IS 7213. Doctoral Research. (0-0) 3 Credit Hours.

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

IS 7214. Doctoral Research. (0-0) 4 Credit Hours.

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

IS 7215. Doctoral Research. (0-0) 5 Credit Hours.

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

IS 7216. Doctoral Research. (0-0) 6 Credit Hours.

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

IS 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

IS 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

IS 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

IS 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

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.

IS 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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.

Management of Technology (MOT) Courses**MOT 5053. Technology Commercialization. (3-0) 3 Credit Hours.**

Prerequisite: MKT 5023 or consent of instructor. Examines the process of bringing technological innovation to the marketplace. Key factors are considered, including, but not limited to, the following four: intellectual property; perceived value; competitive positioning; and supply chains. Emphasis is on managing change to develop enterprise opportunities and competitive advantage. The concepts and tools covered aim to make the tasks of innovation and product portfolio management more understandable and controllable.

MOT 5163. Management of Technology. (3-0) 3 Credit Hours.

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.

MOT 5173. Technology Transfer: The Theory and Practice of Knowledge Utilization. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Examines the organizational, behavioral, and communication challenges involved in transferring technology from the research laboratory to the marketplace. Key factors related to licensing technology that others have patented, and the nuances of licensing one's own technology to create a revenue stream are considered. Emphasis is on valuing technology in diverse areas: for example, information systems, energy systems, and biotechnology. The concepts and tools covered aim to make the task of negotiating the acquisition and protection of intellectual property more understandable.

MOT 5213. Organizational Systems for Management of Technology. (3-0) 3 Credit Hours.

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.

MOT 5223. Management of Professional Personnel. (3-0) 3 Credit Hours.

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.

MOT 5233. Advanced Topics in Project Management. (3-0) 3 Credit Hours.

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 required.

MOT 5243. Essentials of Project and Program Management. (3-0) 3 Credit Hours.

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.

MOT 5253. Starting the High-Tech Firm. (3-0) 3 Credit Hours.

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.

MOT 5313. Emerging Technologies. (3-0) 3 Credit Hours.

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.

MOT 5323. Biotechnology Industry. (3-0) 3 Credit Hours.

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.

MOT 5333. Technological Drivers of Globalization. (3-0) 3 Credit Hours.

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.

MOT 5343. Financial Aspects of Management of Technology. (3-0) 3 Credit Hours.

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.

MOT 5353. Economic Analyses for Technology Management. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. This course is aimed at economic decision making in the high-technology environment. Each technology business decision is based on many factors, such as the optimal investment decision among several choices, or possibly the financial issues underlying the implementation of a project. The elements of capital allocation theory are applied for each type of scenario against both theoretical and actual projects drawn from real life situations. The course is quantitative in nature, but requires only basic math background.

MOT 6203. Strategic Management of Technology. (3-0) 3 Credit Hours.

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.).

MOT 6923. Directed Research in Management of Technology. (3-0) 3 Credit Hours.

Prerequisites: Completion of 18 semester credit hours of required Management of Technology (MOT) or Entrepreneurship (ENT) courses and consent of the M.S. MOT Graduate Advisor of Record. 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.

MOT 6933. Management of Technology Professional Report. (0-0) 3 Credit Hours.

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).

MOT 6943. Management of Technology Internship. (0-0) 3 Credit Hours.

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.

MOT 6953. Independent Study. (0-0) 3 Credit Hours.

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.

MOT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

Prerequisite: Approval of the M.S. MOT Graduate Advisor of Record 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 ETM Graduate Programs Committee. Enrollment is required each term in which the Comprehensive Examination is taken if no other courses are being taken that term. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

MOT 6971. Special Problems. (1-0) 1 Credit Hour.

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.

MOT 6973. Special Problems. (3-0) 3 Credit Hours.

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

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

- Master of Business Administration Degree – Entrepreneurship Concentration (p. 74)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Organization and Management Studies (p. 74)

Master of Business Administration Degree – Entrepreneurship 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 creation, launch and management of new business ventures.

Admission to the concentration in Entrepreneurship requires a personal statement detailing the student's proposed involvement in an entrepreneurial venture and may require a personal interview upon the request of the Graduate Programs Committee.

Students choosing to concentrate in entrepreneurship 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

ENT 5113	Entrepreneurship	3
FIN 5853	Entrepreneurial Financial Management	3

B. Elective courses

6

Students must complete an additional 6 semester credit hours of graduate courses. The Graduate Programs Committee must approve the 6 elective hours.

Total Credit Hours**12**

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 Ph.D. in Business Administration requirements (p. 47) in 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. Required Courses:

MGT 7013	Seminar in Organizational Behavior	3
MGT 7023	Seminar in Organization Theory	3
MGT 7033	Seminar in Human Resource Management	3
MGT 7043	Foundations of Strategy	3
B. Three directed electives:		
MGT 7053	Empirical Approaches to Strategy	3
MGT 7073	Seminar in Organization and Management Studies	3
MGT elective		3
Total Credit Hours		21

Entrepreneurship (ENT) Courses

ENT 5113. Entrepreneurship. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. An introduction to entrepreneurship, with an emphasis on identifying, evaluating and developing new venture opportunities. Topics may include opportunity identification and evaluation, startup strategies, business valuation, business model and business plan development, financing the venture, and exit strategies. Case studies and guest lectures by entrepreneurs and venture capital partners provide a real-world perspective. The major deliverable of this course is usually an early stage business model of a venture of the student's choosing.

ENT 5213. Social Entrepreneurship. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Social enterprises are entities—both private and nonprofit—created and managed to achieve a social good. Social enterprise is becoming increasingly popular as competition increases for scarce resources from philanthropy and government. The focus is on 'social enterprise' models and the entrepreneurs who create them and explored through a combination of lecture, case study and projects. The course objective is to cultivate needed skills and knowledge for building and leading social enterprises. It will also be valuable to those interested in consulting to social enterprises, planning to serve as an advisor in an organization, or funding social efforts or nonprofit organizations.

ENT 5313. Global Entrepreneurship. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Addresses various aspects of entrepreneurship in the global environment. Explores the opportunities that entrepreneurs create, the challenges they encounter, and the ways in which they conduct business across national borders and cultures. All topics are covered from an international perspective and may include: entrepreneurial opportunity identification and evaluation; market analysis and intelligence; joint ventures and partnerships; agents, value added resellers and representatives; regulations, laws and customs; regional and cultural issues; financing foreign ventures; and choice of domestic and international legal entities.

ENT 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ENT 6971. Special Problems in Entrepreneurship. (1-0) 1 Credit Hour.

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. Example topics cover the gamut of subjects important to technology entrepreneurs: venture capital, mergers and acquisitions, leveraged buyouts, negotiating technology contracts, valuation of innovative technology, understanding the sustainable energy sector, understanding the materials sector, understanding the information technology sector, new product development, and intellectual property law for entrepreneurs.

ENT 6972. Special Problems in Entrepreneurship. (2-0) 2 Credit Hours.

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. Example topics cover the gamut of subjects important to technology entrepreneurs: venture capital, mergers and acquisitions, leveraged buyouts, negotiating technology contracts, valuation of innovative technology, understanding the sustainable energy sector, understanding the materials sector, understanding the information technology sector, new product development, and intellectual property law for entrepreneurs.

ENT 6973. Special Problems in Entrepreneurship. (3-0) 3 Credit Hours.

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. Example topics cover the gamut of subjects important to technology entrepreneurs: venture capital, mergers and acquisitions, leveraged buyouts, negotiating technology contracts, valuation of innovative technology, understanding the sustainable energy sector, understanding the materials sector, understanding the information technology sector, new product development, and intellectual property law for entrepreneurs.

Management (MGT) Courses

MGT 5003. Conceptual Foundations of Management. (3-0) 3 Credit Hours.

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.

MGT 5043. Management and Behavior in Organizations. (3-0) 3 Credit Hours.

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.

MGT 5093. Leadership. (3-0) 3 Credit Hours.

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.

MGT 5153. Social Issues in Business. (3-0) 3 Credit Hours.

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.

MGT 5183. Global and Comparative Management. (3-0) 3 Credit Hours.

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.

MGT 5253. Ethics and Globalization. (3-0) 3 Credit Hours.

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.

MGT 5633. Effective Negotiating. (3-0) 3 Credit Hours.

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.

MGT 5643. Management of Personnel and Human Resources. (3-0) 3 Credit Hours.

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.

MGT 5813. Strategic Human Resources Management. (3-0) 3 Credit Hours.

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.

MGT 5903. Strategic Management and Policy. (3-0) 3 Credit Hours.

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" (3.0) or better in this course will satisfy the comprehensive examination requirement. A student who receives a grade of "B-", "C+", or "C" may still satisfy this requirement by successfully passing a comprehensive examination as set out in this catalog.

MGT 6123. Healthcare Strategic Management. (3-0) 3 Credit Hours.

Prerequisite: MGT 5003, an equivalent, or consent of instructor. Strategic management of healthcare organizations involves both making good decisions about where you want your organization to go and deciding how to get there. This course will focus on both direction issues and execution issues. Students will do case studies of current healthcare organizations. (Same as BOH 6123. Credit cannot be earned for both MGT 6123 and BOH 6123.).

MGT 6133. Organizational and Managerial Issues in Healthcare Delivery. (3-0) 3 Credit Hours.

Prerequisite: MGT 5003, an equivalent, or consent of instructor. An analysis of the organizational and managerial implications of clinical issues in the delivery of healthcare. Students have the opportunity to examine quality of care issues and concerns related to patient care that affect how healthcare organizations are managed. (Same as BOH 6133. Credit cannot be earned for both MGT 6133 and BOH 6133.).

MGT 6923. Healthcare Management Internship. (0-0) 3 Credit Hours.

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 healthcare management. Individual conferences and written reports required. (Same as BOH 6923. Credit cannot be earned for both MGT 6923 and BOH 6923.).

MGT 6943. Management Internship. (0-0) 3 Credit Hours.

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.

MGT 6953. Independent Study. (0-0) 3 Credit Hours.

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.

MGT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

MGT 6971. Special Problems. (1-0) 1 Credit Hour.

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.

MGT 6973. Special Problems. (3-0) 3 Credit Hours.

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.

MGT 7013. Seminar in Organizational Behavior. (3-0) 3 Credit Hours.

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.

MGT 7023. Seminar in Organization Theory. (3-0) 3 Credit Hours.

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.

MGT 7033. Seminar in Human Resource Management. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. A critical examination of research examining human resource management philosophies, policies, programs, practices, and processes in the context of internal and external environments and organizational performance.

MGT 7043. Foundations of Strategy. (3-0) 3 Credit Hours.

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

MGT 7053. Empirical Approaches to Strategy. (3-0) 3 Credit Hours.

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.

MGT 7073. Seminar in Organization and Management Studies. (3-0) 3 Credit Hours.

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.

MGT 7211. Doctoral Research. (0-0) 1 Credit Hour.

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.

MGT 7212. Doctoral Research. (0-0) 2 Credit Hours.

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.

MGT 7213. Doctoral Research. (0-0) 3 Credit Hours.

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.

MGT 7214. Doctoral Research. (0-0) 4 Credit Hours.

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.

MGT 7215. Doctoral Research. (0-0) 5 Credit Hours.

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.

MGT 7216. Doctoral Research. (0-0) 6 Credit Hours.

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.

MGT 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

MGT 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

MGT 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

MGT 7314. Doctoral Dissertation. (0-0) 4 Credit Hours.

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.

MGT 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

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.

MGT 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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.

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 (p. 78)
- Master of Science Degree in Applied Statistics (p. 78)
- Doctor of Philosophy Degree in Applied Statistics (p. 79)

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	Decision Support Systems for Building Business Intelligence
MS 5323	Statistical Methods for Business Analytics
MS 5333	Introduction to Business Analytics
MS 5343	Logistics Systems Management
MS 5353	Demand and Forecasting 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 5493	Procurement and Inventory Management
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

Today more professions are depending on data analysis to assist in making informed decisions. Organizations need individuals with knowledge in statistics and methods to collect, analyze, interpret data, and communicate the results. There is a growing demand for individuals who are well trained in designing experiments, statistical modeling, making predictions and forecasts, and analyzing large complex data sets commonly encountered in various areas of scientific study. For example, statisticians are needed in such areas as biomedical fields and bioinformatics to address drug development and health related issues, in environmental studies to address pollution and contamination. They are also needed to analyze big data encountered in internet traffic, fraud detection, cyber security and national defense. Statisticians are employed by such industries as insurance, health, finance, manufacturing and service. The Master of Science degree in Applied Statistics at UTSA is designed to meet these demands. It 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

All application materials must be submitted using the University's online application system and received by the program-specific Fall deadline. Degree-seeking students normally are not admitted for the Spring or Summer semesters due to course-sequence requirements in the program.

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 recent 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 18 semester credit hours of coursework:

STA 5093	Introduction to Statistical Inference	3
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STA 5103	Applied Statistics	3
STA 5503	Mathematical Statistics I	3
STA 5513	Mathematical Statistics II	3
STA 6033	Advanced Programming and Data Management in SAS	3
STA 6233	Advanced Statistical Programming Using SAS Software	3

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

Biostatistics:

STA 6133	Simulation and Statistical Computing
STA 6413	Nonparametric Statistics
STA 6813	Multivariate Analysis
STA 6833	Design and Analysis of Experiments
STA 6853	Categorical Data Analysis
STA 6863	Spatial Statistics
STA 6903	Survival Analysis
STA 6913	Bioinformatics: Microarray and Proteomics Data Analysis
STA 6923	Advanced Statistical Learning/Data Mining

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
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 6013	Regression Analysis
STA 6113	Applied Bayesian Statistics
STA 6133	Simulation and Statistical Computing
STA 6253	Time Series Analysis and Applications

Big Data and Analytics

MS 5333	Introduction to Business Analytics
MS 5323	Statistical Methods for Business Analytics
MS 5353	Demand and Forecasting Management
STA 6013	Regression Analysis
STA 6253	Time Series Analysis and Applications
STA 6813	Multivariate Analysis
STA 6923	Advanced Statistical Learning/Data Mining

General Applied Statistics

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 6 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.

Total Credit Hours

33

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 technology. In particular, there is a real need for professionals with a Ph.D. in Applied Statistics. Statisticians are in high demand in various areas of scientific study. For example, in biomedical field, they are needed to develop methods for evaluating the efficacy and safety of new medications/ drugs, surgeries, and other treatments. In the Bioinformatics area they address topics such as gene therapy, genomic research, and disease mapping. In environmental studies, statisticians are needed to detect exposure of human population to particulate matter based on air quality, to identify polluted areas based on soil samples, and to model areal data. Statisticians are also needed to analyze big data, especially in areas of fraud detection, cyber security, and defense related issues. Statisticians are being recruited in a variety of industries, including insurance and finance institutions, manufacturing and service businesses. Thus, 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 only a bachelor's degree or with a non-quantitative masters' degree must complete the following 18 semester credit hours of coursework:

STA 5093	Introduction to Statistical Inference	3
STA 5103	Applied Statistics	3
STA 5503	Mathematical Statistics I	3
STA 5513	Mathematical Statistics II	3
STA 6033	Advanced Programming and Data Management in SAS	3
STA 6233	Advanced Statistical Programming Using SAS Software	3

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. 12

C. All candidates must complete the following 15 semester credit hours of advanced coursework:

STA 6133	Simulation and Statistical Computing	3
STA 6713	Linear Models	3
STA 6993	Statistical Consulting	3
STA 7503	Advanced Inference I	3
STA 7513	Advanced Inference II	3

D. All candidates for the Ph.D. degree in Applied Statistics must complete 6 semester credit hours of approved graduate courses with numbers 6000 or higher within the Department of Management Science and Statistics. 6

E. All candidates for the Ph.D. degree in Applied Statistics must complete at least 6 semester credit hours of approved graduate elective courses. 6

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

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

Total Credit Hours **87**

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, all candidates for the Ph.D. degree must pass written qualifying examinations and oral defense of dissertation proposal before being admitted to candidacy for the degree. Students admitted with a bachelor's degree must pass the Master's comprehensive examination.

However, those who do not pass the qualifying examination at the Ph.D. level may qualify for the M.S. degree. The written examination is administered by the graduate faculty in the specialization area. Written examinations are scheduled once a year, whereas the oral proposal defense is administered at the discretion of the student's Dissertation Committee. The oral defense 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 proposal defense examination. Majority approval of the dissertation examination committee is required to pass the oral proposal defense. 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, and the approval of the Dean of the College. The UTSA Dean of the Graduate School certifies the completion of all University-wide requirements.

Graduate Certificate in Operations and Supply Chain Management

The Graduate Certificate in Operations and Supply Chain Management is a 12-semester-credit-hour program offered by the Department of Management Science and Statistics. The Graduate Certificate in Operations and Supply Chain Management (OSCM) is designed to provide specialized training to help expand students' area of expertise, learn about new developments in their fields, augment their professional skills and provide credentials that help advance their careers. It certifies to employers that students awarded the certificate have completed coursework that help them understand a myriad of issues, challenges, problems, and decision tools that relate to the internal and external flow of materials and requisite knowledge. Production/operations management, logistics management, and procurement topics are included to resolve the myriad of complex problems. Moreover, this certificate program will help students discover cutting edge techniques and best practices to leverage their operations and supply chain complexities to achieve competitive advantage.

The operations and supply chain management certificate program provides specialized skills in supply chain management for

- Students who seek foundational knowledge of supply chain complexities as well as a strong understanding of how companies leverage their supply chains to achieve competitive advantage

- Experienced professionals who wish to update their knowledge of current thinking and best practices through interaction with faculty
- Working professionals who want to supplement their undergraduate or graduate degree with graduate courses in supply chain management.

Supply chain management is a broad career field where professionals are involved in every function of global commerce, including marketing, procurement, production and service operations, logistics, inventory management, etc. The certificate program provides students with a thorough understanding of integrated supply chain and operations activities while emphasizing skills in problem solving, communication, and teamwork.

To earn a Graduate Certificate in Operations and Supply Chain Management, students must complete 12 semester credit hours from the following courses, one of which is required:

A. Required course:	3
MS 5413 Integrated Global Supply Chain Management	
B. Select three courses from the following:	9
MS 5343 Logistics Systems Management	
MS 5353 Demand and Forecasting Management	
MS 5393 Topics in Production/Operations 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	
Total Credit Hours	12

Applicants for the Operations and Supply Chain Management certificate program who are currently enrolled in a graduate degree program at UTSA have already met University requirements for admission. Thus, 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, the form will be signed by the Certificate Program Advisor and the Dean of the College of Business.

Applicants who are not currently enrolled in a graduate degree program at UTSA will be required to apply for admission to UTSA (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 of Business. 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 admitted into a certificate program while also pursuing a graduate degree will be classified as degree-seeking students.

Management Science (MS) Courses

MS 5003. Quantitative Methods for Business Analysis. (3-0) 3 Credit Hours.

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.

MS 5023. Decision Analysis and Production Management. (3-0) 3 Credit Hours.

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.

MS 5303. Decision Support Systems for Building Business Intelligence. (3-0) 3 Credit Hours.

Prerequisite: MS 5023. Study of systems for supporting managerial decision processes. Topics include review of 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. (Formerly titled "Topics in Decision Support Systems.")

MS 5323. Statistical Methods for Business Analytics. (3-0) 3 Credit Hours.

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.

MS 5333. Introduction to Business Analytics. (3-0) 3 Credit Hours.

This course introduces the basic concepts of business analytics, principles of data mining, Structured Query Language (SQL), and Big Data. It provides students an opportunity to understand how analytics can help improve decisions throughout an organization's value chain. Presents the most prevalent methods for descriptive (e.g., cluster analysis, association analysis), predictive (e.g., multiple regression, logistic regression, decision tree methods), and prescriptive (e.g., optimization) analytics.

MS 5343. Logistics Systems Management. (3-0) 3 Credit Hours.

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.

MS 5353. Demand and Forecasting Management. (3-0) 3 Credit Hours.

This course provides an in-depth study of the processes that balance customer demands with production, procurement, and distribution capabilities. Accurate demand forecasting provides for added flexibility and visibility of inventory, and reduced variability in supply chain outcomes. Core conceptual areas include demand forecasting and management, synchronization of supply and demand, inventory capacity, balancing and positioning, inventory planning, sales and operations planning, and strategic order fulfillment issues. This course introduces modern and practical methods for operations planning and decision making. Short-term forecasting of demand, personnel requirements, costs and revenues, raw material needs, and desired inventory levels are some of the topics included. Other topics covered include technological and environmental forecasting, decomposition methods, and monitoring (automatic procedures such as tracking signals).

MS 5373. Simulation Analysis of Business Systems. (3-0) 3 Credit Hours.

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.

MS 5393. Topics in Production/Operations Management. (3-0) 3 Credit Hours.

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.

MS 5413. Integrated Global Supply Chain Management. (3-0) 3 Credit Hours.

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 a focal firm and its suppliers and customers.

MS 5423. Service Management and Operations. (3-0) 3 Credit Hours.

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, topics include service encounters, service design and development, service productivity, and globalization of services. Tools and techniques for management service operations are also emphasized.

MS 5433. Effective Project Management. (3-0) 3 Credit Hours.

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.

MS 5453. Management and Control of Quality. (3-0) 3 Credit Hours.

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.

MS 5463. Lean Operations and Six Sigma. (3-0) 3 Credit Hours.

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.

MS 5473. Logistics System Analysis. (3-0) 3 Credit Hours.

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.

MS 5493. Procurement and Inventory Management. (3-0) 3 Credit Hours.

A portion of this course focuses on the key issues related to the strategic implications of sourcing of products, the purchasing of goods and services, and the role of purchasing in a supply chain context. It provides students with an understanding of purchasing processes, issues, and best practices. Emphasis areas include supplier quality, relationship management, and global sourcing. Inventory control concepts, techniques, and strategies for effective integration with basic finance, marketing, and manufacturing objectives are topics covered in this course. Models for dependent and independent demand inventory systems, material requirements planning systems, distribution requirements, planning techniques, and the classical reorder point inventory model are also included.

MS 6943. Management Science Internship. (0-0) 3 Credit Hours.

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.

MS 6953. Independent Study. (0-0) 3 Credit Hours.

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.

MS 6971. Special Problems. (1-0) 1 Credit Hour.

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.

MS 6973. Special Problems. (3-0) 3 Credit Hours.

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.

MS 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

MS 7033. Applications in Causal Structural Modeling. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. The purpose of this course is to provide students with an overview of structural equation modeling (SEM) procedures, which includes, but not limited to, issues related to measurement evaluation, model selection and specification, model estimation, and model fit. An additional aim of this course is to provide students with the computer skills needed to analyze and interpret their data, especially as it related to factor analysis, path analysis, and SEM. This course also addresses supplemental topics commonly encouraged in SEM and applied research (sample size and power, missing data, non-normal data, order categorical data, etc.).

Statistics (STA) Courses**STA 5093. Introduction to Statistical Inference. (3-0) 3 Credit Hours.**

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.

STA 5103. Applied Statistics. (3-0) 3 Credit Hours.

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.

STA 5313. Theory of Sample Surveys with Applications. (3-0) 3 Credit Hours.

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.

STA 5503. Mathematical Statistics I. (3-0) 3 Credit Hours.

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.

STA 5513. Mathematical Statistics II. (3-0) 3 Credit Hours.

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.

STA 5803. Process Control and Acceptance Sampling. (3-0) 3 Credit Hours.

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.

STA 5973. Directed Research. (0-0) 3 Credit Hours.

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.

STA 6013. Regression Analysis. (3-0) 3 Credit Hours.

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.

STA 6033. Advanced Programming and Data Management in SAS. (3-0) 3 Credit Hours.

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 STA 5133. Credit cannot be earned for both STA 5133 and STA 6033.)

STA 6113. Applied Bayesian Statistics. (3-0) 3 Credit Hours.

Prerequisites: STA 5103 and 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.

STA 6133. Simulation and Statistical Computing. (3-0) 3 Credit Hours.

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.

STA 6233. Advanced Statistical Programming Using SAS Software. (3-0) 3 Credit Hours.

Prerequisites: STA 5093, STA 5103, and STA 6033. STA 5103 may be taken concurrently. 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.

STA 6253. Time Series Analysis and Applications. (3-0) 3 Credit Hours.

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. (Formerly STA 5253. Credit cannot be earned for both STA 6253 and STA 5253.).

STA 6413. Nonparametric Statistics. (3-0) 3 Credit Hours.

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. (Formerly STA 5413. Credit cannot be earned for both STA 5413 and STA 6413.).

STA 6713. Linear Models. (3-0) 3 Credit Hours.

Prerequisite: STA 5103 or equivalent, 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.).

STA 6813. Multivariate Analysis. (3-0) 3 Credit Hours.

Prerequisite: STA 5103 or equivalent, or consent of instructor. Multivariate normal distribution; estimation of mean vector and covariance matrix; Hotelling's T^2 ; principal components, factor analysis, MANOVA, multivariate regression; cluster analysis, discriminant analysis; Wishart distribution; and tests concerning covariance matrices.

STA 6833. Design and Analysis of Experiments. (3-0) 3 Credit Hours.

Prerequisite: STA 5103 or equivalent 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.).

STA 6843. Response Surface Methodology. (3-0) 3 Credit Hours.

Prerequisite: STA 6833 or equivalent, 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.

STA 6853. Categorical Data Analysis. (3-0) 3 Credit Hours.

Prerequisite: STA 5103 or equivalent, 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.

STA 6863. Spatial Statistics. (3-0) 3 Credit Hours.

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.

STA 6903. Survival Analysis. (3-0) 3 Credit Hours.

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. (Formerly STA 5903. Credit cannot be earned for both STA 6903 and STA 5903.).

STA 6913. Bioinformatics: Microarray and Proteomics Data Analysis. (3-0) 3 Credit Hours.

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.) (Formerly titled "Bioinformatics and Data Mining I: Microarray Data Analysis.").

STA 6923. Advanced Statistical Learning/Data Mining. (3-0) 3 Credit Hours.

Prerequisite: STA 5103 or consent of instructor. This course provides an overview of statistical learning and data mining tools in analyzing the vast amounts of data found in bioinformatics, business, and other high-tech industries. The topics include R programming language, data mining tools in R, data gathering and cleansing, linear models, generalized additive models, model assessment, Classification and Regression Trees (CART), bagging and boosting, random forest, neural networks, support vector machines, nearest-neighbor classification, combining classifiers, cluster analysis, association rules, visualization, Big Data Analytics, Hadoop, and Rhadoop, applications to microarray/proteomics data analysis. (Formerly STA 5923 and STA 7923. Credit can be earned for only one of the following: STA 5923, STA 6923, or STA 7923.).

STA 6943. Statistics Internship. (0-0) 3 Credit Hours.

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 statistics. Individual conferences and written reports required.

STA 6953. Independent Study. (0-0) 3 Credit Hours.

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.

STA 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

STA 6972. Special Problems. (2-0) 2 Credit Hours.

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.

STA 6973. Special Problems. (3-0) 3 Credit Hours.

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.

STA 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

STA 6991. Statistical Consulting. (1-0) 1 Credit Hour.

Prerequisites: STA 6033, STA 6233 or equivalents, and 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.

STA 6992. Statistical Consulting. (2-0) 2 Credit Hours.

Prerequisites: STA 6033, STA 6233 or equivalents, and 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.

STA 6993. Statistical Consulting. (3-0) 3 Credit Hours.

Prerequisites: STA 6033, STA 6233 or equivalents, and 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.

STA 7013. Advanced Applied Business Statistical Methods. (3-0) 3 Credit Hours.

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.

STA 7023. Applied Linear Statistical Models. (3-0) 3 Credit Hours.

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.

STA 7033. Multivariate Statistical Analysis. (3-0) 3 Credit Hours.

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.

STA 7113. Bayesian Statistics. (3-0) 3 Credit Hours.

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.

STA 7211. Doctoral Research. (0-0) 1 Credit Hour.

May be repeated for credit, but not more than 15 hours may be applied toward the Doctoral degree.

STA 7212. Doctoral Research. (0-0) 2 Credit Hours.

May be repeated for credit, but not more than 15 hours may be applied toward the Doctoral degree.

STA 7213. Doctoral Research. (0-0) 3 Credit Hours.

May be repeated for credit, but not more than 15 hours may be applied toward the Doctoral degree.

STA 7214. Doctoral Research. (0-0) 4 Credit Hours.

May be repeated for credit, but not more than 15 hours may be applied toward the Doctoral degree.

STA 7215. Doctoral Research. (0-0) 5 Credit Hours.

May be repeated for credit, but not more than 15 hours may be applied toward the Doctoral degree.

STA 7216. Doctoral Research. (0-0) 6 Credit Hours.

May be repeated for credit, but not more than 15 hours may be applied toward the Doctoral degree.

STA 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

STA 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

STA 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

STA 7314. Doctoral Dissertation. (0-0) 4 Credit Hours.

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.

STA 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

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.

STA 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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.

STA 7503. Advanced Inference I. (3-0) 3 Credit Hours.

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.

STA 7513. Advanced Inference II. (3-0) 3 Credit Hours.

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.

STA 7903. Advanced Survival Analysis: Counting Process Approach. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. STA 5903 recommended. This course introduces and extends the survival regression 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 R programming.

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 (p. 86)
- Doctor of Philosophy Degree in Business Administration with an Emphasis in Marketing (p. 86)

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	3
9 semester credit hours of graduate marketing elective courses beyond MKT 5023 Marketing Management		9

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 Ph.D. in Business Administration requirements (p. 47) in 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. Required courses

MKT 7013	Seminar in Marketing Theory	3
MKT 7023	Behavioral Seminar I	3
MKT 7033	Behavioral Seminar II	3
MKT 7043	Seminar in Experimental Design	3

B. Three directed electives as approved by the Doctoral Studies Committee	9
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Total Credit Hours	21
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Marketing (MKT) Courses

MKT 5003. Introduction to Marketing. (3-0) 3 Credit Hours.

Examination of marketing in society and the firm. Functions, institutions, processes, methods, and issues will be examined. Emphasis is on marketing decision making.

MKT 5023. Marketing Management. (3-0) 3 Credit Hours.

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.

MKT 5043. Consumer Behavior in Marketing Strategy. (3-0) 3 Credit Hours.

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.

MKT 5063. Marketing Research Design and Application. (3-0) 3 Credit Hours.

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.

MKT 5083. Advertising and Promotion Management. (3-0) 3 Credit Hours.

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.

MKT 5313. Marketing and Selling a Destination. (3-0) 3 Credit Hours.

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.

MKT 5333. Economics of Tourism and Sustainable Development. (3-0) 3 Credit Hours.

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.

MKT 5673. International Marketing. (3-0) 3 Credit Hours.

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.

MKT 6943. Marketing Internship. (0-0) 3 Credit Hours.

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.

MKT 6953. Independent Study. (0-0) 3 Credit Hours.

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.

MKT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

MKT 6971. Special Problems. (1-0) 1 Credit Hour.

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.

MKT 6973. Special Problems. (3-0) 3 Credit Hours.

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.

MKT 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

MKT 7013. Seminar in Marketing Theory. (3-0) 3 Credit Hours.

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.

MKT 7023. Behavioral Seminar I. (3-0) 3 Credit Hours.

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.

MKT 7033. Behavioral Seminar II. (3-0) 3 Credit Hours.

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.

MKT 7043. Seminar in Experimental Design. (3-0) 3 Credit Hours.

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.

MKT 7063. Special Topics in Marketing. (3-0) 3 Credit Hours.

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.

MKT 7073. Cross-Cultural Consumer Research. (3-0) 3 Credit Hours.

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.

MKT 7083. Consumer Judgment and Decision Making. (3-0) 3 Credit Hours.

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).

MKT 7211. Doctoral Research. (0-0) 1 Credit Hour.

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.

MKT 7212. Doctoral Research. (0-0) 2 Credit Hours.

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.

MKT 7213. Doctoral Research. (0-0) 3 Credit Hours.

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.

MKT 7214. Doctoral Research. (0-0) 4 Credit Hours.

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.

MKT 7215. Doctoral Research. (0-0) 5 Credit Hours.

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.

MKT 7216. Doctoral Research. (0-0) 6 Credit Hours.

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.

MKT 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

MKT 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

MKT 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

MKT 7314. Doctoral Dissertation. (0-0) 4 Credit Hours.

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.

MKT 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

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.

MKT 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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.

Addendum

Master of Science Degree in Business

The Master of Science in Business (M.S.B.) degree is designed to offer business skills and knowledge to qualified students with a non-business undergraduate major. The plan of study features cohort classes to allow students whose previous education has been in nonbusiness fields, such as liberal arts, science and engineering, to obtain graduate level business training as a complement to their previous education. The program, including admission, is supervised by the Graduate Program Committee in M.S.B. General Requirements for completion of the program consist of required business courses.

Program Admission Requirements

For admission to the M.S. in Business program, applicants must meet University-wide graduate admission requirements. Applicants are limited to individuals with non-business backgrounds and or degrees. Applicants will be considered on the basis of demonstrated potential for success in graduate study in business as indicated by a combination of standardized test scores, prior academic achievement, personal statement, résumé (optional), and letters of recommendation.

The M.S.B. Program Committee will evaluate each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- official Graduate Record Examination (GRE) scores from a recent (no more than five years old) administration of the examination. Or, Graduate Management Admission Test (GMAT) scores from a recent (no more than five years old) administration of the exam will be accepted in lieu of the GRE scores.
- transcripts from all universities attended
- a personal statement of academic and personal goals
- at least two letters of reference
- a current résumé with employment or other experience (optional).

Students who do not submit a standardized test score may be considered for Conditional Admission upon recommendation of the M.S.B. Admissions Committee.

Applicants whose undergraduate degree is in business should consider the MBA or a specialized Masters' degree. Applicants with a B.B.A or other undergraduate or graduate business degree, or significant business experience will not be admitted to this degree program.

Full-time Status

The M.S.B. is a full-time cohort program offered during the daytime.

Degree Requirements

M.S.B. students are required to complete 30 hours of business courses plus 3 credit hours of developmental courses.

A. 30 semester credit hours of required master's level business courses

ACC 5003	Financial Accounting Concepts	3
ECO 5003	Economic Theory and Policy	3
FIN 5023	Financial Management	3

IS 5003	Introduction to Information Systems	3
MGT 5043	Management and Behavior in Organizations	3
MGT 5633	Effective Negotiating	3
MGT 5903	Strategic Management and Policy	3
MOT 5243	Essentials of Project and Program Management	3
MKT 5023	Marketing Management	3
MS 5003	Quantitative Methods for Business Analysis	3
B. 3 semester credit hours of developmental courses		3
MGT 6971	Special Problems (Business Writing)	
MGT 6971	Special Problems (Business Speaking)	
MGT 6971	Special Problems (Professional Development)	
Total Credit Hours		33

Master of Science Degree in Data Analytics

The Master of Science in Data Analytics (M.S.D.A.) program focuses on data science and big data based business intelligence-oriented analytics algorithms, tools, techniques, and technologies. The plan of study features cohort classes, with students participating in formal internships and practical projects in a wide variety of application areas, including, but not limited to business analytics. The program, including admission, is supervised by the Graduate Program Committee in M.S.D.A. General requirements for completion of the program consist of required business courses.

Program Admission Requirements

For admission to the M.S.D.A. program, applicants must meet University-wide graduate admission requirements. A degree of B.A. or B.S. in statistics, mathematics, engineering, computer science, information systems, information technology, or a closely related field is highly recommended. Applicants will be evaluated for success in the program based on demonstrable academic preparation and/or experience with respect to mathematics, statistics, and information technology. Coursework in calculus, differential equations, stochastic processes, statistics, and data mining are not required, but show foundational mathematical preparation and are preferred in some combination. Information systems/technology courses, computer science courses, and/or professional experience related to databases, networks, distributed and cloud infrastructures, and programming are not required, but show foundational information technology preparation and are preferred in some combination.

Applicants will be considered on the basis of demonstrated potential for success in graduate study in business as indicated by a combination of standardized test scores, prior academic achievement, personal statement, résumé, and letters of recommendation.

The M.S.D.A. Program Committee will evaluate each applicant individually based on the complete package of submitted materials.

A complete application package will include:

- a completed application form
- official Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores from a recent (no more than five years old) administration of the examination.
- transcripts from all universities attended
- a personal statement of academic history and personal goals

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

Day or Evening Status

The M.S.D.A. offers both day and evening programs. Students may not switch status once enrolled. Both programs begin in the Fall semester.

Degree Requirements

M.S.D.A. students are required to complete 24 hours of required courses plus 6 hours of required practicum courses. (See course descriptions for M.S.D.A courses following Degree Requirements.)

A. 24 semester hours of required master's level courses		
DA 6213	Data-Driven Decision Making and Design	3
DA 6223	Data Analytics Tools and Techniques	3
DA 6233	Data Analytics Visualization and Communication	3
DA 6813	Data Analytics Applications	3
IS 6713	Data Foundations	3
IS 6733	Big Data Technology	3
STA 6443	Data Analytics Algorithms I	3
STA 6543	Data Analytics Algorithms II	3
B. 6 semester credit hours of required practicum courses		
DA 6823	Data Analytics Practicum I	3
DA 6833	Data Analytics Practicum II	3
Total Credit Hours		30

New courses for M.S.D.A. Program

Data Analytics (DA) Courses

DA 6213. Data-Driven Decision Making and Design. (3-0) 3 Credit Hours.

This course familiarizes students with basic scientific processes and formalisms, such as question formulation and hypothesis development. Students will gain an understanding of how formulated questions and hypotheses can lead to data collection and analysis, as well as how data itself can be explored and summarized to generate such questions and hypotheses. The course also introduces students to foundational data analytics processes, such as the data-to-decision processes, data handling processes, and data analysis processes. Last, we discuss data provenance for data-to-decision traceability and critical scientific documentation principles important to scientific and analytic functions.

DA 6223. Data Analytics Tools and Techniques. (3-0) 3 Credit Hours.

Students will gain education and experience with common tools and techniques used in a variety of data analytics application areas. Students will become familiar with database technology and leading commercial and open source analytics platforms. Students will also learn how to use these technologies and platforms to solve data analytics problems by obtaining a basic understanding of database querying and basic scripting in analytics platforms. Students will not become scientific programmers from this course, nor will they learn the formalisms of programming per se; rather, they will learn and experience how to develop functional scripts and leverage existing analytics libraries to solve data analytics problems using software.

DA 6233. Data Analytics Visualization and Communication. (3-0) 3 Credit Hours.

Since the purpose data analytics is to inform and facilitate better data-driven decisions, and transform data to information and knowledge, the ability to effectively communicate data aggregations, summarizations, and analytic findings to decision makers is very important. The ability to communicate highly complex analyses and scientific findings to a non-technical audience is challenging. This course will educate students on common mistakes and success factors in technical communication, and give them experience communicating findings orally and in writing. The course will also focus heavily on data analytics visualization approaches and tools. Students will learn common methods for data visualization for a wide variety of data types and data analytics applications.

DA 6813. Data Analytics Applications. (3-0) 3 Credit Hours.

Students will obtain a big picture understanding of data analytics, including its purpose, common benefits and challenges, important analytic processes, and what is needed to perform data analytics, such as skills, tools, technology, etc. Students will be introduced to a wide variety of data analytics applications in a wide variety of fields, such as information technology, cyber security, bioinformatics, biomedical/health, insurance and risk, finance, economics, accounting, business intelligence, crime and fraud detection, marketing and customer analytics, energy and environmental, manufacturing and operations, and logistics and supply chain. Data analytics applications will be demonstrated through case-based study and guest lectures from data analytics experts and managers in the various application areas listed above.

DA 6823. Data Analytics Practicum I. (3-0) 3 Credit Hours.

Prerequisites: DA 6213, DA 6813, and STA 6443. This course equips students with practical knowledge, skills, and experience needed to conduct real-world, high-quality data analytics in an application area of interest. Students will meet formally with their peers and the instructor for the purpose of facilitating the practicum experience. Students will simultaneously engage in formal internships and regular meetings with key members of the organizations hosting and facilitating student practicum project(s). During this practicum, students will engage in the following steps of the data analytics process: problem defining, question formulation, hypothesis development, preliminary analytics, analytical design, data acquisition, data preparation and pre-processing, and initial data analysis.

DA 6833. Data Analytics Practicum II. (3-0) 3 Credit Hours.

Prerequisite: DA 6823. This course continues the practicum experience in the same manner as Data Analytics Practicum I. Students will continue and finish their major data analytics project, focusing on the analysis and presentation of results portion of the process. The next steps will be detailed data analysis, conclusion drawing, report preparation and refinement, presentation preparation and final presentation. The practicum will culminate in a formal, completed report to the supporting organization, as well as to data analytics peers and professors.

Information Systems (IS) Courses

IS 6713. Data Foundations. (3-0) 3 Credit Hours.

The ability to understand, store, process, transform, cleanse, fuse, and share data is critical to data analytics; and it can often be the most challenging and/or most time consuming part of the data analytics process due to the vast variety of data sources, types, and formats. This course equips students to collect/process common types of data used in data analytics, and provides them a solid understanding of various data sources, types, and formats, and how to handle and process each. Topics include, but are not limited to, structured vs. unstructured data; data compression, encodings, and character sets; and common metadata in use today, such as geospatial data, temporal data, and linked data (e.g., social network linkages). Students will have the opportunity to learn how to store, process, transform, cleanse, fuse, and share data. Exemplar data will be used extensively in the course so that students see and experience a wide variety of data and understand how to process and handle it. Data handling exercises will be provided in the context of scenario based problems to further improve their educational knowledge, practical skill set, and contextual understanding.

IS 6733. Big Data Technology. (3-0) 3 Credit Hours.

Data set size and the computer intensive nature of many analytic processes are necessarily driving data analytics tasks to the cloud – both for large scale, economic storage and for economic-distributed computing power. The course will not focus on the in-source vs. out-source nature of the cloud infrastructure nor the system and network maintenance thereof. Rather, the course will give students the opportunity to learn how and when to use distributed computing and cloud-based platforms. Students will have the opportunity to learn how to set-up, configure, use, and maintain big data processes, platforms, and environments locally and “in the cloud.” Students will also gain experience with using common cloud-based data analytics platforms, as well as big data indexing, search, and retrieval platforms.

Statistics (STA) Courses

STA 6443. Data Analytics Algorithms I. (3-0) 3 Credit Hours.

Prerequisite: Basic statistics or equivalent. Introduction of basic statistical methods, with specific emphasis on predictive modeling algorithms. Topics include exploratory data analysis, including certain graphical methods, extracting important variables and detecting outliers; regression methods, including linear and nonlinear models; analysis of variance (ANOVA) methods, including classification models, fixed and random effects, interactions, and multiple comparisons; and multivariate analysis, including principal components analysis and factor analysis. Students will be provided the opportunity to gain an understanding of when to apply and how to select various predictive modeling algorithms for various types of problems, as well as data assumptions and requirements for algorithm use, proper parameter setting, and interpreting results.

STA 6543. Data Analytics Algorithms II. (3-0) 3 Credit Hours.

Prerequisite: STA 6443. Statistical methods, with specific emphasis on data segmentation and text analytics. Topics include classification methods, including correlation analysis, clustering analysis, association analysis, and support vector machines; network techniques including Bayesian networks, neural networks, link analyses, and decision trees; and text analytics, including text mining and extraction, natural language processing, and sentiment analysis. Other topics may include social network analysis, trend analysis, time series methods, robust statistics and survival analysis. Students will be provided an opportunity to gain an understanding of when to apply and how to select various predictive modeling algorithms for various types of problems, as well as data

assumptions and requirements for algorithm use, proper parameter setting, and interpreting results.

College of Education and Human Development

The College of Education and Human Development offers the following graduate degrees and certificate programs:

- Master of Arts degree in Bicultural-Bilingual Studies (p. 89)
- Master of Arts degree in Education (p. 120)
- Master of Arts degree in School Psychology (p. 114)
- Master of Arts degree in Teaching English as a Second Language (p. 89)
- Master of Dietetics Studies (p. 134)
- Master of Education degree in Educational Leadership and Policy Studies (p. 107)
- Master of Education degree in School Counseling (p. 100)
- Master of Science degree in Clinical Mental Health Counseling (p. 100)
- Master of Science degree in Health and Kinesiology (p. 134)
- Doctor of Education degree in Educational Leadership (p. 107)
- Doctor of Philosophy degree in Counselor Education and Supervision (p. 100)
- Doctor of Philosophy degree in Culture, Literacy and Language (p. 89)
- Doctor of Philosophy degree in Interdisciplinary Learning and Teaching (p. 120)
- Graduate Certificate in Applied Behavior Analysis (p. 116)
- Graduate Certificate in Bilingual Reading Specialist (p. 94)
- Graduate Certificate in Higher Education Administration (p. 109)
- Graduate Certificate in Language Acquisition and Bilingual Psychoeducational Assessment (p. 116)
- Graduate Certificate in Teaching English as a Second Language (p. 94)

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. For individuals seeking Texas Teacher Certification, the Department offers concentrations for Bilingual Generalist EC-6 and ESL Generalist EC-6.

- Master of Arts Degree in Bicultural-Bilingual Studies (p. 89)
- Master of Arts Degree in Teaching English as a Second Language (p. 91)
- Doctor of Philosophy Degree in Culture, Literacy and Language (p. 93)

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. In addition to University-wide admission requirements, applicants must submit a one-page statement of purpose, in either English or Spanish, describing why she or he wants to pursue a master's degree. 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/ (<http://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 Teacher 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 Teacher 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:

Select 6 hours from the following

6

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:		
BBL 5113	Theoretical Foundations of Bicultural-Bilingual Education	3
Linguistics and Second Language Studies:		
ESL 5013	Foundations of Second Language Acquisition	3
Bilingual Teaching Methodology:		
Select 6 hours of the following courses:		6
BBL 5033	Bilingual Content Instruction	
BBL 5063	Biliteracy in Bilingual Classrooms	
BBL 5193	Multicultural Literature for Children	
Research and Assessment:		
BBL 5053	Assessment in Bilingual and ESL Programs	3
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education	3
English as a Second Language:		
Select 6 hours of the following courses:		6
ESL 5033	Second Language Reading and Writing	
ESL 5053	Approaches to Second Language Instruction	
ESL 5063	Language and Content-Area Instruction	
B. Electives		
6 semester credit hours of graduate elective coursework in Bicultural-Bilingual Studies, English as a Second Language, or in approved related areas.		6
Total Credit Hours		36

Option II. Thesis Option

A. Required coursework. 30 semester credit hours of coursework from six major areas as follows:

Sociocultural Studies:		
Select up to two of the following courses:		3-6
BBL 5003	Foundations for Bicultural Studies	
BBL 5013	Multicultural Groups in the United States	
BBL 5023	Cultural Adaptation in Bilingual Societies	
Select up to two of the following courses:		3-6
BBL 5123	Sociolinguistics and Education	
BBL 5133	Latino Biculturalism in the United States	
BBL 6223	Anthropology and Education in Multicultural Contexts	
Bilingual Education Theory:		
BBL 5113	Theoretical Foundations of Bicultural-Bilingual Education	3
Linguistics and Second Language Studies:		
ESL 5013	Foundations of Second Language Acquisition	3
Select the following if 6 hours are selected:		
ESL 5003	Linguistics for Second Language and Bilingual Specialists	3
Bilingual Teaching Methodology:		
Select 6 hours of the following courses:		6
BBL 5033	Bilingual Content Instruction	
BBL 5063	Biliteracy in Bilingual Classrooms	
BBL 5173	Sociocultural Issues and the Teaching of Reading	
BBL 5193	Multicultural Literature for Children	

Research and Assessment:

BBL 5053	Assessment in Bilingual and ESL Programs	3
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education	3
Select 3 hours of the following:		3
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
Total Credit Hours		36

Bicultural-Bilingual Teacher Education Concentration with Teacher Certification in Bilingual Generalist EC-6

The Bicultural-Bilingual Teacher Education concentration with Teacher Certification in Bilingual Generalist EC-6 program is designed for individuals seeking bilingual education certification at the graduate level. The coursework will prepare students in the field of bilingual education teaching methods and research; students will also have opportunity to engage in field work and a supervised teaching experience. Program of study, modules, and professional development experiences will be provided to prepare students for teacher certification exams. The M.A. in Bicultural-Bilingual Studies with a Bicultural-Bilingual Teacher Education concentration with Teacher Certification in Bilingual Generalist EC-6 is a 36 hour program and experiences are designed to meet the state teacher certification requirements for Bilingual Generalist EC-6.

Degree Requirements

The Bicultural-Bilingual Teacher Education concentration with Teacher Certification in Bilingual Generalist EC-6 requires admission to the graduate program and to the teacher certification program. Students must complete a supervised teaching experience and a graduate project. Students who are offered a teaching position may elect to complete a year-long paid internship in lieu of the semester clinical teaching experience. To obtain Texas Teacher Certification, an applicant must meet all educator certification requirements (see the MA-BITE-C Degree Information Sheet (http://education.utsa.edu/DEGREES/article/Master_of_Arts_in_Bicultural-Bilingual_Teacher_Education_EC-6_BBL_Generalis) on the COEHD website).

Socio-Cultural Studies:

Select 6 hours from the following courses:		6
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	
BBL 5193	Multicultural Literature for Children	
Bilingual Education Theory:		

BBL 5113	Theoretical Foundations of Bicultural-Bilingual Education	3
Linguistics and Second Language Studies:		
ESL 5013	Foundations of Second Language Acquisition	3
Bilingual Teaching:		
BBL 5033	Bilingual Content Instruction	3
BBL 5063	Biliteracy in Bilingual Classrooms	3
Research and Assessment:		
BBL 5053	Assessment in Bilingual and ESL Programs	3
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education	3
English as a Second Language:		
Select 6 hours from the following courses:		6
ESL 5033	Second Language Reading and Writing	
ESL 5053	Approaches to Second Language Instruction	
ESL 5063	Language and Content-Area Instruction	
Internship/Practicum:		
6 semester credit hours of internship/practicum:		6
C&I 6943	Instructional Internship in Teaching	
Total Credit Hours		36

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:		
BBL 5003	Foundations for Bicultural Studies	3
Select 9 additional semester credit hours of the following:		9
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. Select 3 hours from the following:		3
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. Select 9 hours from the following:		9
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:		
BBL 6003	Research Design and Inquiry in Bicultural-Bilingual Studies	3
BBL 6073	Ethnographic Research Methods in Bicultural-Bilingual Settings	3
B. Select one of the following options:		6
Option I. 6 semester credit hours of Master's Thesis		
Option II. 6 semester credit hours of graduate elective coursework in Bicultural-Bilingual Studies, English as a Second Language, or approved related areas.		
Total Credit Hours		36

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/ (<http://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 80 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:		
BBL 5123	Sociolinguistics and Education	3
ESL 5003	Linguistics for Second Language and Bilingual Specialists	3
ESL 5013	Foundations of Second Language Acquisition	3
Classroom Practice and Program Designs:		
Select 9 hours of the following:		9
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	
Select 3 hours of the following:		3
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:		
Select 6 hours from the following:		6
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. Select one course from the following:		3
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. Select one of the following options: 6

Option I. 6 semester credit hours of Master's Thesis

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.

Total Credit Hours 36

Master of Arts Degree in Teaching English as a Second Language with ESL Generalist EC-6 Teacher Certification

The M.A. in TESL with Teacher Certification (TESL-C) program is designed to allow students to simultaneously complete their Master's degree and earn their teaching certification credential for early childhood through sixth grade in ESL through the Texas Education Agency.

English language learners (ELLs) are amongst the fastest-growing group in U.S. schools, and ELLs in Texas are becoming increasingly diverse, coming from a wide variety of cultural and linguistic backgrounds. Schools need teachers who are trained to work with ELLs, and who understand how the process of acquiring English as second language can be fostered, while at the same time helping students succeed across content areas. Additionally, many districts need ESL specialists, and often ESL teachers work in conjunction with dual language programs, newcomer centers for refugee and immigrant children, and with students who have transitioned from bilingual programs.

A distinctive emphasis of the program is its holistic view of English language acquisition as a component of a student's bi-/multilingual development. Dynamic and hands-on courses explore how human learn additional languages, and strategies, techniques and best practices for teaching ESL students that values their linguistic and cultural diversity.

Degree Requirements

The TESL-C program consists of 36 semester credit hours (12 graduate courses), plus some additional learning modules and practice teaching (see the TESL-C Degree Information Sheet (http://education.utsa.edu/DEGREES/article/Master_of_Arts_in_Teaching_English_as_a_Second_Language_-_EC-6_ESL_Generali) on the COEHD website).

36 semester credit hours of required coursework from four major areas as follows:

Language Theory and Use Core:		
BBL 5123	Sociolinguistics and Education	3
ESL 5003	Linguistics for Second Language and Bilingual Specialists	3
ESL 5013	Foundations of Second Language Acquisition	3
Classroom Practice:		
ESL 5033	Second Language Reading and Writing	3
ESL 5053	Approaches to Second Language Instruction	3
ESL 5063	Language and Content-Area Instruction	3
BBL 5053	Assessment in Bilingual and ESL Programs	3
and 6 hours from the following:		6
ESL 5043	Listening and Speaking in Second Language Programs	
ESL 5073	Computer Assisted Language Learning	

ESL 5083	Pedagogical Grammar	
BBL 5173	Sociocultural Issues and the Teaching of Reading	
BBL 5193	Multicultural Literature for Children	
C&I 5043	Classroom Management and Motivation	
ECE 6363	Differentiated Instruction in a Diverse Classroom	
Research:		
BBL 6063	Research Methods in Bilingual and Second Language Studies	3
Certification and Teaching Requirements:		
6 hours of the following course:		6
ESL 6943	Internship in English as a Second Language	
Total Credit Hours		36

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 interdisciplinary research in multicultural-multilingual contexts and is designed to provide a firm foundation in the fields of cultural studies, literacy development, and language learning and use. 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, communication, cultural studies, ethnic studies, education (general, bilingual, foreign language, multicultural), history, international studies, 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. Proficiency or experience learning, using, studying or speaking a language other than English.
 - 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; please also discuss your proficiency or experience learning, using, studying, or speaking a language other than English. (Limit of five double-spaced 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:

BBL 7003	Proseminar in Culture, Literacy and Language	3
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B. Research Methods Courses:

BBL 7013	Research Design and Statistics for Culture, Literacy and Language	3
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BBL 7023	Qualitative Research Methods for Culture, Literacy and Language	3
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BBL 7043	Research Design and Qualitative Analysis for Culture, Literacy and Language	3
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EDU 7043	Educational Research Statistics: Descriptive and Comparative	3
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(Or other approved statistical methods course.)

C. Core Courses

BBL 7123	Sociocultural Contexts of Literacy	3
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BBL 7133	Bilingualism and Second Language Acquisition	3
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BBL 7213	Ethnological Theory	3
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D. Designated Electives. 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 Advanced Research Methods	
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BBL 7113	Seminar in Cultural Studies Research	
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BBL 7203	Seminar in Mexican American and Latina/o Biculturalism	
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BBL 7223	Seminar in Biliteracy and Second Language Literacy	
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BBL 7233	Seminar in Second Language Learning & Multilingualism	
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BBL 7243	Seminar in Applied Linguistics	
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BBL 7253	Seminar in Mexican American & Latina/o Issues in Education	
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Other Designated Electives:

BBL 5043	Ethnography of Communication	
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BBL 5123	Sociolinguistics and Education	
BBL 6043	Advanced Topics in Bilingual and Dual-Language 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. 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.		9
F. Doctoral Research:		
BBL 7303	Directed Doctoral Research (3 hours minimum)	3
BBL 7313	Doctoral Dissertation (12 hours minimum)	12
Total Credit Hours		60

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 Committee

Upon successful completion of the Qualifying Examination, the student is eligible to defend his/her 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 their supervising professor. A Dissertation Committee of four members—selected by the student and their Dissertation Chair—must be approved by the Doctoral Studies Committee and Graduate School prior to the proposal hearing/defense.

Dissertation Proposal

The approved Dissertation Committee will guide and critique the student's dissertation proposal. The student should give a complete draft of the dissertation proposal to the Supervising Professor (Dissertation Chair) one month before the proposal hearing/defense and to the other committee members at least three weeks in advance. The proposal hearing/defense must be advertised to the University community two weeks prior to the set date. Upon successful defense of the proposal, and before conducting the study, the student must secure UTSA Institutional Review Board (IRB) approval for any dissertation research that involves human subjects.

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 subjects 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 final draft of the dissertation should be given to all committee members one month before the oral defense date. 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. Therefore, the dissertation defense must be advertised to the University community two weeks prior to the set date. 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 (p. 94)
- Graduate Certificate in Teaching English as a Second Language (p. 95)

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 a 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	3
BBL 5063	Biliteracy in Bilingual Classrooms	3
BBL 5173	Sociocultural Issues and the Teaching of Reading	3
BBL 5193	Multicultural Literature for Children	3
ESL 5033	Second Language Reading and Writing	3
Total Credit Hours		15

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 Foundations of Second Language Acquisition, ESL 5043 Listening and Speaking in Second Language Programs, and ESL 6943 Internship in English as a Second Language. Teaching methods and literacy courses are selected in consultation with a student's advisor, based on career objectives.

A. Core:

ESL 5013	Foundations of Second Language Acquisition	3
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B. Language Skills:

ESL 5043	Listening and Speaking in Second Language Programs	3
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Select 3 hours in literacy of the following: 3

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. Select 3 hours of the following:		3
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:		
ESL 6943	Internship in English as a Second Language	3
Total Credit Hours		15

Bicultural Bilingual Studies (BBL) Courses

BBL 5003. Foundations for Bicultural Studies. (3-0) 3 Credit Hours.

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.

BBL 5013. Multicultural Groups in the United States. (3-0) 3 Credit Hours.

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.

BBL 5023. Cultural Adaptation in Bilingual Societies. (3-0) 3 Credit Hours.

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.

BBL 5033. Bilingual Content Instruction. (3-0) 3 Credit Hours.

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.

BBL 5043. Ethnography of Communication. (3-0) 3 Credit Hours.

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.

BBL 5053. Assessment in Bilingual and ESL Programs. (3-0) 3 Credit Hours.

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.")

BBL 5063. Biliteracy in Bilingual Classrooms. (3-0) 3 Credit Hours.

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.

BBL 5083. Curricular and Instructional Considerations for Linguistically and Culturally Diverse Classrooms. (3-0) 3 Credit Hours.

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, the 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.

BBL 5093. Multicultural Art and Folklore in the United States. (3-0) 3 Credit Hours.

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.

BBL 5113. Theoretical Foundations of Bicultural-Bilingual Education. (3-0) 3 Credit Hours.

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.

BBL 5123. Sociolinguistics and Education. (3-0) 3 Credit Hours.

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.

BBL 5133. Latino Biculturalism in the United States. (3-0) 3 Credit Hours.

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.

BBL 5173. Sociocultural Issues and the Teaching of Reading. (3-0) 3 Credit Hours.

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.

BBL 5193. Multicultural Literature for Children. (3-0) 3 Credit Hours.

A study of representative children's literature for, and about, the many culture groups in the Americas, with emphasis on Latinos and Latinas.

BBL 6003. Research Design and Inquiry in Bicultural-Bilingual Studies. (3-0) 3 Credit Hours.

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.

BBL 6033. Topics in Bicultural Studies. (3-0) 3 Credit Hours.

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.

BBL 6043. Advanced Topics in Bilingual and Dual-Language Education. (3-0) 3 Credit Hours.

Explores qualitative and quantitative studies, theories, and models within the field of bilingual education. Examines research within schools and communities that influences instructional policies and practices in dual-language and other bilingual enrichment programs. (Formerly titled "Bilingual Education Research.").

BBL 6063. Research Methods in Bilingual and Second Language Studies. (3-0) 3 Credit Hours.

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.

BBL 6073. Ethnographic Research Methods in Bicultural-Bilingual Settings. (3-0) 3 Credit Hours.

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.

BBL 6093. Chicana/Latina Feminist Methodologies. (3-0) 3 Credit Hours.

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/outsiders.

BBL 6103. Chicana/o Historical Thought. (3-0) 3 Credit Hours.

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.

BBL 6223. Anthropology and Education in Multicultural Contexts. (3-0) 3 Credit Hours.

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.

BBL 6233. Advanced Topics in Language Policy. (3-0) 3 Credit Hours.

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.

BBL 6941. Internship in Bicultural/Multicultural Settings. (0-0) 1 Credit Hour.

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.

BBL 6942. Internship in Bicultural/Multicultural Settings. (0-0) 2 Credit Hours.

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.

BBL 6943. Internship in Bicultural/Multicultural Settings. (0-0) 3 Credit Hours.

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.

BBL 6951. Independent Study. (0-0) 1 Credit Hour.

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.

BBL 6952. Independent Study. (0-0) 2 Credit Hours.

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.

BBL 6953. Independent Study. (0-0) 3 Credit Hours.

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.

BBL 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

BBL 6973. Special Problems. (3-0) 3 Credit Hours.

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.

BBL 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

BBL 7003. Proseminar in Culture, Literacy and Language. (3-0) 3 Credit Hours.

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.

BBL 7013. Research Design and Statistics for Culture, Literacy and Language. (3-0) 3 Credit Hours.

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.

BBL 7023. Qualitative Research Methods for Culture, Literacy and Language. (3-0) 3 Credit Hours.

Overview of qualitative research methodologies and applied social science techniques for conducting research in both educational and non-educational settings. Exploration of epistemological and intellectual controversies in qualitative research. Emphasis on practical applications of research methods and techniques to design and carry out qualitative studies.

BBL 7033. Seminar in Advanced Research Methods. (3-0) 3 Credit Hours.

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 "Seminar in Discourse Analysis.")

BBL 7043. Research Design and Qualitative Analysis for Culture, Literacy and Language. (3-0) 3 Credit Hours.

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.

BBL 7083. Technology for Qualitative Research. (3-0) 3 Credit Hours.

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.

BBL 7113. Seminar in Cultural Studies Research. (3-0) 3 Credit Hours.

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.

BBL 7123. Sociocultural Contexts of Literacy. (3-0) 3 Credit Hours.

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.

BBL 7133. Bilingualism and Second Language Acquisition. (3-0) 3 Credit Hours.

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.

BBL 7203. Seminar in Mexican American and Latina/o Biculturalism. (3-0) 3 Credit Hours.

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.").

BBL 7213. Ethnological Theory. (3-0) 3 Credit Hours.

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.

BBL 7223. Seminar in Biliteracy and Second Language Literacy. (3-0) 3 Credit Hours.

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.

BBL 7233. Seminar in Second Language Learning & Multilingualism. (3-0) 3 Credit Hours.

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.").

BBL 7243. Seminar in Applied Linguistics. (3-0) 3 Credit Hours.

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.").

BBL 7253. Seminar in Mexican American & Latina/o Issues in Education. (3-0) 3 Credit Hours.

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.").

BBL 7303. Directed Doctoral Research. (0-0) 3 Credit Hours.

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.

BBL 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

BBL 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

BBL 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

English as a Second Language (ESL) Courses

ESL 5003. Linguistics for Second Language and Bilingual Specialists. (3-0) 3 Credit Hours.

Concepts in linguistics directed toward a broad understanding of human language, with particular attention to teaching in second-language and bilingual contexts.

ESL 5013. Foundations of Second Language Acquisition. (3-0) 3 Credit Hours.

Study of principles, theories, and issues in second language acquisition and bilingualism, with implications for language teaching.

ESL 5033. Second Language Reading and Writing. (3-0) 3 Credit Hours.

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.

ESL 5043. Listening and Speaking in Second Language Programs. (3-0) 3 Credit Hours.

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.

ESL 5053. Approaches to Second Language Instruction. (3-0) 3 Credit Hours.

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.

ESL 5063. Language and Content-Area Instruction. (3-0) 3 Credit Hours.

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.

ESL 5073. Computer Assisted Language Learning. (3-0) 3 Credit Hours.

Prerequisites: Basic computer skills and consent of instructor. 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.

ESL 5083. Pedagogical Grammar. (3-0) 3 Credit Hours.

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.

ESL 6013. Second Language Acquisition Research. (3-0) 3 Credit Hours.

Prerequisite: 15 semester credit hours completed in degree program including ESL 5013, or consent of instructor. Investigation of second language acquisition from multiple perspectives through data-based studies.

ESL 6033. Topics in Second Language Acquisition and Teaching. (3-0) 3 Credit Hours.

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.

ESL 6043. Family and Adult Literacy in Language Minority Communities. (3-0) 3 Credit Hours.

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.

ESL 6053. Program and Syllabus Design. (3-0) 3 Credit Hours.

Theoretical and practical concerns in developing instructional programs to meet the objectives of second language learners, including English for Specific Purposes.

ESL 6063. Advanced Second Language Literacy. (3-0) 3 Credit Hours.

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.

ESL 6941. Internship in English as a Second Language. (0-0) 1 Credit Hour.

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.

ESL 6942. Internship in English as a Second Language. (0-0) 2 Credit Hours.

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.

ESL 6943. Internship in English as a Second Language. (0-0) 3 Credit Hours.

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.

ESL 6951. Independent Study. (0-0) 1 Credit Hour.

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.

ESL 6952. Independent Study. (0-0) 2 Credit Hours.

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.

ESL 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ESL 6973. Special Problems. (3-0) 3 Credit Hours.

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.

ESL 6983. Master’s Thesis. (0-0) 3 Credit Hours.

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

The Department of Counseling offers the Master of Science in Mental Health Counseling, Master of Education in School Counseling and the Doctor of Philosophy in Counselor Education and Supervision.

- Master of Science Degree in Clinical Mental Health Counseling (p. 100)
- Master of Education Degree in School Counseling (p. 101)
- Doctor of Philosophy Degree in Counselor Education and Supervision (p. 102)

Master of Science Degree in Clinical Mental Health Counseling

The Department of Counseling offers the 60 credit hour Master of Science (M.S.) degree in Clinical Mental Health Counseling. This clinical program emphasizes creativity, diversity, developmental and relational processes, ethics, and professional identity within Clinical Mental Health Counseling. Students may earn credit toward a state license and/or certification to practice in clinical settings (i.e., Licensed Professional Counselor, etc.). The Clinical Mental Health Counseling Program is seeking accreditation 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 during the last 60 hours of their undergraduate studies to be eligible for admission to the counseling program. Due to competitive nature and limited space, applicants admitted into the program often exceed minimum requirements.
2. International students must have a minimum score of 100 on the TOEFL Internet-based test, 600 on the TOEFL paper-based test, or 7 on the IELTS.
3. 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.S. in Clinical Mental Health Counseling for more information.

4. Three Applicant Rating forms are required.
5. A two-page narrative statement is required.

Current requirements, forms, and instructions are available on the Graduate School website (<http://graduateschool.utsa.edu>). Interested persons should contact the Student Development Specialist for the Counseling program or check the website for more information.

Degree Requirements

Candidates for the Master of Science degree in Clinical Mental Health Counseling must earn a minimum of 60 semester credit hours. Students must pass a comprehensive portfolio requirement at the conclusion of their formal coursework. The portfolio may be repeated. However, students who fail the portfolio two times must seek petition for re-evaluation and describe via a formal, letter utilizing current APA Style Guidelines exactly how they will address previous portfolio failures and what they will do differently to ensure a successful portfolio project submission. Should the petition be deemed acceptable by the Clinical Mental Health Committee by a majority vote, the student will be allowed a third and final submission opportunity.

A. 51 semester credit hours of required courses:

COU 5113	Ethical, Legal, and Professional Issues in Counseling	3
COU 5203	Introduction to Clinical Mental Health Counseling	3
COU 5213	Counseling Theories	3
COU 5223	Clinical Assessment and Appraisal Strategies for Counselors	3
COU 5233	Group Theory and Process	3
COU 5243	Diagnosis in Counseling	3
COU 5283	Counseling in a Multicultural Setting	3
COU 5393	Development of Counseling Skills	3
COU 5613	Biopsychosocial Aspects of Addiction Counseling	3
COU 5683	Practicum in Counseling	3
COU 5713	Clinical Mental Health Counseling Internship I	3
COU 5723	Clinical Mental Health Counseling Internship II	3
COU 6153	Career Development and Choice	3
COU 6523	Couple and Family Counseling Theories	3
COU 6883	Trauma, Crisis, and Grief Counseling	3
EDP 5033	Human Development Across the Life Span	3
EDU 5003	Research Methods	3
B. 9 semester credit hours of elective courses		9

Total Credit Hours 60

Standards and Procedures

As part of meeting the program objectives set forth in the Department of Counseling Program Student Handbooks and UTSA Graduate Catalog, students are expected to conduct themselves in an ethical, responsible, and professional manner. This conduct is evaluated through the Fitness to Practice (FTP) policy as an element of students’ academic performance. The purpose of the FTP review process is to regularly monitor students’ professional and personal development (CACREP, 2001) to ensure that students demonstrate appropriate

progress toward developing the necessary behaviors, attitudes, and professional competencies to practice as a counselor-in-training. Refer to the Department of Counseling's Web site for the Fitness to Practice policy.

Only two courses with the grade of "C" will be accepted toward this degree. Students must earn a grade of "Pass" in all practicum and internship courses (COU 5683, COU 5713, COU 5723 and COU 6793). Students who earn a "Fail" in a clinical course must retake that course and earn a grade of "Pass" 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.

Students on academic probation or not in good academic standing cannot enroll in practicum or internship and are ineligible to participate in the comprehensive portfolio.

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.

Master of Education Degree in School Counseling

The Department of Counseling offers the Master of Education (M.Ed.) degree in School Counseling. In addition to application to the M.Ed. graduate program, students should apply to the School Counseling Certification Program if they intend to practice as a certified professional school counselor in a school setting upon meeting state requirements. The School Counseling Program is accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP). For information on SCCP admission information, visit the Department of Counseling website (http://education.utsa.edu/counseling/m.a._in_school_counseling) or contact the Department of Counseling Student Development Specialist's office for the required process, timeline and forms.

Program Admission Requirements

1. Application for admission is conducted through the Graduate School. Applicants must hold a 3.0 GPA during the last 60 hours of their undergraduate studies to be eligible for admission to the counseling program. Due to competitive nature and limited space, applicants admitted into the program often exceed minimum requirements.
2. International students must have a minimum score of 100 on TOEFL Internet-based test, 600 on TOEFL paper-based test, or 7 on the IELTS.
3. Applicants without adequate coursework preparation in Education, Psychology, Sociology or 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.Ed. in School Counseling for more information.
4. Three Applicant Rating forms are required.
5. A two-page narrative statement is required

Current requirements, forms, and instructions are available on the Graduate School website (<http://graduateschool.utsa.edu>). Interested

persons should contact the Student Development Specialist for the Counseling program or check the website for more information.

Degree Requirements. Candidates for the Master of Education degree in School Counseling must earn a minimum of 48 semester credit hours. Students must develop, complete, and pass a professional portfolio toward the end of their formal coursework. Students must pass a comprehensive portfolio requirement at the conclusion of their formal coursework. The portfolio may be repeated. However, students who fail the portfolio two times must seek petition for re-evaluation and describe via a formal letter utilizing current APA Style Guidelines exactly how they will address previous portfolio failures and what they will do differently to ensure a successful portfolio project submission. Should the petition be deemed acceptable by the School Counseling Committee by a majority vote, the student will be allowed a third and final submission opportunity.

48 semester credit hours of required courses:

COU 5103	Introduction to School Counseling	3
COU 5213	Counseling Theories	3
COU 5223	Clinical Assessment and Appraisal Strategies for Counselors	3
COU 5233	Group Theory and Process	3
COU 5243	Diagnosis in Counseling	3
COU 5253	Child and Adolescent Counseling in a Systemic Context	3
COU 5283	Counseling in a Multicultural Setting	3
COU 5393	Development of Counseling Skills	3
COU 5683	Practicum in Counseling ¹	3
COU 5793	School Counseling Internship I ²	3
COU 5803	School Counseling Internship II ²	3
COU 5813	School Counseling Internship III ²	3
COU 6003	Consultation and Program Evaluation	3
COU 6153	Career Development and Choice	3
EDP 5033	Human Development Across the Life Span	3
EDP 5003	Psychological Learning Theories	3
Total Credit Hours		48

¹ Practicum in Counseling provides students with their first supervised experience with actual clients. Practicum may be scheduled on campus or off campus.

² The School Counseling Internship courses must be situated in a K-12 school setting.

NOTE: Students must be aware that internship sites beyond a 60-mile radius from the UTSA Downtown Campus will not be approved.

Standards and Procedures

As part of meeting the program objectives set forth in the Department of Counseling Program Student Handbooks and Graduate Catalog, students are expected to conduct themselves in an ethical, responsible, and professional manner. This conduct is evaluated through the Fitness to Practice (FTP) policy as an element of students' academic performance. The purpose of the FTP review process is to regularly monitor students' professional and personal development. (CACREP, 2001) to ensure students demonstrate appropriate progress towards developing the necessary behaviors, attitudes, and professional competencies to practice as a counselor-in-training. Please refer to the Department of Counseling's website for the Fitness to Practice

policy. Only two course with the grade of "C" will be accepted toward this degree. Students must earn a grade of "pass" or better in all clinical courses (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). Students who earn a "fail" in a clinical course must retake that course and earn a grade of "pass" 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. Students on academic probation or not in good academic standing cannot enroll in practicum or internship and are ineligible to participate in the comprehensive portfolio.

School Counseling Certification Program

Those who wish to be employed as a professional school counselor in any Texas public school must successfully pass the state certification program. For more information on SCCP admission information, visit the Department of Counseling website (http://education.utsa.edu/counseling/m.a._in_school_counseling) or contact the Department of Counseling Student Development Specialist's office for the required process, timeline and forms.

Doctor of Philosophy Degree in Counselor Education and Supervision

The Ph.D. in Counselor Education and Supervision is a 67 semester credit hour program intended to prepare professionals for future careers in academic, clinical, research, supervisory, 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. Students will be expected to formulate their own philosophy and approach to counselor education and supervision. 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). Preference will be given to graduates of CACREP accredited master's programs. 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. International students must have a minimum score of 100 on the TOEFL Internet-based test, 600 on the TOEFL paper-based test, or 7 on the IELTS;
 - 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 departmental faculty.

The program offers two application deadlines. To meet the Fall application priority deadline, applicants must submit all required materials by October 15. To meet the Spring application deadline, applicants must submit all required materials by February 1.

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. General core courses:

COU 6003	Consultation and Program Evaluation	3
COU 6323	Advanced Psychological Assessment	3
COU 7121	College and University Teaching Seminar	1
COU 7133	Seminar in Professional Development	3
COU 7213	Advanced Theories of Counseling	3
COU 7283	Advanced Multicultural Counseling	3
COU 7313	Practicum in Counseling	3
COU 7383	Advanced Practicum in Multicultural Counseling	3
COU 7413	Internship I	3
COU 7513	Internship II	3
COU 7583	Supervision of Counseling	3

COU 7593	Practicum in Counseling Supervision	3
COU 7893	Advanced Research in Counseling and Development	3
B. Research courses:		
COU 6893	Foundations of Research in Counseling and Development	3
COU 7103	Qualitative Research Methods in Counseling and Development	3
EDU 7043	Educational Research Statistics: Descriptive and Comparative	3
EDU 7063	Inferential Statistics	3
C. Approved emphasis curriculum area courses		
D. Dissertation:		
COU 7993	Dissertation	3
COU 7996	Dissertation	6
Total Credit Hours		67

Standards and Procedures

As part of meeting the program objectives set forth in the Department of Counseling Program Student Handbooks and UTSA Graduate Catalog, students are expected to conduct themselves in an ethical, responsible, and professional manner. This conduct is evaluated through the Fitness to Practice (FTP) policy as an element of students' academic performance. The purpose of the FTP review process is to regularly monitor students' professional and personal development (CACREP, 2001) to ensure that students demonstrate appropriate progress toward developing the necessary behaviors, attitudes, and professional competencies to practice as a counselor-in-training. Please refer to the Department of Counseling Web site for the Fitness to Practice policy.

Students must earn a grade of "B" or better in all courses. Students must earn a grade of "Pass" in all clinical courses (COU 7313 Practicum in Counseling, COU 7383 Advanced Practicum in Multicultural Counseling, COU 7413 Internship I, and COU 7513 Internship II) or clinical supervision course (COU 7583 Supervision of Counseling and COU 7593 Practicum in Counseling Supervision). Students who earn a grade of "Fail" in a clinical course must retake that course (after being reinstated) and earn a grade of "Pass" before progressing in the clinical 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 the doctoral dissertation or data collection, students must successfully complete their doctoral qualifying exam, 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.

Counseling (COU) Courses

COU 5103. Introduction to School Counseling. (3-0) 3 Credit Hours. 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.

COU 5113. Ethical, Legal, and Professional Issues in Counseling. (3-0) 3 Credit Hours. 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.

COU 5203. Introduction to Clinical Mental Health Counseling. (3-0) 3 Credit Hours.

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.

COU 5213. Counseling Theories. (3-0) 3 Credit Hours. Major counseling theories and techniques are presented.

Students investigate affective, behavioral, relational, and cognitive psychotherapeutic strategies.

COU 5223. Clinical Assessment and Appraisal Strategies for Counselors. (3-0) 3 Credit Hours.

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 case conceptualization and treatment planning. (Formerly titled "Psychological Assessment for Counselors.")

COU 5233. Group Theory and Process. (3-0) 3 Credit Hours.

Prerequisites: COU 5103 or COU 5203, and COU 5213. A study of small group theory, research, and procedures. Explores group membership and leadership behavior. Students are required to participate as a member of a small group in this course.

COU 5243. Diagnosis in Counseling. (3-0) 3 Credit Hours.

Prerequisites: COU 5103 or COU 5203, and COU 5213. Review of Diagnostic and Statistical Manual criteria for mental, behavioral and emotional disorders with case conceptualization emphasizing context, diversity, and relational development. (Formerly titled "Counseling Individuals with Behavioral and Emotional Disorders.")

COU 5253. Child and Adolescent Counseling in a Systemic Context. (3-0) 3 Credit Hours.

Prerequisites: COU 5103 or COU 5203, and COU 5213. The emotional and behavioral experiences of childhood and adolescence are discussed within the context of the school and family. Counseling strategies are presented for fostering wellness; teaching parenting skills; responding to crises, disasters and other trauma-causing events; helping students both identify strengths and cope with environmental and developmental problems. Requires casework.

COU 5283. Counseling in a Multicultural Setting. (3-0) 3 Credit Hours.

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.

COU 5393. Development of Counseling Skills. (3-0) 3 Credit Hours.

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.

COU 5613. Biopsychosocial Aspects of Addiction Counseling. (3-0) 3 Credit Hours.

Prerequisite: COU 5203. This course examines common drugs of abuse, process addictions, and the etiology, course, and progression of addictive disorders. Students learn to diagnose and conceptualize addiction from contextual, systemic, relational, and holistic perspectives. Reviews evidence-based and innovative approaches used in addiction treatment. (Formerly titled "Substance Abuse and Chemical Dependency Counseling.").

COU 5683. Practicum in Counseling. (0-0) 3 Credit Hours.

Prerequisites: COU 5103 or COU 5203, COU 5213, COU 5233, COU 5283, and COU 5393. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into 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.

COU 5713. Clinical Mental Health Counseling Internship I. (0-0) 3 Credit Hours.

Prerequisites: COU 5223, COU 5243, COU 5683, and EDP 5033. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into Clinical Mental Health 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.

COU 5723. Clinical Mental Health Counseling Internship II. (0-0) 3 Credit Hours.

Prerequisite: COU 5713. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into Clinical Mental Health 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.

COU 5793. School Counseling Internship I. (0-0) 3 Credit Hours.

Prerequisites: COU 5253 and COU 5683. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into 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.

COU 5803. School Counseling Internship II. (0-0) 3 Credit Hours.

Prerequisite: COU 5793. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into 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.

COU 5813. School Counseling Internship III. (0-0) 3 Credit Hours.

Prerequisite: COU 5803. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into 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.

COU 6003. Consultation and Program Evaluation. (3-0) 3 Credit Hours.

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.).

COU 6013. The Role of Sport in Society. (3-0) 3 Credit Hours.

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.).

COU 6033. Sport Psychology. (3-0) 3 Credit Hours.

A study of cognition and behaviors related to the participation in sport. This course will have a theoretical focus and will include topics such as self-efficacy, performance enhancement, cohesion, arousal and anxiety. Contemporary research will be discussed. (Same as KAH 6033. Credit cannot be earned for both COU 6033 and KAH 6033.).

COU 6043. Applied Sport Psychology. (3-0) 3 Credit Hours.

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.).

COU 6153. Career Development and Choice. (3-0) 3 Credit Hours.

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.

COU 6203. Psychological Perspectives of Motor Learning and Control. (3-0) 3 Credit Hours.

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.).

COU 6323. Advanced Psychological Assessment. (3-0) 3 Credit Hours.

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.

COU 6523. Couple and Family Counseling Theories. (3-0) 3 Credit Hours.

Prerequisites: COU 5203 and COU 5213. This course examines the history of family therapy, major family counseling theories, and significant marriage and family theorists.

COU 6533. Mental Health and Addiction Issues in Couple and Family Counseling. (3-0) 3 Credit Hours.

Prerequisite: COU 6523. 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.

COU 6543. Intermediate Skills in Couple and Family Counseling. (3-0) 3 Credit Hours.

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.

COU 6553. Assessment and Treatment in Couple and Family Counseling. (3-0) 3 Credit Hours.

Prerequisite: COU 6523. This course provides an overview of common assessment and treatment strategies for counselors working with couples and families. This course will also explore creative and innovative strategies for working with couples and families.

COU 6613. Addicted Families, Violence, and Life-Threatening Behaviors. (3-0) 3 Credit Hours.

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".

COU 6623. Current Topics in Addictions. (3-0) 3 Credit Hours.

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.

COU 6633. Addictions Practice. (3-0) 3 Credit Hours.

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.

COU 6723. Counseling for Advocacy and Social Justice. (3-0) 3 Credit Hours.

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.

COU 6733. Health Care Counseling and Diverse Cultures. (3-0) 3 Credit Hours.

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.

COU 6743. Special Topics in Multicultural Counseling. (3-0) 3 Credit Hours.

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.

COU 6773. Introduction to Neurofeedback. (3-0) 3 Credit Hours.

The course is an introduction to neurofeedback, a form of biofeedback used to help individuals regulate brainwave patterns (via electroencephalogram readings). Course content covers an overview of neurofeedback, history of the field, principles of learning, concepts of biofeedback, basic neurophysiology and neuroanatomy, basic instrumentation and electronics, research, psychopharmacological considerations, treatment planning, and professional conduct. This course is designed to meet the criteria of the "Blueprint of Knowledge Statement for Board Certification in Neurofeedback" by the Biofeedback Certification International Alliance.

COU 6783. Advanced Neurofeedback. (3-0) 3 Credit Hours.

This is an advanced neurofeedback course that covers advanced topics in neuroanatomy, clinical assessment, and treatment planning using neurofeedback. Students will demonstrate skills in administering and interpreting clinical neurofeedback protocols. Case studies will be used to prepare students for their practicum in neurofeedback.

COU 6793. Practicum in Neurofeedback. (3-0) 3 Credit Hours.

This course provides students with hands-on experience in clinical assessment skills, administering and interpreting QEEGs, developing and administering neurofeedback protocols, and monitoring neurofeedback treatment.

COU 6883. Trauma, Crisis, and Grief Counseling. (3-0) 3 Credit Hours.

Prerequisites: COU 5203 and COU 5213. This experiential course covers the full spectrum of grief and loss to include loss by death, and other losses, such as divorce, trauma, addiction, miscarriage, and betrayal. This course reviews the use of creative interventions to help families, individuals, couples, and groups move through periods of adversity and change. Students will engage in reflective activities and demonstrate the principles to effectively counsel clients experiencing grief and loss.

COU 6893. Foundations of Research in Counseling and Development. (3-0) 3 Credit Hours.

Prerequisite: EDU 5003 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.

COU 6951. Independent Study. (0-0) 1 Credit Hour.

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.

COU 6953. Independent Study. (0-0) 3 Credit Hours.

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.

COU 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

COU 6973. Special Issues. (3-0) 3 Credit Hours.

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 the topics vary, but no more than 6 hours, regardless of discipline, may be counted toward the Master's degree. (Formerly titled "Special Problems.")

COU 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

COU 7103. Qualitative Research Methods in Counseling and Development. (3-0) 3 Credit Hours.

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.)

COU 7121. College and University Teaching Seminar. (1-0) 1 Credit Hour.

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.

COU 7133. Seminar in Professional Development. (3-0) 3 Credit Hours.

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.

COU 7213. Advanced Theories of Counseling. (3-0) 3 Credit Hours.

Prerequisite: COU 5213. 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.

COU 7283. Advanced Multicultural Counseling. (3-0) 3 Credit Hours.

Prerequisite: COU 7213. 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.

COU 7313. Practicum in Counseling. (3-0) 3 Credit Hours.

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.

COU 7383. Advanced Practicum in Multicultural Counseling. (3-0) 3 Credit Hours.

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.

COU 7413. Internship I. (0-0) 3 Credit Hours.

Prerequisite: Doctoral status. Incorporates campus-based practicum experience with classroom experience focusing on client problems and the learning of relevant counseling skills.

COU 7513. Internship II. (0-0) 3 Credit Hours.

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.

COU 7583. Supervision of Counseling. (3-0) 3 Credit Hours.

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.

COU 7593. Practicum in Counseling Supervision. (3-0) 3 Credit Hours.

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.

COU 7771. Independent Study. (0-0) 1 Credit Hour.

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.

COU 7773. Independent Study. (0-0) 3 Credit Hours.

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.

COU 7893. Advanced Research in Counseling and Development. (3-0) 3 Credit Hours.

Prerequisites: COU 6323, COU 7103, and COU 7213, or consent of instructor. 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.").

COU 7973. Special Topics in Counseling. (3-0) 3 Credit Hours.

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.

COU 7991. Dissertation. (0-0) 1 Credit Hour.

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.

COU 7993. Dissertation. (0-0) 3 Credit Hours.

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.

COU 7996. Dissertation. (0-0) 6 Credit Hours.

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

The Department of Educational Leadership and Policy Studies offers the Master of Education in Educational Leadership and Policy studies, the Doctor of Education in Educational Leadership and the Graduate Certificate in Higher Education Administration.

- Master of Education Degree in Educational Leadership and Policy Studies (p. 107)
- Doctor of Education Degree in Educational Leadership (p. 108)

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 is also 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 be 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. For those students applying for the higher education administration concentration: a statement of purpose of one to two pages is required that provides (1) the applicant's reasons for pursuing a master's degree with a concentration in higher education administration, (2) a biographical sketch of the applicant's experiences relevant to higher education administration, and (3) career plans after obtaining a master's degree with a concentration in higher education administration.
4. 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.
5. 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.
6. International students must have a minimum score of 79 on the TOEFL Internet-based test, 550 on the TOEFL paper-based test, or 6.5 on the IELTS.

Degree Requirements

A. Core Courses:

EDL 5303	Human Relations in Educational Administration
EDU 5003	Research Methods

EDU 6223	Education in a Culturally and Linguistically Diverse Society	
B. Support work. Select one of the following concentrations:		27
Educational Leadership Concentration:		
C&I 5003	Theory of Curriculum and Instruction	
EDL 5003	Introduction to School Administration	
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 6013	Supervision: Teaching-Learning Process	
EDL 6023	Supervision: Tools and Techniques	
EDL 6943	Practicum in Educational Administration	
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).		
Total Credit Hours		36

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 apply to either the K–12 leadership or higher education administration emphasis as part of the admissions process. Applicants must meet or, as applicable, submit information related to the following criteria to be considered for admission:

1. a bachelor's degree from an accredited institution;
2. a master's degree in education or other appropriate field;

3. a grade point average of 3.5 or better out of a possible 4.0 in a master's degree program;
4. submission of an official score on the verbal, quantitative, and analytical writing sections of the Graduate Record Examination (GRE);
5. 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 or 79 Internet version;
6. a résumé or curriculum vitae including 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);
7. 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
8. a statement of purpose outlining, at a minimum, (1) the applicant's reasons for pursuing a doctorate in educational leadership, including but not limited to the social justice purposes the applicant will strive to achieve as an educational leader; (2) a biographical sketch of the applicant's experiences relevant to the field of education, including but not limited to describing (a) the obstacles the applicant has had to overcome in their educational experiences, (b) how the applicant has worked to improve the education of all students, (c) how the applicant has used criticism constructively to improve the performance of their educational duties, and (d) leadership experiences; (3) career plans, (4) scholarly interests including but not limited to areas of educational leadership about which the applicant would like to learn more; and (5) views on and roles in current and future educational reform efforts, including but not limited to discussing (a) a reform that the applicant believes has improved education significantly and (b) the reform or reforms most needed in educational institutions.

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

The Ed.D in Educational Leadership is a 60-semester-credit-hour program. Degree candidates must complete 33–36 semester credit hours of core courses:

Core Courses (33-36 semester credit hours):

A. 9 semester credit hours of Culture:	9
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. 12 semester credit hours of Methodology:	12
Survey of quantitative and qualitative research designs and methods and the uses of technology for data collection and analysis.	
C. 12-15 semester credit hours of Leadership:	12-15

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.

Courses fulfilling the K–12 or higher education administration emphasis and cognate requirements (15-18 semester credit hours):

D. 9-12 semester credit hours of Area of emphasis: 9-12

This emphasis area targets the development of knowledge and skills in K–12 leadership or higher education administration.

E. 6 semester credit hours of Cognate support: 6

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:

F. A minimum of 9 semester credit hours of Dissertation: 9

LDR 7991 Dissertation

LDR 7992 Dissertation

LDR 7993 Dissertation

LDR 7994 Dissertation

LDR 7995 Dissertation

LDR 7996 Dissertation

Total Credit Hours 60

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.

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:

Select five courses from the following: 15

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

Total Credit Hours 15

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.

Educational Leadership (EDL) Courses

EDL 5003. Introduction to School Administration. (3-0) 3 Credit Hours.

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.

EDL 5103. Introduction to School Finance. (3-0) 3 Credit Hours.

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.

EDL 5203. School and Community Relations in Education. (3-0) 3 Credit Hours.

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.

EDL 5303. Human Relations in Educational Administration. (3-0) 3 Credit Hours.

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.

EDL 5403. The Principalship: Educational Unit and Site Administration. (3-0) 3 Credit Hours.

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.

EDL 5503. Administration and Function of Special Programs. (3-0) 3 Credit Hours.

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.

EDL 5603. Applied Research Seminar in Educational Leadership. (3-0) 3 Credit Hours.

Prerequisites: EDL 5003, EDL 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.

EDL 5703. Legal Foundations in Education. (3-0) 3 Credit Hours.

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.

EDL 6013. Supervision: Teaching-Learning Process. (3-0) 3 Credit Hours.

Prerequisite: EDL 6023 or consent of instructor. A study of impact strategies in instructional supervision and the development of communication and interpersonal skills needed for working with teachers.

EDL 6023. Supervision: Tools and Techniques. (3-0) 3 Credit Hours.

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.

EDL 6203. Educational Facilities and Capital Funds Administration. (3-0) 3 Credit Hours.

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.

EDL 6503. Superintendent's Seminar. (3-0) 3 Credit Hours.

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.

EDL 6941. Practicum in Educational Administration. (0-0) 1 Credit Hour.

Prerequisites: C&I 5003, EDL 5003, EDL 5203 or EDL 5303, EDL 5403, EDL 5503, EDL 5703, EDL 6013, 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.

EDL 6942. Practicum in Educational Administration. (0-0) 2 Credit Hours.

Prerequisites: C&I 5003, EDL 5003, EDL 5203 or EDL 5303, EDL 5403, EDL 5503, EDL 5703, EDL 6013, 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.

EDL 6943. Practicum in Educational Administration. (0-0) 3 Credit Hours.

Prerequisites: C&I 5003, EDL 5003, EDL 5203 or EDL 5303, EDL 5403, EDL 5503, EDL 5703, EDL 6013, 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.

EDL 6953. Independent Study. (0-0) 3 Credit Hours.

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.

EDL 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

EDL 6973. Special Problems. (3-0) 3 Credit Hours.

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.

EDL 7103. Administration of Urban/Multicultural Institutions. (3-0) 3 Credit Hours.

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.

EDL 7213. Foundations of Higher Education. (3-0) 3 Credit Hours.

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.

EDL 7243. Diversity, Equity, and Access in Higher Education. (3-0) 3 Credit Hours.

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.

EDL 7273. Examining School Populations, Structures, and Culture. (3-0) 3 Credit Hours.

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.

EDL 7333. Organizations and Systems in Higher Education. (3-0) 3 Credit Hours.

Prerequisite: Doctoral standing in higher education administration or consent of instructor. This course provides an overview of the organizations and systems that comprise the United States higher education system. Students will review historical and current perspectives about the nature and purposes of U.S. higher education, examine the roles that internal and external forces play in shaping institutions and systems, explore how key actors experience their organizational roles, and consider how variations in the system and individual differences can affect life within the academy. The emphasis will be on understanding and appreciating the scope, complexity, and diversity of higher educational systems, institutions, and stakeholders.

EDL 7343. The Politics of Educational Change. (3-0) 3 Credit Hours.

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.)

EDL 7413. Policy and Politics in Higher Education. (3-0) 3 Credit Hours.

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.

EDL 7423. Theoretical Frameworks in Higher Education. (3-0) 3 Credit Hours.

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.

EDL 7563. Research in Leadership Laboratory: Change Theory, Innovation, and Application. (3-0) 3 Credit Hours.

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.

EDL 7573. Research Theory and Design in Educational Administration. (3-0) 3 Credit Hours.

Prerequisite: EDU 7063 or EDU 7123, or consent of instructor. Research theory and design in preparation for the craft of research proposals. Includes the development of inquiry and procedures in qualitative and quantitative analyses as they relate to the discipline of educational administration.

EDL 7773. Independent Study. (0-0) 3 Credit Hours.

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.

EDL 7783. Special Problems. (3-0) 3 Credit Hours.

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.

EDL 7893. Doctoral Research. (0-0) 3 Credit Hours.

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.

Education (EDU) Courses

EDU 5003. Research Methods. (3-0) 3 Credit Hours.

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.

EDU 5103. Advanced Foundations of Education. (3-0) 3 Credit Hours.

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.")

EDU 6223. Education in a Culturally and Linguistically Diverse Society. (3-0) 3 Credit Hours.

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.

EDU 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

EDU 6973. Special Problems. (3-0) 3 Credit Hours.

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.

EDU 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

EDU 7003. Survey of Research Methods. (3-0) 3 Credit Hours.

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.

EDU 7043. Educational Research Statistics: Descriptive and Comparative. (3-0) 3 Credit Hours.

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.)

EDU 7063. Inferential Statistics. (3-0) 3 Credit Hours.

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.)

EDU 7103. Qualitative Research Traditions. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Covers major qualitative research paradigms and 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.

EDU 7123. Advanced Qualitative Data Analysis. (3-0) 3 Credit Hours.

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.

EDU 7133. The Role of Research in Educational Environments. (3-0) 3 Credit Hours.

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.

EDU 7213. Educational Reform. (3-0) 3 Credit Hours.

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.

EDU 7223. Learning in a Culturally and Linguistically Diverse Society. (3-0) 3 Credit Hours.

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.

EDU 7403. Education, Cultural Differences, and Acculturation. (3-0) 3 Credit Hours.

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.

Higher Education-Student Affairs Administration (HSA) Courses

HSA 5003. History of American Higher Education. (3-0) 3 Credit Hours.

A knowledge of history makes possible the awareness and understanding of present-day issues in higher education, such as the interdependence and role of higher education in society. This course covers the development of western higher education from the 11th century to the present with an emphasis on the development of U.S. higher education since the colonial colleges. Course sections may use chronological, critical, thematic, or other strategies for covering content.

HSA 5023. Foundation and Function of College Student Personnel. (3-0) 3 Credit Hours.

Provides initial insight into the student affairs profession, including expectations and ethical standards of the profession. This survey course introduces students to the numerous differentiated student affairs functional areas in postsecondary education by using theory-based and application-oriented approaches.

HSA 5103. College Student Development. (3-0) 3 Credit Hours.

This course offers those who work or plan to work in post-secondary educational institutions the opportunity to build an understanding of classic and contemporary college student development theories and their application in practice.

HSA 5203. Multicultural Issues in Higher Education. (3-0) 3 Credit Hours.

This course focuses on diversity and multiculturalism regarding institution types, student populations, and research. Special attention is given to the impact of HBCUs, HSIs, PWIs; race, ethnicity, and gender among students; and income and first generation status on student achievement. Students are introduced to scholarship on multiculturalism and institutional transformation, and apply their knowledge in a culminating project. (Credit cannot be earned for more than one of the following: HSA 5203, AHE 5633, ALT 5633, and COU 5633.).

HSA 6003. Higher Education Law. (3-0) 3 Credit Hours.

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.

HSA 6103. Assessing Higher Education Environments. (3-0) 3 Credit Hours.

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.

HSA 6123. Program Planning and Evaluation in Higher Education and Student Affairs. (3-0) 3 Credit Hours.

An overview of program evaluation theories, models and perspectives currently being applied in higher education. Emphasis will be on how to plan programs and perform evaluations of functional areas and/or organizational units in higher education that are focused on student support, activities and success.

HSA 6143. Administration of Student Services in Higher Education. (3-0) 3 Credit Hours.

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, professional standards and principles of good practice, and challenges for the future.

HSA 6203. Contemporary Thought in Higher Education. (3-0) 3 Credit Hours.

A study of current thought as it relates to the management of institutions of higher education.

HSA 6303. Seminar in Governance in Higher Education. (3-0) 3 Credit Hours.

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.

HSA 6403. Financing Higher Education. (3-0) 3 Credit Hours.

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.

HSA 6503. The Community College. (3-0) 3 Credit Hours.

Examines the history, purpose and societal role of the American community college. Provides an overview of the different functions of the community college and the major issues impacting community college governance and administration. The role of community colleges in P-20 efforts is also discussed.

HSA 6943. Internship in Higher Education. (0-0) 3 Credit Hours.

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.

HSA 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

Leadership (LDR) Courses**LDR 7003. Proseminar in Educational Leadership. (3-0) 3 Credit Hours.**

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.

LDR 7133. Majority-Minority Settings: Creating a Community of Leaders. (3-0) 3 Credit Hours.

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.

LDR 7153. Reflective Leadership: The Personal Dimension. (3-0) 3 Credit Hours.

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.

LDR 7183. Emerging Paradigms in Leadership. (3-0) 3 Credit Hours.

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.

LDR 7203. Leadership in Multiple Language Educational Settings. (3-0) 3 Credit Hours.

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.

LDR 7303. Organizational Theory. (3-0) 3 Credit Hours.

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.

LDR 7343. Principles of Ethical Leadership. (3-0) 3 Credit Hours.

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.

LDR 7413. Sponsored Internship in Educational Leadership. (1-16) 3 Credit Hours.

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.

LDR 7991. Dissertation. (0-0) 1 Credit Hour.

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.

LDR 7992. Dissertation. (0-0) 2 Credit Hours.

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.

LDR 7993. Dissertation. (0-0) 3 Credit Hours.

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.

LDR 7994. Dissertation. (0-0) 4 Credit Hours.

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.

LDR 7995. Dissertation. (0-0) 5 Credit Hours.

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.

LDR 7996. Dissertation. (0-0) 6 Credit Hours.

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. The Department also offers two graduate certificates: Certificate in Applied Behavior Analysis and Certificate in Language Acquisition and Bilingual Psychoeducational Assessment.

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. The number of students admitted to this program may be limited, and admission may be competitive. 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).
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. Applicants must obtain a minimum score of 3.0 on the Analytical Writing test. There is not a cutoff score for the Verbal Reasoning or Quantitative Reasoning tests; rather, scores on these tests will be balanced with GPA and other criteria.
4. Applicants whose native language is not English must submit an official score on either the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS). Minimum scores include a score of at least 550 on the TOEFL paper version, at least 79 on the TOEFL Internet version, or at least 6.5 on the IELTS.
5. Applicants must provide two letters of recommendation from professional references. Appropriate sources of letters include professors, supervisors, employers, and similar individuals with whom the applicant has a professional relationship. Letters should not be submitted from personal references such as friends or family members. 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.

Please note: In addition to the importance of applicants' other test scores and performance in undergraduate coursework, selection decisions will be strongly influenced by applicants' writing ability as demonstrated by their Statement of Purpose and score on the GRE Analytical Writing test. Demonstration of writing skills is especially important because success in the field of School Psychology largely depends on these skills, and students will be required to complete a significant amount of writing throughout the School Psychology curriculum.

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 Comprehensive Examination 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:

EDP 5003	Psychological Learning Theories	3
EDP 5033	Human Development Across the Life Span	3
EDP 5053	Psychosocial Contexts of Learning	3
EDP 5303	Principles and Techniques of Evaluation	3
EDP 6033	Legal, Ethical, and Professional Issues in School Psychology	3
EDP 6103	Research Methods and Statistics I	3
EDP 6203	Research Methods and Statistics II	3
EDP 6213	School Based Counseling Theories	3
EDP 6233	Mental Health Services in the Schools	3
EDP 6243	Cognitive Assessment and Intervention	3
EDP 6253	Academic Assessment and Intervention	3
EDP 6263	Behavioral Assessment and Intervention	3
EDP 6293	Consultation in the Schools	3
EDP 6343	Advanced Psychological Assessment	3
EDP 6643	Child and Adolescent Psychopathology	3
EDP 6703	Clinical Neuropsychology	3
EDP 6733	Multicultural Assessment and Intervention	3
EDP 6833	Practicum in School Psychology (must be repeated for a total of 6 credit hours)	6
EDP 6943	Internship in School Psychology (must be repeated for a total of 6 credit hours)	6
SPE 5403	Survey of Special Education	3
Total Credit Hours		66

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 consistently 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” (defined as grades of “C” or “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.

- Graduate Certificate in Applied Behavior Analysis (p. 116)
- Graduate Certificate in Language Acquisition and Bilingual Psychoeducational Assessment (p. 116)

Graduate Certificate in Applied Behavior Analysis

The Applied Behavior Analysis certificate is offered through collaboration with the Department of Interdisciplinary Learning and Teaching. Admission, advising, and review of academic progress are conducted through the Department of Educational Psychology. This 15-semester-credit-hour certificate in Applied Behavior Analysis is designed to meet the needs of current and prospective students interested in developing basic skills in applied behavior analysis. The certificate is 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.

This certificate is designed to provide students with focused training in the area of applied behavior analysis as it relates to educational psychology and special education. The certificate provides educators with specialized skills in the application of behavior analysis to support the social behavior needs of students. The certificate coursework provides students with a strong background in behavioral theory and principles as well as the skills to apply this learning to relevant contexts (e.g., educational settings, clinic settings, home settings). In addition, completion of the coursework linked with the certificate will meet the coursework requirements set forth by the Behavior Analyst Certification Board, Inc. (BACB®).

The following departmental requirements are applicable to the Certificate in Applied Behavior Analysis:

- A bachelor’s degree from an accredited university in an approved area of study (e.g., psychology, education).
- A minimum grade point average (GPA) of 3.0 for the last two years of work toward the bachelor’s degree.
- To maintain enrollment in the certificate program, students should maintain a 3.0 GPA throughout their tenure in the program.
- Submission of the Applied Behavior Analysis Certificate Supplemental Information Form.

To meet the curricular requirements for the Graduate Certificate in Applied Behavior Analysis students must complete 15 semester credit hours with a grade point average of 3.0 or above from the following courses:

A. 9 semester credit hours of required courses:	9
EDP 5003 Psychological Learning Theories (with BCBA approved instructor-confirm section with advisor)	
EDP 6263 Behavioral Assessment and Intervention	
SPE 5503 Applied Behavior Analysis for Classroom Teachers	
B. 6 semester credit hours of practicum through EDP or SPE:	6

EDP 6833	Practicum in School Psychology (must be repeated for a total of 6 hours)
OR	
SPE 5793 & SPE 5893	Practicum in Special Education: Children and Youth with Disabilities and Practicum in Special Education: Individuals with Behavior Problems

Total Credit Hours **15**

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 Applied Behavior Analysis. 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.

Students should see an advisor if they are interested in becoming eligible to take the Board Certified Behavior Analysis (BCBA) Examination. An advisor will provide further instructions about the requirements for the BCBA.

Graduate Certificate in Language Acquisition and Bilingual Psychoeducational Assessment

The LABPA certificate is offered through the Department of Educational Psychology (EDP) with support from the Department of Bicultural-Bilingual Studies (BBL). Both Departments reside in the College of Education and Human Development.

This 15-hour certificate in Language Acquisition and Bilingual Psychoeducational Assessment (LABPA) is designed to meet the needs of prospective students interested in developing skills in bilingual psychoeducational assessment and foundational knowledge in language acquisition and the bilingualism continuum, with an emphasis on Spanish-speaking English Language Learners (ELLs). The purpose is to increase the utilization of best practices in bilingual psychoeducational assessment based upon an understanding of language acquisition. Best practices incorporate knowledge of tests of cognitive and achievement abilities, of tests of language proficiency, and bilingualism and language acquisition. The goal is to improve the educational experience, educational planning, provision of special education services, and overall well-being of ELL children, and youth in general.

Admission Requirements

- A bachelor’s degree from an accredited university in an approved area of study (e.g., psychology, education), or
- A master’s or doctoral degree from an accredited university in an approved area of study (e.g., school psychology, counseling psychology, educational diagnostician) or clinical psychology with completion of graduate-level coursework in academic assessment and cognitive assessment, or
- Current Educational Diagnostic Certificate
- Attainment of passing grade on a mandated Spanish proficiency test (e.g., Texas Bilingual (Spanish) Target Language Proficiency Test or designated University (ALPS) Spanish Proficiency Test)

Note: Appropriate coursework in areas of Cognitive Assessment and Academic Assessment includes graduate-level coursework that integrates the administration, scoring, and interpretation of commonly used measures (e.g., WISC-V, WIAT-III, WJ-IV Tests of Cognitive Abilities and of Achievement) within these domains. These courses are typically completed after students have completed coursework on the principles and techniques of evaluation, including principles of psychological and educational measurement, statistical and psychometric concepts, and the development and selection of assessment instruments related to a range of psychological constructs. Completion of appropriate coursework should be documented by course syllabi indicating training in these areas.

Although coursework will be offered in English, students must have the ability to administer Spanish-language tests of language proficiency, academic achievement, and cognitive abilities. The attainment of a passing grade on a state-mandated Spanish proficiency test pertains to this requirement.

Once admitted, the student will contact the Certificate Program Advisor and complete a form requesting permission to enter and complete the certificate program. The LABPA Program Advisor and the Dean of the College of Education and Human Development will sign the form. A copy of this form will be sent to the Graduate School.

Certificate Requirements

Requirements for completion include:

1. Completion of 15 graduate hours of approved UTSA coursework with a grade point average (GPA) of 3.0 or above.
2. Completion of a language acquisition and bilingual psychoeducational assessment project portfolio.
3. Maintain a 3.0 GPA throughout tenure in the program.

A. EDP Required Courses:	9
EDP 6343	Advanced Psychological Assessment
EDP 6733	Multicultural Assessment and Intervention
EDP 6833	Practicum in School Psychology
B. BBL Required Courses:	6
BBL 5053	Assessment in Bilingual and ESL Programs
ESL 5013	Foundations of Second Language Acquisition
or BBL 7133	Bilingualism and Second Language Acquisition
Total Credit Hours	15

Educational Psychology (EDP) Courses

EDP 5003. Psychological Learning Theories. (3-0) 3 Credit Hours.

Provides a current and comprehensive overview of theory and research related to 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.

EDP 5033. Human Development Across the Life Span. (3-0) 3 Credit Hours.

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.

EDP 5043. Classroom Management and Motivation. (3-0) 3 Credit Hours.

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. (Same as C&I 5043. Credit cannot be earned for both EDP 5043 and C&I 5043.)

EDP 5053. Psychosocial Contexts of Learning. (3-0) 3 Credit Hours.

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 and/or workplace learning.

EDP 5273. Child Development. (3-0) 3 Credit Hours.

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.

EDP 5303. Principles and Techniques of Evaluation. (3-0) 3 Credit Hours.

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.

EDP 5313. Assessment and Evaluation for Educators. (3-0) 3 Credit Hours.

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 objective and performance assessments, administration procedures, classroom evaluation and the role of testing, measurement and evaluation in instructional practice.

EDP 5323. Educational Measurement and Assessment in Special Education. (3-0) 3 Credit Hours.

Introduces principles of educational measurement necessary to develop sound assessment tools and strategies for students with disabilities. Primary course focus will be on approaches for making reliable and valid decisions based upon sound measurement theory, including methods for establishing evidence of reliability and validity, statistical and psychometric concepts, the development and selection of assessment instruments related to academic and behavioral constructs, and techniques for interpreting and communicating evaluation results.

EDP 5333. Adolescent Development. (3-0) 3 Credit Hours.

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.

EDP 5343. Instructional Design Theory. (3-0) 3 Credit Hours.

Prerequisite: IST 5003 or consent of instructor. An investigation of theories, principles, and processes of instructional and digital learning design including their application to instructional product and curriculum development. (Same as IST 5343. Credit cannot be earned for both IST 5343 and EDP 5343.)

EDP 5503. Applied Behavior Analysis for Classroom Teachers. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5513, SPE 6403 or EDP 6403 and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about principles and procedures of applied behavior analysis and classroom management for teachers. As an introductory course to behavior analysis, special attention will be paid to philosophy, terminology, and methods. In addition, ethical considerations for those delivering behavior analytic services will be discussed. Assessments will be modeled after the BCBA certification exam. Requires an applied project. (Formerly EDP 5423. Same as SPE 5503. Credit cannot be earned for more than one of the following: EDP 5423, EDP 5503, or SPE 5503.)

EDP 5603. Psychology of Human Motivation. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or permission of the instructor. Explores the study of human motivation from a variety of approaches including educational, psychological and social-historical. The goal of the course is to help students develop foundational understandings of how various motivational theories relate to the teaching and learning processes in a variety of educational contexts.

EDP 5633. Instruction and Educational Interventions for Individuals with Mild/Moderate Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503 or EDP 5503, SPE 6403 or EDP 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about evidenced-based instructional practices for teaching individuals with mild/moderate intellectual disabilities. Students will have the opportunity to learn to design appropriate instructional interventions, how to apply those interventions, and to make decisions based on student data to inform future instructional practices. (Same as SPE 5633. Credit cannot be earned for both SPE 5633 and EDP 5633.)

EDP 5643. Instruction and Educational Interventions for Individuals with Moderate/Severe Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503 or EDP 5503, SPE 5513, SPE 6403 or EDP 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about evidenced-based instructional practices for teaching individuals with moderate/severe intellectual disabilities. Students will have the opportunity to learn to design appropriate instructional interventions, how to apply those interventions, and make decisions based on student data to inform future instructional practices. (Same as SPE 5643. Credit cannot be earned for both SPE 5643 and EDP 5643.)

EDP 6033. Legal, Ethical, and Professional Issues in School Psychology. (3-0) 3 Credit Hours.

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.

EDP 6103. Research Methods and Statistics I. (3-0) 3 Credit Hours.

This course covers an overview of research design and introductory statistical concepts used in behavioral research. Thus students will focus on developing an understanding of evidence-based inquiry, experimental validity, sampling procedures, and basic descriptive and comparative research designs. Students will be introduced to probability and sampling distributions, the major theoretical distributions referenced in behavioral research (the Binomial distribution, the Chi-Square distribution, and the Gaussian distribution) and classical tests (t-tests). Students will use these concepts to read, interpret, and evaluate educational and psychological research. (Formerly titled "Methods and Techniques of Inquiry I.")

EDP 6203. Research Methods and Statistics II. (3-0) 3 Credit Hours.

Building on concepts from Research Methods and Statistics I, this course covers specific experimental (true-experimental design, quasi-experimental design) and non-experimental research designs (ex-post facto research design.) Topics covered include correlation, regression, sampling error, various t-statistics, one-way analysis of variance (ANOVA) and factor analysis. Students will use these concepts to read, interpret, and evaluate educational and psychological research. (Formerly titled "Methods and Techniques of Inquiry II.")

EDP 6213. School Based Counseling Theories. (3-0) 3 Credit Hours.

Prerequisite: Admission to the School Psychology program. This course covers selected psychotherapeutic and counseling theories for the treatment of children and adolescents experiencing emotional and behavioral disorders/disruptions that interfere with learning. Topics include: behavioral approaches, cognitive-behavioral, choice theory, play-based and other related group and individual theoretically based therapies. Emphasis is placed on empirically-supported theory in relation to services within a school system framework.

EDP 6223. Research in Single Case Design. (3-0) 3 Credit Hours.

This course provides an overview of basic single-subject design methods and procedures. Topics include critical analysis of single subject research design, issues related to conducting and analyzing single subject research in applied settings, as well as institutional review process and ethical consideration. Students will use these concepts to read, interpret, evaluate, and conduct applied research.

EDP 6233. Mental Health Services in the Schools. (3-0) 3 Credit Hours.

Prerequisite: EDP 6213. 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.

EDP 6243. Cognitive Assessment and Intervention. (3-0) 3 Credit Hours.

Prerequisite: EDP 5303 or equivalent. Examines educational and clinical applications of individual assessment; specific diagnostic measures of intelligence and cognitive abilities; supervised instruction in administration, scoring, and interpretation; and using cognitive assessment results to inform intervention. Videotaping and direct observation of test administration is required for purposes of supervision and self-evaluation. (Formerly titled "Assessment of Intelligence and Achievement.") (Credit cannot be earned for both EDP 6243 and SPE 5533.)

EDP 6253. Academic Assessment and Intervention. (3-0) 3 Credit Hours.

Prerequisite: EDP 5303. Examines educational and clinical applications of individual achievement assessment within the context of response-to-intervention; specific diagnostic measures of academic skills, including curriculum-based assessment; supervised instruction in administration, scoring, and interpretation; and using academic assessment results to inform intervention. Videotaping and direct observation of test administration is required for purposes of supervision and self-evaluation.

EDP 6263. Behavioral Assessment and Intervention. (3-0) 3 Credit Hours.

Prerequisites: EDP 5003 and EDP 5303 or equivalent. Examines behavioral learning theory and operant conditioning principles; overview of behavioral assessment strategies with an emphasis on conducting interviews and direct observations of behaviors; functional behavior assessment and applied behavior analysis as systematic assessment-intervention approaches to behavior modification; and specific behavior intervention approaches for use with children and adolescents.

EDP 6293. Consultation in the Schools. (3-0) 3 Credit Hours.

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.

EDP 6343. Advanced Psychological Assessment. (3-0) 3 Credit Hours.

Prerequisites: EDP 5303, 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. (Formerly EDP 6323. Credit cannot be earned for both EDP 6323 and EDP 6343.) (The content of this course differs from that of COU 6323, Advanced Psychological Assessment, and the two courses are not equivalent.)

EDP 6403. Culturally Responsive Teaching and Collaboration. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403 and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge in relation to cultural changes experienced in schools. Additionally the course will provide students with an opportunity to gain insight on cultural diversity, characteristics of diverse students and family. (Same as SPE 6403. Credit cannot be earned for both SPE 6403 and EDP 6403.)

EDP 6423. Development of Girls and Women. (3-0) 3 Credit Hours.

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.).

EDP 6643. Child and Adolescent Psychopathology. (3-0) 3 Credit Hours.

Prerequisite: EDP 5033 or equivalent. 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.

EDP 6703. Clinical Neuropsychology. (3-0) 3 Credit Hours.

Prerequisites: EDP 5303, EDP 6243, and EDP 6833. 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.

EDP 6733. Multicultural Assessment and Intervention. (3-0) 3 Credit Hours.

Prerequisites: EDP 5303, EDP 6643, and EDP 6833. 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.

EDP 6833. Practicum in School Psychology. (0-0) 3 Credit Hours.

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.

EDP 6891. Field Experience in Behavioral Analysis. (0-0) 1 Credit Hour.

Supervised field-based applied research experience in approved school and clinic settings. Emphasis is on orientation to behavior analysis in applied settings, learning the role of a behavior consultant within larger systems, implementation and evaluation of behavioral interventions for students struggling with problem behaviors. May be repeated for up to 6 hours of credit.

EDP 6943. Internship in School Psychology. (0-0) 3 Credit Hours.

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.

EDP 6951. Independent Study. (0-0) 1 Credit Hour.

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.

EDP 6953. Independent Study. (0-0) 3 Credit Hours.

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.

EDP 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

EDP 6973. Special Issues. (3-0) 3 Credit Hours.

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.

EDP 6991. Independent Study in School Psychology Internship. (0-0) 1 Credit Hour.

Prerequisites: Concurrent enrollment in EDP 6943 and consent of instructor. Independent reading, research, and/or writing under the direction of a faculty member. This Independent Study is restricted to students currently enrolled in Internship in School Psychology, and may involve the detailed analysis of a critical problem, issue, or research question related to the professional practice of School Psychology. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the Master’s degree.

Department of Interdisciplinary Learning and Teaching

Mission Statement

The mission of the Department of Interdisciplinary Learning and Teaching is to:

- Advance the intellectual and professional development of students and faculty through research, critical reflection and dialogue, social responsibility, and transformative leadership;
- Promote equality and social justice by advocating for educational change and reform; and
- Nurture the personal and professional integrity of all learners.

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

- Master of Arts in Education (p. 120)
 - Curriculum and Instruction Concentration (p. 121)
 - Early Childhood and Elementary Education Concentration (p. 121)
 - Instructional Technology Concentration (p. 122)

- Literacy Education Concentration (p. 122)
- Special Education Concentration (p. 122)
- Teacher Certification Concentrations within the Master of Arts Degree in Education (p. 122)
- Doctor of Philosophy in Interdisciplinary Learning and Teaching (p. 123)

Master of Arts Degree in Education

- Curriculum and Instruction Concentration
- Early Childhood and Elementary Education Concentration
- Instructional Technology Concentration
- Literacy Education Concentration
- Special Education Concentration

The Master of Arts (M.A.) degree in Education offers the opportunity for advanced study and professional development programs in five fields of 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. International students must have a minimum score of 79 on the TOEFL Internet-based test, 550 on the TOEFL paper-based test, or 6.5 on the IELTS. Contact the Graduate Advisor of Record for the M.A. in Education for more information.

Degree Requirements

Education degrees have three 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	3
EDU 5003	Research Methods	3
ILT 5003	Principles of Interdisciplinary Learning and Teaching	3

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). At least 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 experience. The comprehensive experience for the Master of Arts in Education varies depending on the students' selected concentration. Students must contact the Graduate Advisor of Record or their academic advisor for further details.

Total Credit Hours **33-36**

Summary of Degree Options

Option I. Thesis option

A. Core:

C&I 5003	Theory of Curriculum and Instruction	3
ILT 5003	Principles of Interdisciplinary Learning and Teaching	3
EDU 5003	Research Methods	3

B. Concentration. At least 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

Enrollment in appropriate section of Master's Thesis course as determined by thesis advisor.

Total Credit Hours **33**

Option II. Nonthesis option

A. Core:

C&I 5003	Theory of Curriculum and Instruction	3
ILT 5003	Principles of Interdisciplinary Learning and Teaching	3
EDU 5003	Research Methods	3

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

6 hours of approved electives 6

Total Credit Hours **36**

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	3
C&I 5013	Curriculum, Instruction and Assessment	3
C&I 6103	Research in Action	3
C&I 6673	Policy and Critical Issues in Teaching	3
or C&I 7123	Critical Perspectives in Curriculum and Instruction	

Total Credit Hours **12**

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. Students should see the graduate advisor for information about this option. C&I 5003 Theory of Curriculum and Instruction is part of the general core required of all students in the M.A. in Education, and C&I 5013 Curriculum, Instruction and Assessment and C&I 6103 Research in Action are required for all students in the C&I concentration. In addition, students in the C&I concentration must take either C&I 6673 Policy and Critical Issues in Teaching or C&I 7123 Critical Perspectives in Curriculum and Instruction for fulfillment of the requirements in the C&I concentration. Students should see their faculty graduate advisor for information about teacher certification option.

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

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 (15 semester credit hours) include:

ECE 5133	Language and Discourse Development in Preschool–Primary Children	3
ECE 5503	Theoretical Foundations of Early Childhood and Elementary Education	3
ECE 6453	Assessment and Evaluation in Early Childhood and Elementary Education	3
ECE 6653	Action Research in Childhood Settings	3
ECE 6423	Advanced Studies in Play	3
Total Credit Hours		15

Master of Arts Degree in Education – Instructional Technology Concentration

The Instructional Technology concentration focuses on the theoretical foundations and applications of technology-supported and culturally-relevant learning environments in formal and informal settings for both EC-12 and adult populations. Emphasis is placed on the design, application, and evaluation of emergent technologies in 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	3
IST 5313	Development of Instructional Technology	3
IST 5343	Instructional Design Theory	3
IST 5703	Technology and Learning Cultures	3
Total Credit Hours		12

Students must take 12 hours of IST coursework to satisfy the support work requirement for the Master's degree. All coursework and course substitutions must be approved by the student's program advisor prior to registration.

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 within the language system and 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. Students planning to pursue the reading specialist certification area must apply and be accepted into this program. This area includes the five courses for Master Reading Teacher (MRT) endorsement. The writing and literature foci allow students to develop specialized knowledge in these areas.

Students interested in one of the five concentrations (including the reading specialist certificate or the Master Reading Teacher endorsement) should see an advisor for further instructions about the requirements for the Literacy Education concentration. Students must

meet with their academic advisor for a list of required core courses for this concentration.

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, to develop and apply skills for effective instructional practices in working with individuals with disabilities. The special education and related courses must be approved by the student's program advisor prior to enrolling in courses.

In addition to the core courses required for all students seeking the Master's degree, the following courses are required for this concentration area (15 semester credit hours):

SPE 5403	Survey of Special Education	3
SPE 5503	Applied Behavior Analysis for Classroom Teachers	3
SPE 5513	Curriculum and Instructional Applications for Children and Youth in Special Education	3
SPE 6403	Ethically and Culturally Responsive Teaching	3
SPE 6623	Seminar on Current and Critical Issues in Special Education	3

Total Credit Hours **15**

Certification Option

Students interested in seeking teacher certification in special education should see an advisor for further instructions about the requirements for this program.

Applied Behavior Analysis Option

Students interested in becoming eligible to take the Board Certified Behavior Analyst (BCBA) Examination should see an advisor for further instructions about the requirements for this program.

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
- 8–12 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.

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 educational 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 educational 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 culturally, linguistically, and economically diverse populations across the human lifespan; and,
3. Preparation of educational researchers 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 master's degree with a minimum of 33 semester credit hours (with thesis) or 36 semester credit hours (without thesis) in an education field, such as early childhood and elementary education, special education, curriculum, instructional technology, literacy education, or in an academic discipline, such as history, mathematics, the sciences, humanities, or fine arts;
2. An official master's degree transcript documenting a grade point average (GPA) of 3.25 or higher;
3. For applicants whose native language is not English, the 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 the IELTS. See general UTSA graduate admission guidelines in Chapter 1 of this catalog for further details;
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 statement of purpose which includes: (a) reason(s) for pursuing a doctorate in ILT; (b) a biographical overview of experiences related to education; (c) professional goals; and (d) scholarly and/or research interests;

6. Graduate Record Examination (GRE) test scores not older than five years;
7. A professional curriculum 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, 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. Students pursuing the Ph.D. in Interdisciplinary Learning and Teaching will be required to complete an on-campus residence taking at least 6 semester credit hours per semester or summer term for three consecutive semesters. For more information, refer to Doctoral Degree Regulations in Chapter 5 of this catalog.

A. Research Methods Courses:

ILR 7643	Advanced Application of Research on Interdisciplinary Learning and Teaching	3
ILT 7013	Overview of Research Design for Instructional Inquiry	3

6 semester credit hours of approved research methods courses selected from within the College of Education and Human Development (recommended: 3 hours of qualitative research methodology and 3 hours of quantitative research methodology).

B. Core Courses:

ILT 7003	Exploration of Interdisciplinary Learning and Teaching	3
ILT 7133	Socio-constructivist and Cognitivist Perspectives on Interdisciplinary Learning & Teaching	3
ILT 7143	Internship	3
ILT 7153	Critical Cultural Perspectives on Interdisciplinary Learning and Teaching	3
ILT 7633	Multiple Behavioral and Contextual Perspectives on Interdisciplinary Learning and Teaching	3
ILT 7733	Evaluation of Educational Research	3

C. Cognate Courses:

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:

ILT 7891	Doctoral Seminar in Interdisciplinary Learning and Teaching (required to be repeated a minimum of 3 credit hours)	3
ILT 7983	Doctoral Dissertation (required to be repeated a minimum of 9 credit hours)	9

Total Credit Hours **60**

Curriculum and Instruction (C&I) Courses

C&I 5003. Theory of Curriculum and Instruction. (3-0) 3 Credit Hours.

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.

C&I 5013. Curriculum, Instruction and Assessment. (3-0) 3 Credit Hours.

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.

C&I 5043. Classroom Management and Motivation. (3-0) 3 Credit Hours.

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.).

C&I 5523. Metacognitive Learning Principles. (3-0) 3 Credit Hours.

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. (Same as ECE 6753. Credit cannot be earned for both ECE 6753 and C&I 5523.).

C&I 5663. Topics in Curriculum and Instruction. (3-0) 3 Credit Hours.

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.

C&I 5703. Secondary School Curricula. (3-0) 3 Credit Hours.

A systematic analysis of secondary school curricula. A critical study of objectives, methods of organization, content, methods, and learning materials for youth.

C&I 5723. Integrating Reading and the Language Arts. (3-0) 3 Credit Hours.

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.

C&I 5743. Secondary Literacy Development, Diagnosis and Practicum. (3-0) 3 Credit Hours.

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.").

C&I 5753. Literature for Children. (3-0) 3 Credit Hours.

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

C&I 5763. Diagnosis and Practicum in Reading. (3-0) 3 Credit Hours.

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.

C&I 5793. Seminar in Reading Supervision. (3-0) 3 Credit Hours.

Prerequisites: C&I 5723, C&I 5763 and C&I 5823 or C&I 5743. 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.

C&I 5813. Adult Literacy. (3-0) 3 Credit Hours.

Examination of the acquisition and development of reading and writing in adult populations. Reviews research and issues relevant to the teaching of reading and writing to adults. (Same as ALT 5813. Credit cannot be earned for both ALT 5813 and C&I 5813.).

C&I 5823. Early Literacy Development, Diagnosis and Practicum. (3-0) 3 Credit Hours.

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.").

C&I 5833. Picture Books and the Practice of Literacy. (3-0) 3 Credit Hours.

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.

C&I 5843. Young Adult Literature. (3-0) 3 Credit Hours.

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.

C&I 5873. Critical Issues and Topics in Literacy Assessment. (3-0) 3 Credit Hours.

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.").

C&I 5933. Service-Learning. (3-0) 3 Credit Hours.

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.

C&I 6023. Supervision: Tools and Techniques. (3-0) 3 Credit Hours.

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.).

C&I 6033. Survey of Reading Research. (3-0) 3 Credit Hours.

Prerequisites: C&I 5723, C&I 5763, and EDU 5003. Registration with approval of instructor only; students must be in the final 12 hours of program to enroll. 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.).

C&I 6043. Survey of Writing Research. (3-0) 3 Credit Hours.

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.

C&I 6053. Instructional Supervision. (3-0) 3 Credit Hours.

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.

C&I 6063. Research in Subject Matter Fields. (3-0) 3 Credit Hours.

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; English Language Arts; Foreign Languages; Physical and Health Education; Interdisciplinary. May be repeated once for credit (for a total of 6 hours) when disciplines vary.

C&I 6073. Multiple Literacies Using Critical Perspectives. (3-0) 3 Credit Hours.

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 information 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.).

C&I 6103. Research in Action. (3-0) 3 Credit Hours.

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. (Credit cannot be earned for both C&I 6103 and ECE 6653.).

C&I 6133. Curriculum in International Contexts. (3-0) 3 Credit Hours.

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?.

C&I 6303. Advanced Methods in Subject-Matter Fields. (3-0) 3 Credit Hours.

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; Environmental Education. May be repeated for credit when disciplines vary.

C&I 6513. Grant Writing. (3-0) 3 Credit Hours.

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.

C&I 6603. Middle Grades Theory, Research and Practice. (3-0) 3 Credit Hours.

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.).

C&I 6613. Nature and Meaning of Science in Education. (3-0) 3 Credit Hours.

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.).

C&I 6623. Inquiry in Science Education. (3-0) 3 Credit Hours.

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.).

C&I 6633. Science for All? Equity and Agency in Science Education. (3-0) 3 Credit Hours.

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.)

C&I 6643. Middle Grades Policy and Critical Issues. (3-0) 3 Credit Hours.

Exploration of policy and examination of critical issues (e.g., funding, mandated assessments, parent involvement) affecting middle schools.

C&I 6653. History of Mathematics. (3-0) 3 Credit Hours.

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.

C&I 6673. Policy and Critical Issues in Teaching. (3-0) 3 Credit Hours.

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.)

C&I 6683. Theory, Research and Practice in Social Studies Education. (3-0) 3 Credit Hours.

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 have upon current social studies educational practices will be investigated.

C&I 6693. History, Policy and Critical Issues in Social Studies Education. (3-0) 3 Credit Hours.

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.

C&I 6733. Fundamentals of Environmental Education. (3-0) 3 Credit Hours.

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.

C&I 6773. Environmental Education in the Curriculum. (3-0) 3 Credit Hours.

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.

C&I 6783. Theory and Practice of Mathematics. (3-0) 3 Credit Hours.

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.

C&I 6803. San Antonio Writing Project Summer Institute. (3-0) 3 Credit Hours.

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.

C&I 6813. Advanced San Antonio Writing Project Summer Institute. (3-0) 3 Credit Hours.

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.

C&I 6923. Mentoring. (3-0) 3 Credit Hours.

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.)

C&I 6931. Curriculum and Instruction Practicum. (0-0) 1 Credit Hour.

An exploration of the teaching profession. Required field experience for all graduate-level teacher certification students.

C&I 6933. Curriculum and Instruction Practicum. (0-0) 3 Credit Hours.

An exploration of the teaching profession. Required field experience for all graduate-level teacher certification students.

C&I 6943. Instructional Internship in Teaching. (0-0) 3 Credit Hours.

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.

C&I 6946. Instructional Internship in Teaching. (0-0) 6 Credit Hours.

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.

C&I 6951. Independent Study. (0-0) 1 Credit Hour.

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 M.A. in Education degree.

C&I 6953. Independent Study. (0-0) 3 Credit Hours.

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 M.A. in Education degree.

C&I 6973. Special Problems. (3-0) 3 Credit Hours.

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 M.A. in Education degree.

C&I 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

C&I 7123. Critical Perspectives in Curriculum and Instruction. (3-0) 3 Credit Hours.

This course offers an examination of curriculum in intersection of power, identity, knowledge, and cultural politics. Critical theoretical frameworks introduced in this course include critical social theories, and postmodernism. Recommended cognate course for Curriculum and Instruction Ph.D. students. (Formerly C&I 6123. Credit cannot be earned for both C&I 6123 and C&I 7123.)

C&I 7403. Survey of Research in Literature for Children and Young Adults. (3-0) 3 Credit Hours.

This course surveys theory and research on literature for children and young adults and examines research on reader response and related classroom practices. (Formerly C&I 6403. Credit cannot be earned for both C&I 7403 and C&I 6403.)

C&I 7853. Cognitive Processes in Reading and Learning from Text. (3-0) 3 Credit Hours.

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 5853. Credit cannot be earned for both C&I 7853 and C&I 5853.)

C&I 7863. Russian Contributions to Literacy, Psychology and Learning. (3-0) 3 Credit Hours.

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. (Formerly C&I 5863. Credit cannot be earned for both C&I 7863 and C&I 5863.)

Early Childhood (ECE) Courses**ECE 5123. Seminar in Infancy and Toddler Development. (3-0) 3 Credit Hours.**

Prerequisite: EDP 5003 or consent of instructor. Examines the developmental milestones of infants and toddlers and the optimal environments needed for them to thrive. Identifies critical developmental issues related to early intervention. Discussion of appropriate instructional practice, observational assessment, and parental involvement.

ECE 5133. Language and Discourse Development in Preschool-Primary Children. (3-0) 3 Credit Hours.

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.

ECE 5443. Guidance of Social/Emotional Development in Children. (3-0) 3 Credit Hours.

Study of children's socioemotional development in early childhood and elementary settings. Emphasis on how development and learning influence social competence. Focus on how guidance can assist children in building positive relationships, positive sense of self, resiliency, peer relationships, self-discipline, and prosocial behaviors. (Formerly ECE 5453. Credit cannot be earned for both ECE 5443 and ECE 5453.)

ECE 5503. Theoretical Foundations of Early Childhood and Elementary Education. (3-0) 3 Credit Hours.

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.)

ECE 5513. Curriculum, Methods and Materials in Early Childhood and Elementary Education. (3-0) 3 Credit Hours.

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.

ECE 6123. Leadership and Administration of Early Childhood Programs. (3-0) 3 Credit Hours.

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.

ECE 6163. Biological Basis of Child Development: Brain Based Research and Learning. (3-0) 3 Credit Hours.

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.

ECE 6183. Seminar in Early Childhood Education in Cross-Cultural Perspective. (3-0) 3 Credit Hours.

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.

ECE 6213. Current Issues in Early Childhood and Elementary Education. (3-0) 3 Credit Hours.

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.

ECE 6303. Advanced Methods in Early Childhood and Elementary Education. (3-0) 3 Credit Hours.

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; Nutrition and Health. May be repeated for credit when curriculum areas vary.

ECE 6363. Differentiated Instruction in a Diverse Classroom. (3-0) 3 Credit Hours.

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.)

ECE 6423. Advanced Studies in Play. (3-0) 3 Credit Hours.

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.

ECE 6453. Assessment and Evaluation in Early Childhood and Elementary Education. (3-0) 3 Credit Hours.

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.

ECE 6473. Seminar in Early Childhood and Elementary Education Research. (3-0) 3 Credit Hours.

Examination of research topics in early childhood and elementary education, including an extensive study of methodology, research findings, and publications applied to early childhood and elementary programs.

ECE 6523. Social Policy for Families and Children. (3-0) 3 Credit Hours.

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.

ECE 6653. Action Research in Childhood Settings. (3-0) 3 Credit Hours.

Prerequisite: EDU 5003. This is a capstone course restricted to students in their last semester of the program. Advisor code required. 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. Credit cannot be earned for both ECE 6653 and C&I 6103.)

ECE 6723. Integrating Technology and Multimodal Digital Literacies Across the Early Childhood Elementary Curriculum. (3-0) 3 Credit Hours.

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.

ECE 6753. Metacognitive Thinking and Learning Strategies in Childhood Settings. (3-0) 3 Credit Hours.

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.)

ECE 6943. Instructional Internship in Teaching. (0-0) 3 Credit Hours.

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.

ECE 6946. Instructional Internship in Teaching. (0-0) 6 Credit Hours.

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.

ECE 6951. Independent Study. (0-0) 1 Credit Hour.

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 M.A. in Education degree.

ECE 6953. Independent Study. (0-0) 3 Credit Hours.

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 M.A. in Education degree.

ECE 6973. Special Problems. (3-0) 3 Credit Hours.

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 M.A. in Education degree.

ECE 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

ECE 7123. Cognitive Development in Early Childhood. (3-0) 3 Credit Hours.

Theories and research of cognitive and intellectual development in early childhood within sociocultural contexts. Implications for early childhood programs, environments, learning and teaching.

Instructional Leadership (ILR) Courses**ILR 7133. Introduction to Single-case Methodology. (3-0) 3 Credit Hours.**

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.

ILR 7143. Application of Single-case Methodology. (3-0) 3 Credit Hours.

Prerequisite: ILR 7133. This advanced 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. (Same as SPE 7143. Credit cannot be earned for both ILR 7143 and SPE 7143.)

ILR 7203. Leadership in Curriculum Development. (3-0) 3 Credit Hours.

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.

ILR 7643. Advanced Application of Research on Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.

Prerequisite: Completion of, or concurrent enrollment in, ILT 7733 or consent of instructor. Design and development of interdisciplinary research studies including appropriate data collection and analysis methods. Participants conduct directed educational research.

ILR 7873. Survey Research Methods. (3-0) 3 Credit Hours.

Prerequisite: Introductory statistics 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.

ILR 7893. Directed Doctoral Research. (0-0) 3 Credit Hours.

Supervised research on a topic in Interdisciplinary Learning and Teaching. May be repeated for credit, but no more than 6 hours may be applied to the Doctoral degree.

Instructional Technology (IST) Courses**IST 5003. Foundations of Instructional Technology. (3-0) 3 Credit Hours.**

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.

IST 5313. Development of Instructional Technology. (3-0) 3 Credit Hours.

This course provides an overview of instructional technology development tools and opportunities to evaluate current trends in learning environments. Students will have opportunities to gain both theoretical and practical knowledge of these technologies.

IST 5323. Learner-Centered Design. (3-0) 3 Credit Hours.

Prerequisite: IST 5003 or consent of instructor. This course provides an overview of learner-centered theories, design, and tools. Course content and activities provide opportunities to develop an understanding of the history, frameworks, philosophy, tools, and technologies that support learner-centered practices.

IST 5343. Instructional Design Theory. (3-0) 3 Credit Hours.

Prerequisite: IST 5003 or consent of instructor. An investigation of theories, principles, and processes of instructional and digital learning design including their application to instructional product and curriculum development. (Same as EDP 5343. Credit cannot be earned for both IST 5343 and EDP 5343. EDP 5343 may not be substituted for IST 5343 in the M.A. in Education Instructional Technology Concentration.)

IST 5363. Distance Learning and Teaching. (3-0) 3 Credit Hours.

Examination of the application of tools, resources, and strategies to support, deliver, and enhance technology-supported curriculum. Students actively participate in online activities as they engage in design.

IST 5383. Instructional Technology for Training and Professional Development. (3-0) 3 Credit Hours.

Prerequisite: IST 5343 or consent of instructor. The dynamic nature of technology development and innovation requires strategies to ensure that professional populations are well prepared. Activities in this course include a review of models of training and professional development in adult educational settings, design and development of technology-supported training and professional development using industry-standard tools, and evaluation.

IST 5703. Technology and Learning Cultures. (3-0) 3 Credit Hours.

Prerequisite: IST 5003 or consent of instructor. An examination of technology-delivered and -mediated instruction as it interacts with the learners' views of the world and themselves. This course provides opportunities to explore the implications of culture and community on the design, delivery, and evaluation of instruction.

IST 5883. Digital Storytelling and Learning. (3-0) 3 Credit Hours.

Digital storytelling is a multimodal narrative practice through which people create and share cultural artifacts by combining textual and audiovisual components. It offers opportunities for documentation, self-reflection, expression, communication, and case-based reasoning. This course explores approaches, tools, and techniques to effectively integrate it in learning settings. (Formerly C&I 5883. Credit cannot be earned for both IST 5883 and C&I 5883.).

IST 6103. Virtual Learning and Teaching. (3-0) 3 Credit Hours.

Prerequisite: IST 5003 or consent of instructor. Virtual and augmented reality provide opportunities to learn through active participation in designed environments. This course explores instructional applications across formal and informal educational settings.

IST 6353. Multimedia Design and Development. (3-0) 3 Credit Hours.

Prerequisite: IST 5313 or consent of instructor. This course explores the development of multimodal and interactive materials and resources and covers issues relating to usability, interactivity, accessibility, and aesthetics.. Course activities include the use of specific technologies to develop multimedia/new media artifacts for learning.

IST 6373. Games and Learning. (3-0) 3 Credit Hours.

This course investigates games as a learning technology. Learners will review, design, and evaluate 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.

IST 6513. Emergent Technologies in Education. (3-0) 3 Credit Hours.

Prerequisite: IST 5003 or consent of instructor. This course explores emergent technologies in terms of functional and pedagogical frameworks of use. Students will complete theoretical and practical application tasks.

IST 6613. Media, Literacy, and Education. (3-0) 3 Credit Hours.

Media literacy is the ability to critically analyze, evaluate, understand, produce, and share media. It is a set of skills and habits necessary for an informed and responsible participation in society. This course provides an overview of research and educational perspectives on media literacy examining topics such as ideology, propaganda, censorship, bias, and stereotyping.

IST 6623. New Literacies and Youth Cultures. (3-0) 3 Credit Hours.

New literacies involve new ways of being, doing, and participating through practices such as multimodality, transmedia, and remixing. Youth cultures are personal and social domains in which people express, reinterpret, and share their interests, often through the use of digital technologies. This course provides an overview of new literacies and youth cultures, and their relationships, offering theoretical and practical approaches to leverage them in educational settings.

IST 6943. Internship. (0-0) 3 Credit Hours.

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 technology-mediated learning experiences. (Credit cannot be earned for both IST 6943 and other internships.).

IST 6951. Independent Study. (0-0) 1 Credit Hour.

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 M.A. in Education degree.

IST 6953. Independent Study. (0-0) 3 Credit Hours.

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 M.A. in Education degree.

IST 6973. Special Problems. (3-0) 3 Credit Hours.

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 M.A. in Education degree.

IST 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

IST 7003. Proseminar in Instructional Technology. (3-0) 3 Credit Hours.

This course is intended to provide 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.

IST 7013. Field Research in Instructional Technology. (3-0) 3 Credit Hours.

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.

IST 7023. Design and Development of Learning Environments. (3-0) 3 Credit Hours.

Students will design, develop, pilot, and evaluate a learning environment using the theories and practices of instructional technology.

IST 7033. Current Research in Instructional Technology. (3-0) 3 Credit Hours.

Focused exploration of current research in the field of instructional technology. Students will have opportunities to deeply engage with current research across a variety of active research fields.

IST 7043. Technology and Global Learning. (3-0) 3 Credit Hours.

Structured exploration of the conditions, platforms, and implications of technology-supported learning in culturally and linguistically diverse contexts.

IST 7053. Evaluation in Instructional Design. (3-0) 3 Credit Hours.

An overview of evaluation models, procedures, tools, and philosophies as they apply to applications of technology in education.

Interdisciplinary Learning and Teaching (ILT) Courses**ILT 5003. Principles of Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.**

This course emphasizes fundamental theories for interdisciplinary learning and teaching. A focus is given to issues of social justice and equity, students as diverse learners, student motivation, and meta-cognitive processes associated with student learning and its relation to teaching.

ILT 6951. Independent Study. (0-0) 1 Credit Hour.

Prerequisites: Approval 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.

ILT 6953. Independent Study. (0-0) 3 Credit Hours.

Prerequisites: Approval 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.

ILT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

ILT 7003. Exploration of Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.

This course introduces students to the history and theoretical underpinnings of interdisciplinarity and interdisciplinary studies in education. Through group and individual examination of interdisciplinary issues, topics and problems, students will engage in scholarly literature study and research practice.

ILT 7013. Overview of Research Design for Instructional Inquiry. (3-0) 3 Credit Hours.

Prerequisite: Research methods or statistics course. Overview of research design for quantitative, qualitative, and mixed-methods studies in Interdisciplinary Learning and Teaching. The emphasis of this course includes the situatedness of interdisciplinary research and the design of a research study positioned within an appropriate theoretical frame.

ILT 7023. Doctoral Seminar in Literacy. (3-0) 3 Credit Hours.

An organized course in the examination of critical issues in literacy. May be repeated for credit when topics vary.

ILT 7133. Socio-constructivist and Cognitivist Perspectives on Interdisciplinary Learning & Teaching. (3-0) 3 Credit Hours.

This course focuses on the historical roots, theories, and impact of socio-constructivist, sociocultural and cognitivist philosophies on teaching and learning. (Formerly titled "Perspectives and Approaches to Interdisciplinary Learning & Teaching.").

ILT 7143. Internship. (0-0) 3 Credit Hours.

Students, with their advisor's recommendation, will complete an internship in which they collaborate and apprentice with departmental and college faculty on teaching. May be repeated for credit.

ILT 7153. Critical Cultural Perspectives on Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.

This course focuses on the historical roots and theories of critical, cultural and postmodernist philosophies and their impact on teaching and learning. (Formerly titled "Interdisciplinary Learning and Teaching in Sociocultural Contexts.").

ILT 7203. Applications of Qualitative Interdisciplinary Research Methods. (3-3) 3 Credit Hours.

This course provides multiple opportunities to deepen understanding of qualitative research methods on such topics as grounded theory, phenomenological study, case study, content analysis and document analysis in Interdisciplinary Learning and Teaching. The course examines various design elements of qualitative research including sampling, data collection and data analysis from various theoretical frameworks. Specific attention will focus on the development of observation, interview skills, focus groups, and recording of data as well as the political and ethical issues in qualitative research. May be repeated for credit when topics vary.

ILT 7213. Quantitative Analysis and Research Design in Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.

This course examines the design decisions researchers make when conducting experimental, quasi-experimental, and correlational studies in learning and teaching settings. Topics include: design considerations in interdisciplinary educational research, ensuring the validity of causal inferences, calculating and graphically depicting descriptive statistics, the conceptual basis of inferential statistics and hypothesis testing, analytical approaches for comparing data across groups, and introduction to multiple regression analysis. Students practice interpreting and reporting statistical findings in academic writing.

ILT 7303. Oral and Written Discourse Analysis. (3-0) 3 Credit Hours.

This course examines methods for analysis of oral and written discourse. Students will focus on authentic samples of discourse including family communications, teacher-student and peer interaction, other institutional or community, workplace, and everyday discourse with the goal of understanding life-long learning. (Formerly C&I 6823. Credit cannot be earned for both C&I 6823 and ILT 7303.)

ILT 7633. Multiple Behavioral and Contextual Perspectives on Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.

This course focuses on the historical roots and theories of behavior analysis and functional contextualization and their impact on teaching and learning. (Formerly titled "Multiple Perspectives on Learning and Teaching.").

ILT 7733. Evaluation of Educational Research. (3-0) 3 Credit Hours.

Prerequisites: ILT 7013, ILT 7203 or a qualitative course, and ILT 7213 or a quantitative course. This course offers students multiple opportunities to explore and analyze common practices in educational research. Students will take a critical look at strengths and challenges 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.

ILT 7743. Mixed Methods Analysis and Application. (3-0) 3 Credit Hours.

Course focuses on conceptualizing mixed methods research, developing a mixed method design, and conducting data analysis and inferences using mixed methods. Takes into account historical and epistemological antecedents leading to the development of mixed methods research. Includes an examination of mixed method studies pertinent to the field of interdisciplinary learning and teaching.

ILT 7891. Doctoral Seminar in Interdisciplinary Learning and Teaching. (1-0) 1 Credit Hour.

This seminar is designed as a general seminar for all ILT doctoral students to be taken three times across the doctoral program. The seminar will: (1) introduce students to the doctoral community and resources that support doctoral work; (2) provide students with an overview of the requirements for completing the doctoral proposal and dissertation and serve as a forum for discussing proposal and dissertation-related concerns and issues with other students; and (3) prepare students to participate in professional networks beyond the university. May be repeated for credit, but no more than 3 hours will count toward student's program of study.

ILT 7893. Doctoral Seminar in Interdisciplinary Learning and Teaching. (3-0) 3 Credit Hours.

This seminar is designed as a general seminar for all ILT doctoral students to be taken three times across the doctoral program. The seminar will: (1) introduce students to the doctoral community and resources that support doctoral work; (2) provide students with an overview of the requirements for completing the doctoral proposal and dissertation and serve as a forum for discussing proposal and dissertation-related concerns and issues with other students; and (3) prepare students to participate in professional networks beyond the university. May be repeated for credit, but no more than 3 hours will count toward student's program of study.

ILT 7951. Independent Study. (0-0) 1 Credit Hour.

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. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Doctoral degree.

ILT 7953. Independent Study. (0-0) 3 Credit Hours.

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. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Doctoral degree.

ILT 7961. Qualifying Examination. (0-0) 1 Credit Hour.

Prerequisite: Approval of the appropriate Graduate Program Committee to take the Qualifying Examination. Course for the purpose of taking the Qualifying Examination. May be repeated once as approved by the Graduate Program Committee. The grade report for the course is either "CR" (satisfactory performance on the Qualifying Examination) or "NC" (unsatisfactory performance on the Qualifying Examination).

ILT 7973. Special Topics Seminar. (3-0) 3 Credit Hours.

An organized special topics seminar 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 will apply to the Doctoral degree.

ILT 7981. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

ILT 7983. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

ILT 7986. Doctoral Dissertation. (0-0) 6 Credit Hours.

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.

Special Education (SPE) Courses**SPE 5403. Survey of Special Education. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This course will provide students with the opportunity to acquire knowledge in the field of special education including characteristics, etiology, definition, and prevalence of disabilities. Students will also have the opportunity to study effective strategies for use with individuals with disabilities. (Formerly titled "Exceptional Children and Youth in the Schools.").

SPE 5491. Field Experience in Behavioral Analysis. (1-0) 1 Credit Hour.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to participate in supervised field-based applied research experiences in approved school and clinical settings. Emphasis is on orientation to behavior analysis in applied settings, learning the role of a behavior consultant within larger systems, implementation and evaluation of behavioral interventions for students struggling with problem behaviors. May be repeated for up to 6 hours of credit.

SPE 5503. Applied Behavior Analysis for Classroom Teachers. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about principles and procedures of applied behavior analysis and classroom management for teachers. As an introductory course to behavior analysis, special attention will be paid to philosophy, terminology, and methods. In addition, ethical considerations for those delivering behavior analytic services will be discussed. Assessments will be modeled after the BCBA certification exam. Requires an applied project. (Formerly EDP 5423. Same as EDP 5503. Credit cannot be earned for more than one of the following: EDP 5423, EDP 5503, or SPE 5503.)

SPE 5513. Curriculum and Instructional Applications for Children and Youth in Special Education. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide the opportunity for students 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.

SPE 5523. Language Development and Intervention for Individuals with Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide an opportunity for students to acquire knowledge and skills for assisting individuals with mild to moderate disabilities in achieving 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.

SPE 5533. Assessment and Evaluation of Children and Youth with Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students the opportunity to develop knowledge and skills in the selection, administration, and interpretation of instruments and procedures to evaluate individuals with disabilities and design, modify, and monitor instruction for individuals with disabilities. (Same as EDP 6243. Credit cannot be earned for both SPE 5533 and EDP 6243.)

SPE 5613. Legal Issues in Special Education. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge related to the historical and legal issues of special education. Through an in-depth study of state and federal laws, students will have the opportunity to engage in activities that examine the ethical implications of special education.

SPE 5633. Instruction and Educational Interventions for Individuals with Mild/Moderate Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about evidenced-based instructional practices for teaching individuals with mild/moderate intellectual disabilities. Students will have the opportunity to learn to design appropriate instructional interventions, how to apply those interventions, and to make decisions based on student data to inform future instructional practices.

SPE 5643. Instruction and Educational Interventions for Individuals with Moderate/Severe Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about evidenced-based instructional practices for teaching individuals with moderate/severe intellectual disabilities. Students will have the opportunity to learn to design appropriate instructional interventions, how to apply those interventions, and make decisions based on student data to inform future instructional practices.

SPE 5793. Practicum in Special Education: Children and Youth with Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide the students with the opportunity to acquire knowledge about the application of theoretical principles to field settings. Students are required to develop, implement, and evaluate educational programs for individuals with disabilities.

SPE 5893. Practicum in Special Education: Individuals with Behavior Problems. (0-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about the application of theoretical principles to field settings. The student works in educational settings to plan, implement, and evaluate appropriate experiences with individuals exhibiting emotional and/or behavior problems.

SPE 6133. Introduction to Single-Subject Methodology. (3-0) 3 Credit Hours.

Prerequisites: Doctoral standing and SPE 5503 or approval of 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. (Same as ILR 7133. Formerly SPE 7133. Credit cannot be earned for both SPE 6133 and SPE 7133 or ILR 7133.)

SPE 6143. Application of Single-Subject Methodology. (3-0) 3 Credit Hours.

Prerequisites: Doctoral standing and SPE 6133 or ILR 7133. This advanced 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. (Formerly SPE 7143. Same as ILR 7143. Credit cannot be earned for both SPE 6143 and SPE 7143 or ILR 7143.)

SPE 6403. Ethically and Culturally Responsive Teaching. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403 and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge in relation to cultural changes experienced in schools. Additionally the course will provide students with an opportunity to gain insight on cultural diversity, characteristics of diverse students and family.

SPE 6443. Conference and Consultative Skills in Special Education. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. Course will provide students with the opportunity to acquire knowledge and skills working with parents, teachers and other professionals to optimize the educational experiences of individuals with disabilities. Students plan, implement, and evaluate conferences, staff development, and consultative activities. Requires 5–10 hours of field experience. (Formerly SPE 5443. Credit cannot be earned for both SPE 5443 and SPE 6443.)

SPE 6503. Educational Applications of Applied Behavior Analysis. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity for advanced instruction in educational applications of behavior analysis, including assessment and treatment of problem behavior and learning strategies. Advanced assessment and treatment techniques will be taught to students to further develop their understanding of behavior analysis and its application to clinical and classroom settings. The creation of functional behavior assessments, behavior intervention plans, and their use in classroom management systems will be taught.

SPE 6623. Seminar on Current and Critical Issues in Special Education. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. This course will provide students with the opportunity to examine critical issues in special education, including a study of research-supported practices, controversial issues, and critical topics in special education. A research project is required. (Formerly SPE 5623. Credit cannot be earned for both SPE 5623 and SPE 6623.).

SPE 6943. Technology for Individuals with Disabilities. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or consent of instructor. This course will provide students with the opportunity to acquire knowledge about 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 technology is addressed especially as it relates to individuals with disabilities.

SPE 6951. Independent Study. (0-0) 1 Credit Hour.

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 M.A. in Education degree.

SPE 6953. Independent Study. (0-0) 3 Credit Hours.

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 M.A. in Education degree.

SPE 6973. Special Problems. (3-0) 3 Credit Hours.

Prerequisites: SPE 5403, SPE 5503, SPE 5513, SPE 6403, and SPE 6623 or 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 M.A. in Education degree.

SPE 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

SPE 7003. Doctoral Seminar in Special Education. (3-0) 3 Credit Hours.

Prerequisites: Doctoral standing and consent of instructor. This course will provide students with the opportunity to develop a professional orientation for a career, initiate a career planning process, discuss fundamental concepts underlying special education teacher preparation, and begin to acquire a platform of scholarly writing skills and resources.

Department of Kinesiology, Health, and Nutrition

Department of Kinesiology, Health, and Nutrition offers the Master of Science degree in Health and Kinesiology and the Master of Dietetics Studies.

- Master of Science degree in Health and Kinesiology (p. 134)
- Master of Dietetics Studies (p. 135)

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 other universities at the doctoral level.

There are three specializations (Health, Exercise Science, and Sport Pedagogy) each with a thesis (33 credit hours) or non-thesis (36 credit hours) option.

- The Health 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 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.
3. 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.

- Applicants whose native language is not English must have a score of at least 550 on the paper-based Test of English as a Foreign Language (TOEFL) or 79 on the Internet-based TOEFL or a score of 6.5 on the IELTS.
- Applicants whose undergraduate major was not in Kinesiology or Health may be required to take 6 semester credit hours of undergraduate leveling courses.
- Applicants are required to submit two professional references to the Graduate Committee.
- A professional résumé and Statement of Purpose are required of all applicants. The Statement of Purpose cannot be longer than one single-spaced, typed page and must list the interest of specialization.
- Students who are admitted with leveling courses must take the following undergraduate courses: HTH 3503 Theories of Health Behavior Theories of Health Behavior (Health Specialization) or KIN 2303 Foundations of Kinesiology Cultural and Scientific Foundations (Exercise Science and Sport Pedagogy Specializations), and one additional course at the discretion of the student's faculty advisor.

Degree Requirements

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

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

A. Core Courses. 6 semester credit hours required:

KAH 5093	Statistics and Research in Health and Kinesiology	3
KAH 5123	Research in Health and Kinesiology	3

B. Specialization Courses. Select one of the following specializations: 12 Health 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 Specialization:

KAH 5173	Measurement and Evaluation in Physical Education
KAH 5243	Learning and Teaching Styles in Physical Education
KAH 6033	Sport Psychology
KAH 6213	Motor Development

C. Prescribed KAH Electives. Select 9 semester credit hours of the following courses: 9

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 5133	Health Program Planning, Implementation, and Evaluation
KAH 5173	Measurement and Evaluation in Physical Education
KAH 5243	Learning and Teaching Styles in Physical Education
KAH 5303	Community Health
KAH 5403	Cardiovascular Fitness
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 6961	Comprehensive Examination
KAH 6973	Special Problems
KAH 6983	Master's Thesis (for thesis option only)

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

E. Students must successfully pass a comprehensive examination

Total Credit Hours **36**

Master of Dietetics Studies

The Master of Dietetics Studies is an advanced professional degree which together with the Bachelor of Science in Nutrition and Dietetics is known as the Coordinated Program in Dietetics (CPD). Students who successfully complete the dual degree within the CPD receive a verification statement that certifies their eligibility to take the Commission on Dietetics Registration national examination to become a Registered Dietitian (RD). The graduate level coursework and advanced practicum are designed to meet knowledge and competencies to practice as an entry-level practitioner in nutrition and dietetics.

Students in the Master of Dietetics Studies (MDS) will be enrolled in a non-thesis option with an emphasis in Health Promotion and Disease Prevention and Treatment.

Program Admission Requirements

Admission to the program is based on the following criteria:

- Students who have been admitted into the UTSA Coordinated Program in Dietetics as undergraduate students are guaranteed acceptance into the Master of Dietetics Studies program if they have maintained a grade point average (GPA) of at least 3.0 (on a 4.0 scale) in their coursework.
- Students from other institutions will be considered for the Master of Dietetics Studies if openings are available in the Coordinated Program in Dietetics. The number of students in the program is determined by the number approved through the accreditation

process and the number of placement available for the advanced practicum. These applicants must meet all the requirements described below:

- a. Applicants must have a verification statement from an accredited Didactic Program in Dietetics (DPD) or an equivalent baccalaureate degree in nutrition and dietetics from a regionally accredited college or university in the United States or have proof of equivalent training at a foreign institution.
- b. Applicants whose undergraduate major is not in nutrition and dietetics must have taken all prerequisite courses described under the Nutrition and Dietetics Program in the undergraduate catalog. In addition applicants must have completed all or equivalent undergraduate courses in dietetics and nutrition to meet core knowledge and competencies mandated by the accreditation. All coursework must have been passed with a grade of "C" or better.
- c. Acceptance to the MDS program is contingent on having a GPA of at least 3.0 (on a 4.0 scale) in all the undergraduate coursework, as well as in any graduate-level courses previously taken.
- d. Foreign educated students must submit official transcripts as well as a course-by-course evaluation by an approved credentialing organization.
- e. Applicants whose native language is not English must have a score of at least 550 on the paper-based Test of English as a Foreign Language (TOEFL) or 79 on the Internet-based TOEFL or a score of 6.5 on the IELTS.
- f. Applicants are required to submit a program application along with statement of interest and two faculty references (use standard program form) to the Admission Committee.
- g. Personal interview with the admission committee.

Degree Requirements

Non-thesis option: Minimum of 30 semester credit hours including 28 hours of the core courses, and 2-3 hours of free electives.

A. Core Courses (28 semester credit hours):

NDT 5313	Public Health Nutrition and Policy	3
NDT 5323	Nutrition Pathophysiology	3
NDT 5333	Nutritional Supplements and Functional Foods	3
NDT 5343	Integration of Metabolism	3
NDT 5947	Advanced Dietetics Practicum I	7
NDT 5957	Advanced Dietetics Practicum II	7
NDT 5901	Seminar in Dietetics	1
NDT 5911	Research Seminar	1

Students must successfully pass a comprehensive examination under the capstone course NDT 5901 Seminar in Dietetics

B. Graduate Free Elective (2-3 semester credit hours): ¹ 2-3

NDT 5851	Independent Study	
KAH 5063	Health Behaviors	
KAH 5073	Essential Concepts in Health Promotion	
KAH 6063	Obesity and Health	
KAH 6223	Exercise Nutrition	

Total Credit Hours

30-31

¹ Other courses under KAH with the approval of the graduate advisor.

Kinesiology and Health (KAH) Courses

KAH 5003. Current Trends in Kinesiology and Health Education. (3-0) 3 Credit Hours.

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.

KAH 5043. Child and Adolescent Health Promotion. (3-0) 3 Credit Hours.

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.

KAH 5053. Principles of Exercise Physiology. (3-0) 3 Credit Hours.

Prerequisite: KIN 3433 or an equivalent. A survey of exercise physiology, examining muscular, metabolic and cardiorespiratory adaptations to acute and chronic exercise.

KAH 5063. Health Behaviors. (3-0) 3 Credit Hours.

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.

KAH 5073. Essential Concepts in Health Promotion. (3-0) 3 Credit Hours.

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.").

KAH 5083. Epidemiology. (3-0) 3 Credit Hours.

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.

KAH 5093. Statistics and Research in Health and Kinesiology. (3-0) 3 Credit Hours.

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.

KAH 5103. Biomechanics. (3-0) 3 Credit Hours.

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.

KAH 5123. Research in Health and Kinesiology. (3-0) 3 Credit Hours.

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.

KAH 5133. Health Program Planning, Implementation, and Evaluation. (3-0) 3 Credit Hours.

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. (Credit cannot be earned for both KAH 5133 and PSY 7213.).

KAH 5173. Measurement and Evaluation in Physical Education. (3-0) 3 Credit Hours.

Prerequisite: KIN 4113 or an equivalent. Overview of measurement theory, item analysis, reliability and validity studies, and factor analysis of tests.

KAH 5243. Learning and Teaching Styles in Physical Education. (3-3) 3 Credit Hours.

Prerequisite: KAH 5003. Techniques for analyzing and enhancing the learning environment to promote and improve physical and sport performance.

KAH 5303. Community Health. (3-0) 3 Credit Hours.

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.

KAH 5403. Cardiovascular Fitness. (3-0) 3 Credit Hours.

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.

KAH 6013. The Role of Sport in Society. (3-0) 3 Credit Hours.

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.).

KAH 6023. Exercise Psychology. (3-0) 3 Credit Hours.

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.).

KAH 6033. Sport Psychology. (3-0) 3 Credit Hours.

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.).

KAH 6043. Applied Sport Psychology. (3-0) 3 Credit Hours.

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.).

KAH 6053. Nutrition in Health and Disease. (3-0) 3 Credit Hours.

Study of basic nutrients, nutritional needs at various stages of life, and therapeutic diets for selected disease states.

KAH 6063. Obesity and Health. (3-0) 3 Credit Hours.

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.

KAH 6203. Psychological Perspectives of Motor Learning and Control. (3-0) 3 Credit Hours.

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.).

KAH 6213. Motor Development. (3-0) 3 Credit Hours.

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.

KAH 6223. Exercise Nutrition. (3-0) 3 Credit Hours.

A scientific evidence-based study of the nutritional aspects of exercise performance and health-related fitness. This course will focus on nutrition-related support of various modes, training, and competition, as well as nutritionally-relevant diseases. Included in the course is an examination of macronutrients, water/hydration, ergogenic aids, and supplements.

KAH 6953. Independent Study. (0-0) 3 Credit Hours.

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.

KAH 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

KAH 6973. Special Problems. (3-0) 3 Credit Hours.

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.

KAH 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

KAH 7893. Doctoral Research. (0-0) 3 Credit Hours.

Prerequisites: Doctoral student standing; consent of the instructor and of the Graduate Advisor of Record. Under the direction of a faculty advisor, this course consists of independent and original research skill building, preparation and writing of dissertation proposal. May be repeated for a maximum of 30 credit hours.

KAH 7991. Doctoral Dissertation. (0-0) 1 Credit Hour.

Prerequisites: Admission to candidacy and consent of student's faculty advisor. This course consists of independent and original research skill building under the direction of a faculty advisor. May be repeated for credit, but not more than 10 hours may be applied toward the Doctoral degree.

KAH 7993. Doctoral Dissertation. (0-0) 3 Credit Hours.

Prerequisites: Admission to candidacy and consent of student's faculty advisor. Must be a Ph.D. candidate. Preparation, writing, and successful defense of Doctoral dissertation. May be repeated for credit, but not more than 18 hours may be applied toward the Doctoral degree.

Nutrition and Dietetics (NDT) Courses**NDT 5313. Public Health Nutrition and Policy. (3-0) 3 Credit Hours.**

Concepts in nutritional epidemiology and public policy; and community-based interventions, resources, and research.

NDT 5323. Nutrition Pathophysiology. (3-0) 3 Credit Hours.

Prerequisites: Human physiology and advanced nutrition. Concepts related to nutrigenomics, immunology, pharmacology, fluid and electrolyte balance, acid-based balance, response to injury, complex diseases, and metabolic aberrations.

NDT 5333. Nutritional Supplements and Functional Foods. (3-0) 3 Credit Hours.

Fundamentals of complementary and alternative medicines, nutritional supplement, ergogenics, herbs, and functional foods; and issues related to their use in health and physical performance.

NDT 5343. Integration of Metabolism. (3-0) 3 Credit Hours.

Prerequisite: NDT 3413 or equivalent course. An in-depth study of the metabolism of nutrients, energy utilization at the cellular level, and role of coenzymes and cofactors.

NDT 5851. Independent Study. (0-0) 1 Credit Hour.

Independent reading, research, discussion, project, and/or writing under the guidance of a faculty member. May be repeated for credit, but not more than 6 semester credit hours, regardless of discipline, will apply to a master's degree.

NDT 5852. Independent Study. (0-0) 2 Credit Hours.

Independent reading, research, discussion, project, and/or writing under the guidance of a faculty member. May be repeated for credit, but not more than 6 semester credit hours, regardless of discipline, will apply to a master's degree.

NDT 5853. Independent Study. (0-0) 3 Credit Hours.

Independent reading, research, discussion, project, and/or writing under the guidance of a faculty member. May be repeated for credit, but not more than 6 semester credit hours, regardless of discipline, will apply to a master's degree.

NDT 5901. Seminar in Dietetics. (1-0) 1 Credit Hour.

Prerequisites: Concurrent enrollment in NDT 5957; must be in good academic standing. Capstone course. An in-depth analysis of mastery of knowledge and skills required for entry-level practice. Successful completion includes standardized testing and approval of a professional portfolio by program faculty. To be taken during the last semester of the Coordinated Program.

NDT 5911. Research Seminar. (1-0) 1 Credit Hour.

Discussion of current research topics, use of databases, and evaluation of research articles. May be repeated for credit.

NDT 5941. Advanced Dietetics Practicum I. (0-0) 1 Credit Hour.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5942. Advanced Dietetics Practicum I. (0-0) 2 Credit Hours.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5943. Advanced Dietetics Practicum I. (0-0) 3 Credit Hours.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5944. Advanced Dietetics Practicum I. (0-0) 4 Credit Hours.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5945. Advanced Dietetics Practicum I. (0-0) 5 Credit Hours.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5946. Advanced Dietetics Practicum I. (0-0) 6 Credit Hours.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5947. Advanced Dietetics Practicum I. (0-0) 7 Credit Hours.

Prerequisites: Successful completion of all dietetics knowledge core requirements; must be in good academic standing. Supervised practice in dietetics in different settings including acute and long term care facilities, rehabilitation and outpatient clinics, community programs, and foodservice operations; includes weekly seminar.

NDT 5951. Advanced Dietetics Practicum II. (0-0) 1 Credit Hour.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

NDT 5952. Advanced Dietetics Practicum II. (0-0) 2 Credit Hours.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

NDT 5953. Advanced Dietetics Practicum II. (0-0) 3 Credit Hours.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

NDT 5954. Advanced Dietetics Practicum II. (0-0) 4 Credit Hours.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

NDT 5955. Advanced Dietetics Practicum II. (0-0) 5 Credit Hours.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

NDT 5956. Advanced Dietetics Practicum II. (0-0) 6 Credit Hours.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

NDT 5957. Advanced Dietetics Practicum II. (0-0) 7 Credit Hours.

Prerequisites: NDT 5947; must be in good academic standing. Advanced supervised practice in dietetics with culminating experiences leading to entry-level competency; includes weekly seminar.

College of Engineering

The College of Engineering offers the following graduate programs:

- Master of Civil Engineering
- Master of Science in Advanced Manufacturing and Enterprise Engineering
- Master of Science in Advanced Materials Engineering
- Master of Science in Biomedical Engineering
- Master of Science in Civil Engineering
- Master of Science in Computer Engineering
- Master of Science in Electrical Engineering
- Master of Science in Mechanical Engineering
- Doctor of Philosophy in Biomedical Engineering
- Doctor of Philosophy in Electrical Engineering
- Doctor of Philosophy in Environmental Science and Engineering
- Doctor of Philosophy in Mechanical 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 neural 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 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.

All College of Engineering departments offer Master's programs from their own discipline and research emphases: Department of Biomedical Engineering offers M.S. in Biomedical Engineering, Department of Civil Engineering offers M.S. in Civil Engineering and Master of Civil Engineering, Department of Electrical and Computer Engineering offers M.S. in Electrical Engineering and M.S. in Computer Engineering, and Department of Mechanical Engineering offers M.S. in Mechanical Engineering and M.S. in Advanced Manufacturing and Enterprise Engineering. In addition, the College of Engineering offers an interdisciplinary Master of Science degree in Advanced Materials Engineering that features state-of-the-art technical knowledge and multidisciplinary courses with focus in two concentration areas:

1. Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials; and
2. Multifunctional Biomedical Materials.

The M.S. in Advanced Materials Engineering degree program is administered by the Department of Electrical and Computer Engineering.

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 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 Doctor of Philosophy degree in Mechanical Engineering offers an in-depth and integrated research focus on three concentration areas: Thermal and Fluid Systems, Design and Manufacturing Systems, and Mechanics and Materials.

A limited number of assistantships and fellowships are available to qualified students. Financial assistance is awarded on a competitive basis.

Engineering (EGR) Courses

EGR 5023. Numerical Techniques in Engineering Analysis. (3-0) 3 Credit Hours.

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.

EGR 5213. Topics in Systems Modeling. (3-0) 3 Credit Hours.

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.

EGR 5233. Advanced Quality Control. (3-0) 3 Credit Hours.

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.

EGR 5703. Advanced Scientific Visualization. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Topics include 3D image display and generation techniques, visual thinking process, interaction with visualization, efficiency of visualization on sparse grid, haptic rendering and control, and immersive 3D programming.

EGR 5713. High Performance Computing. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor.

Topics include scientific computing in UNIX/LINUX environment, instruction on several import UNIX applications, various parallelization styles of computing, and application programming interfaces (APIs) in scientific applications.

EGR 6013. Advanced Engineering Mathematics I. (3-0) 3 Credit Hours.

Prerequisites: EGR 2323 and EGR 3323, or equivalent courses.

Advanced methods of applied mathematics, including vector differential calculus, linear algebra, functional space and their applications to engineering problems. (Same as BME 6033. Credit cannot be earned for both EGR 6013 and BME 6033.) (Formerly titled "Analytical Techniques in Engineering Analysis").

EGR 6023. Advanced Engineering Mathematics II. (3-0) 3 Credit Hours.

Prerequisites: EGR 2323 and EGR 3323, or equivalent courses.

Advanced methods of applied mathematics. Topics may include solution methods of partial differential equations, complex analysis, optimization theory, other topics in engineering mathematics and their applications to engineering problems. May be repeated for credit as topics vary.

Department of Biomedical Engineering

The Department of Biomedical Engineering offers the Master of Science degree in Biomedical Engineering and the Doctor of Philosophy degree in Biomedical Engineering.

- Master of Science in Biomedical Engineering (p. 141)
- Doctor of Philosophy in Biomedical Engineering (p. 144)

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 neural 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 an emphasis in either engineering, physical science, or biological science disciplines. All students are required to have completed at least one year of engineering physics, chemistry, biology, and mathematics (up to Differential Equations I or Applied Engineering Analysis I). Students with deficiencies in the above courses will be required to satisfactorily complete selected 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 or 79 on the Internet 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 31.5 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 (UTHSCSA Catalog (<http://catalog.uthscsa.edu>)), students must register through the UTHSCSA Web site (<http://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. Core courses:

16.5

Required Core Courses offered at UTSA:

BME 6033	BME Engineering Analysis
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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).

BME 6703	Biomedical Imaging
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BME 6803	Experimental Biomechanics
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BME 6903	Biomaterials
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Required Core Courses offered at UTHSCSA:

BME 6004	Biology for Bioengineers	
INTD 5082	Responsible Conduct of Research	
B. Research seminar		3
BME 6011 (or BME 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.		6
UTSA Elective Courses:		
BIO 5433	Neurophysiology	
BIO 5483	Computational Neuroscience	
BIO 5503	Sensory Physiology	
BME 6093	Topics in Biomedical Engineering	
BME 6111	Introduction to Clinical Practices	
BME 6123	Medical Device Design	
BME 6143	Biomedical Device Development	
BME 6203	Physiology for Engineers	
BME 6213	Cellular Engineering	
BME 6223	Transport Processes in Biological Systems	
BME 6233	Cardiovascular Bioengineering	
BME 6243	Mechanobiology	
BME 6253	Bioheat Transfer	
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 6723	Bioinstrumentations	
BME 6733	Microfabrication and Application	
BME 6743	Biophotonics	
BME 6753	Biosensors: Fundamentals and Applications	
BME 6793	Topics in Image and Signal Processing	
BME 6823	Advanced Biomechanics	
BME 6843	Tissue Mechanics	
BME 6863	Mechanical Behavior of Living Tissues	
BME 6873	Biofluid Mechanics	
BME 6893	Topics in Biomechanics	
BME 6913	Biomaterials II	
BME 6923	Tissue Engineering	
BME 6933	Tissue-Biomaterials Interactions	
BME 6943	Biomaterials and 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 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	Elasticity	
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 5022	Inter-Professional Human Gross Anatomy	
CSBL 5095	Experimental Design and Data Analysis	
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	
PHAR 5013	Principles of Pharmacology	
PHAR 5014	Integrated Physiology and Therapeutics	
PHAR 5019	Metabolism, Hormones, GI Physiology and Therapeutics	
PHAR 5021	Cardiovascular, Renal and Respiratory Physiology and Therapeutics	
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	Pulse Sequence Programming for MRI	
RESD 6102	Biomaterials II	

D. A minimum of 6 semester credit hours of biomedical engineering Master's Thesis Research is required. 6

Total Credit Hours 31.5

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

The Nonthesis Option is not offered to new incoming students. All students enrolled in the Nonthesis Option will require approval from the Program Director and the Graduate Advisor of Record. Typically, a Master's degree (Nonthesis Option) program of study will consist of at least 35.5 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 (UTHSCSA Catalog (<http://catalog.uthscsa.edu>)), students must register through the UTHSCSA Web site (<http://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. Core Courses: 17.5

Required Core Courses offered at UTSA:

BME 6033 BME Engineering Analysis

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).

BME 6131 Biomedical Project ¹

BME 6703 Biomedical Imaging

BME 6803 Experimental Biomechanics

BME 6903 Biomaterials

BME 6961 Comprehensive Examination ¹

[1] Only one of these course may be counted toward the core requirements.

Required Core Courses offered at UTHSCSA:

BIME 6004 Biology for Bioengineers

INTD 5082 Responsible Conduct of Research

B. Research seminar 3

BME 6011 (or BIME 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 of electives for the Thesis Option above. Courses from this list may be taken with the approval of the Program Director, Supervising Professor, and course instructor.

Total Credit Hours **35.5**

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 neural 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. All students are required to have completed at least one year of engineering physics, chemistry, biology, and mathematics (up to Differential Equations I or Applied Engineering Analysis I). Students with deficiencies in the above courses will be required to satisfactorily complete selected 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 (except research and thesis hours) toward their doctoral degree. The Committee on Graduate Studies (COGS) 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 or 79 on the Internet 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 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 (UTHSCSA Catalog (<http://catalog.uthscsa.edu>)), students must register through the UTHSCSA Web site (<http://www.uthscsa.edu>). Any questions concerning registration at UTHSCSA should be directed to the BME Program Office at UTHSCSA. The minimum required curriculum for all students is as follows:

A. Core Courses: 15.5

Required Core Courses offered at UTSA:

BME 6033 BME Engineering Analysis ¹

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).

BME 6203 Physiology for Engineers ^{1, 2}

BME 6703 Biomedical Imaging ^{1, 3}

BME 6803 Experimental Biomechanics ¹

BME 6903 Biomaterials ¹

Required Core Courses offered at UTHSCSA:

BIME 6004 Biology for Bioengineers ^{1, 2}

CSBL 5095 Experimental Design and Data Analysis

INTD 5082 Responsible Conduct of Research

RADI 5015 Physics of Diagnostic Imaging I ^{1, 3}

[1] Select any four (4) courses to satisfy core requirements.

[2] Only one of these course may be counted toward the core requirements.

[3] Only one of these course may be counted toward the core requirements.

B. Research seminar 8

BME 6011 (or BIME 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. 9

UTSA Prescribed Elective Courses:

BIO 5433	Neurophysiology
BIO 5483	Computational Neuroscience
BIO 5503	Sensory Physiology
BME 6043	Critical Thinking and Writing for BME
BME 6093	Topics in Biomedical Engineering
BME 6111	Introduction to Clinical Practices
BME 6123	Medical Device Design
BME 6143	Biomedical Device Development
BME 6213	Cellular Engineering
BME 6223	Transport Processes in Biological Systems
BME 6233	Cardiovascular Bioengineering
BME 6243	Mechanobiology
BME 6253	Bioheat Transfer
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 6723	Bioinstrumentations
BME 6733	Microfabrication and Application
BME 6743	Biophotonics
BME 6753	Biosensors: Fundamentals and Applications
BME 6793	Topics in Image and Signal Processing
BME 6823	Advanced Biomechanics
BME 6843	Tissue Mechanics
BME 6863	Mechanical Behavior of Living Tissues
BME 6873	Biofluid Mechanics
BME 6893	Topics in Biomechanics
BME 6913	Biomaterials II
BME 6923	Tissue Engineering
BME 6933	Tissue-Biomaterials Interactions
BME 6943	Biomaterials and 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 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	Elasticity
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:

BIME 6003	Introduction to Clinical Practices
CSBL 5022	Inter-Professional Human Gross Anatomy
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
PHAR 5013	Principles of Pharmacology
PHAR 5014	Integrated Physiology and Therapeutics
PHAR 5019	Metabolism, Hormones, GI Physiology and Therapeutics
PHAR 5021	Cardiovascular, Renal and Respiratory Physiology and Therapeutics
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	Pulse Sequence Programming for MRI
RESD 6102	Biomaterials II

D. A minimum of 15 semester credit hours of Doctoral Dissertation, Research and Supervised Teaching is required. 15

E. Students in the program must complete at least 81 semester credit hours for graduation, additional courses such as research hours, dissertation hours, or graduate level electives are often prescribed to make up the remaining hours to meet the program requirement. The entire program of study must be recommended by the student's Dissertation Advisor, Dissertation Committee, and COGS 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 qualifying examination 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.

Biomedical Engineering (BME) Courses

BME 6011. Research Seminar. (1-0) 1 Credit Hour.

Prerequisites: Graduate student standing; consent of the 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 BIME 6090 at UTHSCSA.)

BME 6021. Supervised Teaching. (0-0) 1 Credit Hour.

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 BIME 6071 at UTHSCSA.)

BME 6022. Supervised Teaching. (0-0) 2 Credit Hours.

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 BIME 6071 at UTHSCSA.).

BME 6023. Supervised Teaching. (0-0) 3 Credit Hours.

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 BIME 6071 at UTHSCSA.).

BME 6033. BME Engineering Analysis. (3-0) 3 Credit Hours.

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.).

BME 6043. Critical Thinking and Writing for BME. (3-0) 3 Credit Hours.

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 and manuscript writing, and provides the opportunity to learn through writing and critiquing research proposals, manuscripts, abstracts, and scientific presentations.

BME 6051. Independent Study in Biomedical Engineering. (0-0) 1 Credit Hour.

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.

BME 6052. Independent Study in Biomedical Engineering. (0-0) 2 Credit Hours.

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.

BME 6053. Independent Study in Biomedical Engineering. (0-0) 3 Credit Hours.

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.

BME 6063. Introduction to Scientific Computing and Visualization. (3-0) 3 Credit Hours.

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.).

BME 6073. Professional Science Master's Practicum. (0-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent 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.

BME 6093. Topics in Biomedical Engineering. (3-0) 3 Credit Hours.

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.

BME 6103. Biology for Bioengineers. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing; consent of the instructor and of the Graduate Advisor of Record. This course provides a broad background in biological concepts with specific attention given to biological processes important to bioengineering. Topics may include biochemistry, genetics, molecular biology, cell biology, and physiology. (Same as BIME 6004 at UTHSCSA. Credit cannot be earned for both BME 6103 and BIME 6004.).

BME 6111. Introduction to Clinical Practices. (1-0) 1 Credit Hour.

Prerequisites: Graduate standing; consent of the instructor and of the Graduate Advisor of Record. This course will provide an introduction to clinical medicine for graduate biomedical engineering students. It will provide the opportunity for the students to gain a working knowledge of engineering aspects as it relates to clinical practices. (Same as BIME 6004 at UTHSCSA. Credit cannot be earned for both BME 6103 and BIME 6004.).

BME 6123. Medical Device Design. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing; consent of the instructor and of the Graduate Advisor of Record. This course will educate students about current biomedical technologies and product development. Topics covered will include ideation, concept development, design methodologies, business plan basics, regulatory concepts for medical devices and intellectual property management.

BME 6131. Biomedical Project. (0-0) 1 Credit Hour.

Prerequisites: Graduate standing; consent of the instructor and of the Graduate Advisor of Record and concurrent enrollment in BME 6143. This project course will be offered to nonthesis students as an alternative to the comprehensive examination and will involve the design and development of a biomedical device or instrument. This course requires the final presentation of a prototype at the end of the semester and cannot be repeated for credit. The grade report for the course is either "CR" (satisfactory performance in Biomedical Project) or "NC" (unsatisfactory performance in Biomedical Project). (Credit cannot be earned for both BME 6131 and BME 6961.)

BME 6143. Biomedical Device Development. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing; consent of the instructor and of the Graduate Advisor of Record and BME 6123. This course involves the development of project proposals, testing of the design project and presentation of conceptual designs and a final prototype. Industrial collaboration and/or faculty sponsorship of these projects is encouraged.

BME 6203. Physiology for Engineers. (3-0) 3 Credit Hours.

Prerequisite: Consent of the instructor or completion of BIME 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.

BME 6213. Cellular Engineering. (3-0) 3 Credit Hours.

Prerequisites: Consent of the instructor and completion of BIME 6004 (UTHSCSA) or BME 6203. 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.

BME 6223. Transport Processes in Biological Systems. (3-0) 3 Credit Hours.

Prerequisites: Consent of the instructor and completion of BIME 6004 (UTHSCSA) or BME 6203. 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 and pharmacokinetic analysis.

BME 6233. Cardiovascular Bioengineering. (3-0) 3 Credit Hours.

Prerequisites: BME 2103, BME 6203, and BME 6033 or consent of the instructor. This course introduces the bioengineering principles applied to the understanding and modeling of the cardiovascular system. Topics covered include anatomy of the human cardiovascular system; comparative anatomy; allometric scaling principles; cardiovascular molecular and cell biology; overview of continuum mechanics; form and function of blood, blood vessels, and the heart from an engineering perspective; normal, diseased and engineered replacement tissues and medical devices.

BME 6243. Mechanobiology. (3-0) 3 Credit Hours.

Prerequisites: BME 6803 and BIME 6004 (UTHSCSA) or BME 6203. The course will explore the role of mechanical forces in modulating molecular and cellular responses and signal transduction in cardiovascular, pulmonary, renal, skeletal and muscular systems, and impact in health and disease including stem cell differentiation and microgravity.

BME 6253. Bioheat Transfer. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of the instructor. Principles and applications of heat transfer in soft tissue. Topics may include fundamental conservation laws and governing equations of heat transfer, coupling of fluid and mass transport, and thermal activated nanoparticle transvascular transport. (Same as ME 6253. Credit cannot be earned for both BME 6253 and ME 6253.)

BME 6303. Computational Oncology and Cancer Treatment Simulations. (3-0) 3 Credit Hours.

Prerequisite: Completion of BME 6033 or consent 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.

BME 6313. Computational Bioengineering and Biomedicine. (3-0) 3 Credit Hours.

Prerequisite: Completion of BME 6033 or consent 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 ME 6873. Credit cannot be earned for both BME 6313 and ME 6873.)

BME 6323. Bioinformatics. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent 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.)

BME 6333. Stochastic Modeling in Bioengineering. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.)

BME 6343. Statistical Pattern Recognition and Data Mining in Biomedical Engineering. (3-0) 3 Credit Hours.

Prerequisites: Completion of BME 6333 and consent 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.

BME 6353. Computational Methods in Mass Spectrometry. (3-0) 3 Credit Hours.

Prerequisites: Completion of BME 6333 and consent 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.

BME 6363. Multiscale Computational Modeling of Biomedical Systems. (3-0) 3 Credit Hours.

Prerequisites: Completion of EE 3413 or EE 5143 and consent 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.).

BME 6523. Biological Laboratory Techniques in Biomedical Engineering. (3-0) 3 Credit Hours.

Prerequisites: Consent of the instructor and completion of BME 6004 (UTHSCSA) or BME 6203. 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.

BME 6703. Biomedical Imaging. (3-0) 3 Credit Hours.

Prerequisite: Consent of the BME Program Director. 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. With approval from the BME Program Director, credit for this course can be counted towards satisfying the imaging core course for Ph.D. students. (Credit can be earned for only one of the following: BME 6703 or RADI 5015 at UTHSCSA.).

BME 6723. Bioinstrumentations. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.

BME 6733. Microfabrication and Application. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.

BME 6743. Biophotonics. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.

BME 6753. Biosensors: Fundamentals and Applications. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.

BME 6793. Topics in Image and Signal Processing. (3-0) 3 Credit Hours.

Prerequisite: Consent of the instructor. May be repeated for credit on a different topic of study.

BME 6803. Experimental Biomechanics. (3-0) 3 Credit Hours.

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.) (Formerly titled "Biomechanics I.").

BME 6823. Advanced Biomechanics. (3-0) 3 Credit Hours.

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. (Formerly titled "Biomechanics II.").

BME 6843. Tissue Mechanics. (3-0) 3 Credit Hours.

Prerequisite: BME 6803 or ME 3663 or consent of the instructor. Topics may include biomechanics characterization, modeling, and properties of regenerating tissues ranging from bone, cartilage, tendons, ligaments, skin, adipose tissue, nerves, bladder, eye, and pulmonary and cardiovascular tissues.

BME 6863. Mechanical Behavior of Living Tissues. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.).

BME 6873. Biofluid Mechanics. (3-0) 3 Credit Hours.

Prerequisite: BME 6803 or ME 3663 or consent of the instructor. This course is an introduction to the fluid dynamics concepts necessary to design and perform research in physiological and biofluid mechanics, with a special emphasis in the quantitative understanding and fundamental engineering concepts of the human systemic and pulmonary circulation. Computational and experimental techniques will be studied with hands-on research projects based on student interest.

BME 6893. Topics in Biomechanics. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.)

BME 6903. Biomaterials. (3-0) 3 Credit Hours.

Prerequisite: Consent 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.)

BME 6913. Biomaterials II. (3-0) 3 Credit Hours.

Prerequisites: BME 6903 and consent of the instructor. Application of biomaterials in medicine and dentistry will be emphasized.

BME 6923. Tissue Engineering. (3-0) 3 Credit Hours.

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.)

BME 6933. Tissue-Biomaterials Interactions. (3-0) 3 Credit Hours.

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.

BME 6943. Biomaterials and Cell Signaling. (2-3) 3 Credit Hours.

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.

BME 6953. Biomaterials for Drug-Delivery/Pharmacology. (2-3) 3 Credit Hours.

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.

BME 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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). (Credit cannot be earned for both BME 6961 and BME 6131.)

BME 6963. Fundamentals to Polymer Science with Select Biomedical Applications. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and BME 6903; or consent 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.

BME 6973. Current Analytical Tools for Biomaterials Characterizations. (1-4) 3 Credit Hours.

Prerequisites: Graduate standing and BME 6903; or consent of the instructor. This course introduces the fundamentals of biomaterials characterizations and its limitations.

BME 6981. Master's Thesis Research. (0-0) 1 Credit Hour.

Prerequisites: Master's student standing; consent of the instructor and of the Graduate Advisor of Record. May be repeated for a maximum of 9 credit hours. (Same as BIME 6098 at UTHSCSA.)

BME 6982. Master's Thesis Research. (0-0) 2 Credit Hours.

Prerequisites: Master's student standing; consent of the instructor and of the Graduate Advisor of Record. May be repeated for a maximum of 9 credit hours. (Same as BIME 6098 at UTHSCSA.)

BME 6983. Master's Thesis Research. (0-0) 3 Credit Hours.

Prerequisites: Master's student standing; consent of the instructor and of the Graduate Advisor of Record. May be repeated for a maximum of 9 credit hours. (Same as BIME 6098 at UTHSCSA.)

BME 6986. Master's Thesis Research. (0-0) 6 Credit Hours.

Prerequisites: Master's student standing; consent of the instructor and of the Graduate Advisor of Record. May be repeated for a maximum of 9 credit hours. (Same as BIME 6098 at UTHSCSA.)

BME 6993. Topics in Biomaterials. (3-0) 3 Credit Hours.

Prerequisite: Consent of the instructor. May be repeated for credit on a different topic of study.

BME 7951. Doctoral Research. (0-0) 1 Credit Hour.

Prerequisites: Doctoral student standing; consent of the instructor and of the 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 BIME 6097 at UTHSCSA.)

BME 7952. Doctoral Research. (0-0) 2 Credit Hours.

Prerequisites: Doctoral student standing; consent of the instructor and of the 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 BIME 6097 at UTHSCSA.)

BME 7953. Doctoral Research. (0-0) 3 Credit Hours.

Prerequisites: Doctoral student standing; consent of the instructor and of the 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 BIME 6097 at UTHSCSA.)

BME 7956. Doctoral Research. (0-0) 6 Credit Hours.

Prerequisites: Doctoral student standing; consent of the instructor and of the 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 BIME 6097 at UTHSCSA.)

BME 7991. Doctoral Dissertation. (0-0) 1 Credit Hour.

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 BIME 7099 at UTHSCSA.)

BME 7992. Doctoral Dissertation. (0-0) 2 Credit Hours.

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 BIME 7099 at UTHSCSA.)

BME 7993. Doctoral Dissertation. (0-0) 3 Credit Hours.

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 BIME 7099 at UTHSCSA.)

BME 7996. Doctoral Dissertation. (0-0) 6 Credit Hours.

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 BIME 7099 at UTHSCSA.)

Department of Civil and Environmental Engineering

The Department of Civil Engineering offers the Master of Civil Engineering degree and the Master of Science degree in Civil Engineering, as well as the Doctor of Philosophy degree in Environmental Science and Engineering.

- Master of Science Degree in Civil Engineering (p. 151)
- Master of Civil Engineering Degree (p. 151)
- Doctor of Philosophy Degree in Environmental Science and Engineering (p. 152)

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 comprehensive examination during their 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

A. Degree Core Curriculum

CE 5043	Advanced Civil Engineering Statistics	3
CE 5143	Numerical Methods in Civil Engineering	3

B. Electives		18
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C. CE 5983 Master's Thesis (includes comprehensive examination/thesis defense/seminar presentation)		6
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Total Credit Hours		30
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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 take a comprehensive examination during his or her seminar presentation at the end of his or her program. He/she is also expected to attend the seminars offered by other students. These seminars are administered by the Graduate Committee of the CEE Department.

Program of Study

A. Degree Core Curriculum		
CE 5043	Advanced Civil Engineering Statistics	3
CE 5143	Numerical Methods in Civil Engineering	3
B. Electives		27
C. CE 5991	Graduate Seminar (includes comprehensive examination)	1
Total Credit Hours		34

Doctor of Philosophy Degree in Environmental Science and Engineering

The Civil and Environmental Engineering (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. The program has three separate

tracks, namely Environmental Science, Environmental Engineering, and Civil Engineering. 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 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 degrees should be in biology, ecology, environmental science, chemistry, geology, geography, environmental engineering, civil engineering or other related scientific or engineering discipline. Exceptional applicants without a Master of Science degree 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 vita.

Applications must be submitted to the UTSA Graduate School online at <http://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 2 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 the 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 Master’s degree. Students with only a baccalaureate degree are required to have a minimum of 75 semester credit hours to graduate.

21 semester credit hours of required elective courses must be selected by each student according to his/her selected track of study, as defined below. These need to be approved by the Chair of the DSC and the student’s Dissertation Committee. These elective courses may be offered

by departments in the College of Sciences, 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. This 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

A. Degree Core Curriculum:

CE 5001	Process and Ethics in Thesis/Dissertation Research Development	1
CE 5043 or ES 5023	Advanced Civil Engineering Statistics Environmental Statistics	3
CE 5013 or ES 5233	Civil Engineering Systems Analysis Experimental Design and Analysis	3
Select one of the following:		3
CE 6113	Global Change	
ES 5043	Global Change	
GEO 5043	Global Change	

B. Track Electives:

These can be selected from 5000–7000 level courses offered in Civil and Environmental Engineering or other departments, with the approval of the Environmental Science and Engineering Doctoral Studies Committee. 12

1. Environmental Science Track Electives

The objective of this track is to train students in conducting research in the various aspects of environmental science with a focus on the application of physical and biological sciences in solving environmental problems. These elective courses can be selected from the graduate courses offered by the College of Sciences, the CEE Department or other UTSA departments. 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 Ph.D. degree in Environmental Science and Engineering and must be approved by the student's Dissertation Advisor and the Doctoral Studies Committee.

2. Environmental Engineering Track Electives

The objective of this track is to train students in conducting research in the various aspects of environmental engineering with a focus on the application of science and engineering principles in sustaining the natural environment (i.e., air, water and land). Elective courses can be selected from the graduate courses offered by the College of Sciences, the CEE Department or other departments. 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 Ph.D. degree in Environmental Science and Engineering and must be approved by the student's Dissertation Advisor and the Doctoral Studies Committee.

3. Civil Engineering Track Electives

The objective of this track is to train students in conducting research in the various aspects of civil engineering with an emphasis on the application of civil engineering principles in the design, construction, and maintenance of the physical and naturally built environment. Elective courses can be selected from the graduate courses offered by the CEE Department or other College of Engineering departments. 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 Ph.D. degree in Environmental Science and Engineering and must be approved by the student's Dissertation Advisor and the Doctoral Studies Committee.

C. Other Electives: 6

These can be selected from 5000–7000 level courses offered in Civil and Environmental Engineering or other departments, with the approval of the Environmental Science and Engineering Doctoral Studies Committee.

D. Seminars: 2

CE 6221	Graduate Seminar in Environmental Science and Engineering
or ES 5981	Graduate Seminar in Environmental Science and Engineering

E. Doctoral Research and Dissertation:

Select one of the following options: 30

Option I:

CE 7213	Doctoral Research
or CE 7212	Doctoral Research
or CE 7211	Doctoral Research
CE 7313	Doctoral Dissertation
or CE 7312	Doctoral Dissertation
or CE 7311	Doctoral Dissertation

Option II:

ES 7213	Doctoral Research
or ES 7212	Doctoral Research
or ES 7211	Doctoral Research
ES 7313	Doctoral Dissertation
or ES 7312	Doctoral Dissertation
or ES 7311	Doctoral Dissertation

Total Credit Hours

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 on six core areas, including statistics, hydrogeology, biology, chemistry, environmental engineering and civil engineering. Students are expected to show in-depth knowledge of the topics pertaining to their track of study. 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.

Civil Engineering (CE) Courses

CE 5001. Process and Ethics in Thesis/Dissertation Research Development. (1-0) 1 Credit Hour.

Course discusses the process and the ethical issues involved in conducting research and developing a thesis or dissertation. It covers research organizational skills, literature searches, technical writing, honesty in writing and plagiarism issues.

CE 5013. Civil Engineering Systems Analysis. (3-0) 3 Credit Hours.

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.

CE 5023. Finite Element Methods. (3-0) 3 Credit Hours.

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.)

CE 5043. Advanced Civil Engineering Statistics. (3-0) 3 Credit Hours.

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.

CE 5103. Advanced Steel Design. (3-0) 3 Credit Hours.

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.)

CE 5123. Bridge Engineering. (3-0) 3 Credit Hours.

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.)

CE 5133. Advanced Reinforced Concrete. (3-0) 3 Credit Hours.

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.)

CE 5143. Numerical Methods in Civil Engineering. (3-0) 3 Credit Hours.

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.

CE 5153. Prestressed Concrete. (3-0) 3 Credit Hours.

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.)

CE 5203. Environmental Microbiology. (3-0) 3 Credit Hours.

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.)

CE 5213. Biological Phenomena in Environmental Engineering. (3-0) 3 Credit Hours.

The major biological phenomena and processes used in environmental engineering control. Fundamentals of microbiology and biochemistry as applied to wastewater treatment, drinking water treatment, and hazardous waste remediation. (Formerly titled "Industrial Waste Treatment.").

CE 5293. Geographic Information Systems (GIS). (3-0) 3 Credit Hours.

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.

CE 5303. Hydrometeorology. (3-0) 3 Credit Hours.

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.

CE 5403. Advanced Characterization of Highway Materials. (3-0) 3 Credit Hours.

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.

CE 5423. Advanced Pavement Analysis and Design. (3-0) 3 Credit Hours.

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.).

CE 5433. Advanced Geometric Design. (3-0) 3 Credit Hours.

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.).

CE 5443. Pavement Management. (3-0) 3 Credit Hours.

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.).

CE 5453. Transportation Engineering. (3-0) 3 Credit Hours.

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.).

CE 5463. Foundation Engineering. (3-0) 3 Credit Hours.

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.).

CE 5503. Advanced Open Channel Hydraulics. (3-0) 3 Credit Hours.

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.).

CE 5613. Environmental Chemistry. (3-0) 3 Credit Hours.

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.

CE 5623. Advanced Treatment Processes for Water Quality Control. (3-0) 3 Credit Hours.

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.).

CE 5643. Sustainable Energy Systems. (3-0) 3 Credit Hours.

Course explores various facets of sustainable energy systems and their role in securing America's energy future. It covers national and global energy trends, social, political, regulatory, technical/economic constraints and policy considerations. The course uses a systems approach in examining the technology and economics behind each alternative energy source and the major qualitative and quantitative factors affecting their large-scale deployment. (Same as ME 5273. Credit cannot be earned for both CE 5643 and ME 5273.).

CE 5653. River Science. (3-0) 3 Credit Hours.

An in-depth examination of river sediment transport principles. Topics include water and sediment supply, sediment dynamics, river morphology, and channel instability. Field trip required. (Same as GEO 5413. Credit cannot be earned for both CE 5653 and GEO 5413.).

CE 5663. River Mechanics and Engineering Applications. (3-0) 3 Credit Hours.

Prerequisite: CE 5653 or equivalent. This course focuses on the application of sediment transport principles to practical river mechanics and environmental problems. Applications include laboratory experiments, and numerical simulations related to the solution of practical river engineering problems.

CE 5703. Special Topics in Hydraulics and Hydrology. (3-0) 3 Credit Hours.

Course deals with special aspects of hydraulics and hydrology. May be repeated for credit as topics vary.

CE 5713. Special Topics in Structures. (3-0) 3 Credit Hours.

Course deals with special aspects of structural engineering. May be repeated for credit as topics vary.

CE 5723. Special Topics in Transportation. (3-0) 3 Credit Hours.

Course deals with special aspects of transportation engineering. May be repeated for credit as topics vary.

CE 5733. Special Topics in Environmental Engineering. (3-0) 3 Credit Hours.

Course deals with special aspects of environmental engineering. May be repeated for credit as topics vary.

CE 5743. Special Topics in Geotechnical Engineering. (3-0) 3 Credit Hours.

Course deals with special aspects of geotechnical engineering. May be repeated for credit as topics vary.

CE 5973. Special Project. (0-0) 3 Credit Hours.

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.

CE 5981. Master's Thesis. (0-0) 1 Credit Hour.

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.).

CE 5982. Master's Thesis. (0-0) 2 Credit Hours.

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.).

CE 5983. Master's Thesis. (0-0) 3 Credit Hours.

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.).

CE 5991. Graduate Seminar. (1-0) 1 Credit Hour.

Graduate seminar may be repeated for credit up to 3 semester credit hours.

CE 6013. Hydrologic Modeling and Analysis. (3-0) 3 Credit Hours.

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.

CE 6103. Fate and Transport of Contaminants in the Environment. (3-0) 3 Credit Hours.

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.).

CE 6113. Global Change. (3-0) 3 Credit Hours.

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.).

CE 6153. Advanced Mechanics and Modeling of Structural Materials. (3-0) 3 Credit Hours.

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.

CE 6221. Graduate Seminar in Environmental Science and Engineering. (1-0) 1 Credit Hour.

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.

CE 6523. Advanced Surface Water Hydrology. (3-0) 3 Credit Hours.

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.).

CE 6951. Independent Study. (0-0) 1 Credit Hour.

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.

CE 6952. Independent Study. (0-0) 2 Credit Hours.

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.

CE 6953. Independent Study. (0-0) 3 Credit Hours.

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.

CE 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

Prerequisite: Written permission of the student's Advisory Committee.

The comprehensive examination course is intended as a 1 semester credit hour substitute for the Master of Science degree in Civil Engineering thesis or the Master of Civil Engineering graduate seminar. Students may register for this course in a semester in which the examination is to be taken, if they are not enrolled in other courses. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

CE 7211. Doctoral Research. (0-0) 1 Credit Hour.

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.

CE 7212. Doctoral Research. (0-0) 2 Credit Hours.

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.

CE 7213. Doctoral Research. (0-0) 3 Credit Hours.

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.

CE 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

CE 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

CE 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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

The Department of Electrical and Computer Engineering offers Master of Science degrees in Advanced Materials Engineering, Computer Engineering, and Electrical Engineering, as well as a Doctor of Philosophy degree in Electrical Engineering.

- Master of Science Degree in Electrical Engineering (p. 157)
- Master of Science Degree in Computer Engineering (p. 158)

- Master of Science Degree in Advanced Materials Engineering (p. 160)
- Doctor of Philosophy Degree in Electrical Engineering (p. 163)
- Integrated Bachelor's/Master's Program (p. 164)

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 Devices. 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 electrical engineering. 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, or in related fields for exceptional candidates
- a minimum grade point average of 3.0 in the last 60 semester credit hours.

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, 79 on the TOEFL iBT, or 6.5 on the International English Language Testing System (IELTS).

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 minimum number of semester credit hours required for the degree is 30 for the thesis option and 33 for the nonthesis option.

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 semester credit hours, including 3 semester credit hours of a core course, must be taken from courses in the student's concentration area. At least 3 semester credit hours of core courses must be taken outside the concentration area to satisfy the breadth requirement. No more than 3 semester credit hours of independent study should be included. One (1) semester credit hour of EE 6991 Research Seminar is required and up to two (2) semester credit hours of EE 6991 may be included. Up to 6 semester credit hours 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 electrical engineering graduate courses by area of

concentration is available in the department office. The distribution of required courses is shown below.

Thesis Option

A. Core course based on student's area of concentration from the list below:	3
Computer Engineering Concentration	
EE 5123 Computer Architecture	
Systems and Control Concentration	
EE 5143 Linear Systems and Control	
Digital Signal Processing Concentration	
EE 5163 Digital Signal Processing	
Communications Concentration	
EE 5183 Foundations of Communication Theory	
Electronic Materials and Devices Concentration	
EE 5693 Dielectric and Optoelectronic Devices	
B. At least one course from student's selected concentration	3
C. At least one core course from outside the concentration	3
D. Additional graduate electrical engineering courses	9
Must include 1 semester credit hour of EE 6991 Research Seminar	
E. Other Electives (may be courses from outside electrical engineering) ¹	6
F. Master's Thesis (a minimum of 6 semester credit hours are required)	6
EE 6983 Master's Thesis	
Total Credit Hours	30

¹ Chosen with approval of the Electrical Engineering Graduate Program Committee.

Nonthesis Option

The degree requires 33 semester credit hours of technical course credits. At least 9 semester credit hours, including 3 semester credit hours of a core course, must be taken from one area to establish the student's concentration. At least 6 semester credit hours of core courses must be taken outside the concentration area to satisfy the breadth requirement. No more than 3 semester credit hours of independent study should be included. One (1) semester credit hour of EE 6991 Research Seminar is required and up to two (2) semester credit hours of EE 6991 may be included. Up to 6 semester credit hours 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 electrical engineering graduate courses by area of concentration is available in the department office. The distribution of required courses is given below.

Nonthesis Option

A. Core course based on student's area of concentration from the list below:	3
Computer Engineering Concentration	
EE 5123 Computer Architecture	
Systems and Control Concentration	
EE 5143 Linear Systems and Control	
Digital Signal Processing Concentration	
EE 5163 Digital Signal Processing	

Communications Concentration

EE 5183 Foundations of Communication Theory	
Electronic Materials and Devices Concentration	
EE 5693 Dielectric and Optoelectronic Devices	
B. At least two courses from student's selected concentration	6
C. At least two core courses from outside the concentration	6
D. Additional graduate electrical engineering courses	9
Must include 1 semester credit hour of EE 6991 Research Seminar	
E. Other Electives (may be courses from outside electrical engineering) ¹	6
F. Master's Project (a minimum of 3 semester credit hours are required)	3
EE 6943 Graduate Project	
Total Credit Hours	33

¹ Chosen with approval of the Electrical Engineering Graduate Program Committee.

Concentrations

The Electrical Engineering (EE) courses are divided into five concentrations as follows:

Computer Engineering

EE 5103 Engineering Programming	3
EE 5113 VLSI System Design	3
EE 5123 Computer Architecture	3
EE 5193 FPGA and HDL	3
EE 5223 Topics in Digital Design	3
EE 5323 Topics in VLSI Design	3
EE 5423 Topics in Computer Architecture	3
EE 5453 Topics in Software Engineering	3

Systems and Control

EE 5143 Linear Systems and Control	3
EE 5243 Topics in Systems and Control	3
EE 5343 Intelligent Control and Robotics	3
EE 5443 Discrete-Time Control Theory and Design	3
EE 6343 Advanced Topics in Systems and Control	3
EE 7443 Nonlinear Control Systems	3

Digital Signal Processing

EE 5153 Random Signals and Noise	3
EE 5163 Digital Signal Processing	3
EE 5203 Multimedia Security Processing	3
EE 5263 Topics in Digital Signal Processing and Digital Filtering	3
EE 5353 Topics in Multimedia Signal Processing	3
EE 6363 Advanced Topics in Signal Processing	3

Communications

EE 5153 Random Signals and Noise	3
EE 5183 Foundations of Communication Theory	3
EE 5283 Topics in Communication Systems	3

EE 5373	Wireless Communication	3
EE 5473	Fiber Optic Communication	3
EE 5583	Topics in Digital Communication	3
EE 6383	Advanced Topics in Communications	3

Electronic Materials and Devices

EE 5293	Topics in Microelectronics	3
EE 5403	Advanced Dielectric and Optoelectronic Engineering Laboratory	3
EE 5413	Principles of Microfabrication	3
EE 5503	Introduction to Micro and Nanotechnology	3
EE 5593	Topics in Advanced Sensor Devices	3
EE 5693	Dielectric and Optoelectronic Devices	3
EE 6493	Advanced Topics in Electronic Materials and Devices	3

Degree plans must be consistent with the guidelines established by the Electrical Engineering Graduate Program Committee. In general, undergraduate courses, general education courses, and courses satisfying provisional conditions for admission cannot be counted toward the total required degree credit hours.

Comprehensive Examination

Degree candidates are required to pass an oral comprehensive examination. The examination is to be administered in the form of a presentation of the thesis or research project to the student's advisory committee, chaired by a tenured or tenure-track graduate faculty member. 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.

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 options to obtain their degrees: (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 or in related fields for exceptional candidates
- a minimum grade point average of 3.0 in the last 60 semester credit hours of undergraduate studies.

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, 79 on the TOEFL iBT, or 6.5 on the International English Language Testing System (IELTS).

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 is 30 for the thesis option and 33 for the nonthesis option.

The courses are divided into three groups as follows:

Thesis Option

A. Select any two core courses from Group A 6

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

B. Additional computer engineering courses from Group A or B (must include 1 semester credit hour of EE 6991 Research Seminar) ¹ 12

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 6991	Research Seminar
CPE 6951	Independent Study
CPE 6952	Independent Study
CPE 6953	Independent Study

C. Elective courses from Group A or B or C ¹ 6

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

D. Master's Thesis (a minimum of 6 semester credit hours) 6

CPE 6983	Master's Thesis	
Total Credit Hours		30

¹ Chosen with approval of the Computer Engineering Graduate Program Committee.

Nonthesis Option

A. Select any two core courses from Group A 6

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

B. Additional computer engineering courses from Group A or B (must include 1 semester credit hour of EE 6991 Research Seminar)¹ 15

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 6991	Research Seminar
CPE 6951	Independent Study
CPE 6952	Independent Study
CPE 6953	Independent Study

C. Elective courses from Group A or B or C¹ 9

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

D. Master's Project (a minimum of 3 semester credit hours) 3

CPE 6943	Graduate Project	
Total Credit Hours		33

¹ Chosen with approval of the Computer Engineering Graduate Program Committee.

One (1) credit hour of EE 6991 Research Seminar is required for both the thesis and nonthesis options and up to two (2) credit hours of EE 6991 can be included. No more than three (3) credit hours of independent study can be included.

Degree plans must be consistent with the guidelines established by the Computer Engineering Graduate Program Committee. In general, undergraduate courses, general education courses, and courses satisfying provisional conditions for admission cannot be counted toward the total required degree credit hours.

Comprehensive Examination

Degree candidates are required to pass an oral comprehensive examination. The examination is to be administered in the form of a presentation of the thesis or research project to the student's advisory committee, chaired by a tenured or tenure-track graduate faculty member. 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.

Master of Science Degree in Advanced Materials Engineering

The Master of Science (M.S.) degree in Advanced Materials Engineering (MatE) at The University of Texas at San Antonio (UTSA) is an interdisciplinary graduate degree program offered by the College of Engineering. The M.S. in MatE degree program is currently administered by the Department of Electrical and Computer Engineering.

The Master of Science degree in Advanced Materials Engineering is designed to train graduate students with the state-of-the-art technical knowledge and skill sets necessary for independent critical thinking, problem solving, and decision making to address multidisciplinary problems in materials engineering. The degree program also provides students with opportunities in taking multidisciplinary courses from the College of Engineering and other colleges at UTSA to enhance students' leadership, problem-solving, and entrepreneurship skills.

The program addresses three interlinked areas of knowledge in advanced materials engineering:

1. Structure-function relationships in materials, which determine behavior at the macro-, micro-, nano-, molecular- and atomic-levels;
2. Synthesis, characterization, measurement, and computational modeling of materials (ceramics, composites, metals, polymers, multifunctional, electronic and biomedical) especially those with novel properties, to address current and future technological challenges; and
3. Design and applications of materials that impact different facets of our economy, including materials in energy, nanotechnology, medicine, communications, sensors, transportation, structural and environmental applications.

The M.S. in MatE offers core courses to all enrolled students to achieve a common platform of understanding and knowledge. Subsequently, students will choose their concentrations according to materials classifications and applications. Currently two concentrations are offered:

- Concentration I – Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials
- Concentration II – Multifunctional Biomedical Materials

With the approval of the Program Director and the student's Supervising Professor, a student may take graduate-level courses offered by other graduate programs related to materials science and engineering, including from the Management of Technology program, to augment the

student's education and creativity in interdisciplinary areas and to better prepare for jobs in research and in the industry.

Both thesis and nonthesis options are available.

Program Admission Requirements

In addition to the University-wide graduate admission requirements, admission decisions will be made by the Admissions Committee based on a combination of the following:

- A bachelor's degree in any discipline of engineering, materials science, physics or chemistry. A minimum grade point average of 3.0 (on a 4.0 scale) in the last 60 semester credit hours of undergraduate studies.
- A statement of research experience, interests and goals.
- Two letters of recommendation.
- A satisfactory score on the Graduate Record Examination (GRE) test as evaluated by the Admissions Committee. An applicant's performance on the GRE is considered with other criteria when making an admission or competitive fellowship decision but will not be used as the sole or 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, 79 on the TOEFL iBT, or 6.5 on the International English Language Testing System (IELTS).

Degree Requirements

The minimum number of semester credit hours required for the M.S. in MatE degree is 30 for the thesis option and 33 for the nonthesis option.

Thesis Option

The degree requires 30 semester credit hours including 24 technical course credits and 6 thesis credits identified as MATE 6983 Master's Thesis Research. A total of 18 semester credit hours, including 9 credits of core courses in Group A and at least 6 credits of concentration courses and 3 credits of another concentration course in Group B must be taken to satisfy the depth and the breadth requirement. Up to 6 credits, but no more than a total of 3 semester credit hours of MATE 6951 Directed Research in Advanced Materials Engineering, MATE 6952 Directed Research in Advanced Materials Engineering, MATE 6953 Directed Research in Advanced Materials Engineering and Research Seminar courses (BME 6011 or EE 6991), may be taken from other graduate courses in Group C, including courses from outside the College of Engineering with the approval of the Advanced Materials Engineering Graduate Program Committee. A current list of MATE graduate courses is available in the department office.

Thesis Option

A. Required Core Courses from Group A	9
Group A. Required core courses:	
MATE 5103	Principles of Materials Engineering: Fundamentals of Structure, Chemistry, and Physical Properties
MATE 5113	Functions, Evaluations and Synthesis Technology of Advanced Materials
MOT 5163	Management of Technology
B. Concentration specific courses from Group B	9
Group B. Concentration specific courses:	

Concentration I: Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials

EE 5403	Advanced Dielectric and Optoelectronic Engineering Laboratory
EE 5413	Principles of Microfabrication
EE 5503	Introduction to Micro and Nanotechnology
EE 5693	Dielectric and Optoelectronic Devices
EE 6493	Advanced Topics in Electronic Materials and Devices (may be repeated when topics vary)
MATE 5213	Sensing and Sensor Materials
MATE 5223	Structure-Chemistry-Property Relations in Materials Science and Engineering
MATE 5233	Anisotropy and Crystalline Materials
MATE 5243	Optic and Nonlinear Optical Materials
MATE 5253	Magnetic Materials and Electromagnetic Engineering
MATE 5393	Topics in Advanced Materials Engineering (may be repeated when topics vary)

Concentration II: Multifunctional Biomedical Materials

BME 6933	Tissue-Biomaterials Interactions
BME 6943	Biomaterials and Cell Signaling
BME 6953	Biomaterials for Drug-Delivery/Pharmacology
BME 6963	Fundamentals to Polymer Science with Select Biomedical Applications
BME 6993	Topics in Biomaterials
MATE 5513	Fundamentals of Microfabrication and Application
MATE 5523	Biosensors: Fundamentals and Applications
MATE 5533	Biomaterials
MATE 5543	Current Analytical Tools for Biomaterials Characterizations
MATE 5393	Topics in Advanced Materials Engineering

C. Prescribed Electives from Group C 6

Group C. Prescribed elective courses. Additional elective courses may be added with approval of the Advanced Materials Engineering Graduate Program Committee.

BME 6011	Research Seminar
EE 6991	Research Seminar
MATE 6951	Directed Research in Advanced Materials Engineering
MATE 6952	Directed Research in Advanced Materials Engineering
MATE 6953	Directed Research in Advanced Materials Engineering
BME 6723	Bioinstrumentations
ME 5483	Finite Element Methods
ME 5713	Mechanical Behavior of Materials
ME 5743	Composite Materials
MOT 5243	Essentials of Project and Program Management
MOT 5253	Starting the High-Tech Firm
MOT 5313	Emerging Technologies
MOT 5323	Biotechnology Industry
MOT 5333	Technological Drivers of Globalization
MOT 6971	Special Problems
MOT 6973	Special Problems

D. Master's Thesis (a minimum of 6 semester credit hours)	6
MATE 6983 Master's Thesis Research	
Total Credit Hours	30

Nonthesis Option

The degree requires 33 semester credit hours including 30 technical course credits and 3 project credits identified as MATE 6943 Master's Project. A total of 24 semester credit hours, including 9 credits of core courses in Group A and at least 9 credits of concentration courses and 3 credits of another concentration course in Group B, must be taken to satisfy the depth and the breadth requirement. Up to 9 credits, but no more than a total of 3 credits of MATE 6951 Directed Research in Advanced Materials Engineering, MATE 6952 Directed Research in Advanced Materials Engineering, MATE 6953 Directed Research in Advanced Materials Engineering and Research Seminar courses (BME 6011 or EE 6991), may be taken from other graduate courses in Group C, including courses from outside the College of Engineering with the approval of the Advanced Materials Engineering Graduate Program Committee. A current list of MATE graduate courses is available in the department office.

Nonthesis Option

A. Required Core Courses from Group A	9
Group A. Required core courses:	
MATE 5103 Principles of Materials Engineering: Fundamentals of Structure, Chemistry, and Physical Properties	
MATE 5113 Functions, Evaluations and Synthesis Technology of Advanced Materials	
MOT 5163 Management of Technology	
B. Concentration specific courses from Group B	12
Group B. Concentration specific courses:	
Concentration I: Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials	
EE 5403 Advanced Dielectric and Optoelectronic Engineering Laboratory	
EE 5413 Principles of Microfabrication	
EE 5503 Introduction to Micro and Nanotechnology	
EE 5693 Dielectric and Optoelectronic Devices	
EE 6493 Advanced Topics in Electronic Materials and Devices (may be repeated when topics vary)	
MATE 5213 Sensing and Sensor Materials	
MATE 5223 Structure-Chemistry-Property Relations in Materials Science and Engineering	
MATE 5233 Anisotropy and Crystalline Materials	
MATE 5243 Optic and Nonlinear Optical Materials	
MATE 5253 Magnetic Materials and Electromagnetic Engineering	
MATE 5393 Topics in Advanced Materials Engineering (may be repeated when topics vary)	
Concentration II: Multifunctional Biomedical Materials	
BME 6933 Tissue-Biomaterials Interactions	
BME 6943 Biomaterials and Cell Signaling	
BME 6953 Biomaterials for Drug-Delivery/Pharmacology	
BME 6963 Fundamentals to Polymer Science with Select Biomedical Applications	
BME 6993 Topics in Biomaterials	

MATE 5513 Fundamentals of Microfabrication and Application	
MATE 5523 Biosensors: Fundamentals and Applications	
MATE 5533 Biomaterials	
MATE 5543 Current Analytical Tools for Biomaterials Characterizations	
MATE 5393 Topics in Advanced Materials Engineering	
C. Prescribed Electives from Group C	9
Group C. Prescribed elective courses. Additional elective courses may be added with approval of the Advanced Materials Engineering Graduate Program Committee.	
BME 6011 Research Seminar	
EE 6991 Research Seminar	
MATE 6951 Directed Research in Advanced Materials Engineering	
MATE 6952 Directed Research in Advanced Materials Engineering	
MATE 6953 Directed Research in Advanced Materials Engineering	
BME 6723 Bioinstrumentations	
ME 5483 Finite Element Methods	
ME 5713 Mechanical Behavior of Materials	
ME 5743 Composite Materials	
MOT 5243 Essentials of Project and Program Management	
MOT 5253 Starting the High-Tech Firm	
MOT 5313 Emerging Technologies	
MOT 5323 Biotechnology Industry	
MOT 5333 Technological Drivers of Globalization	
MOT 6971 Special Problems	
MOT 6973 Special Problems	
D. Master's Project (a minimum of 3 semester credit hours)	3
MATE 6943 Master's Project	
Total Credit Hours	33

Degree plans must be consistent with the guidelines established by the Advanced Materials Engineering Graduate Program Committee. In general, undergraduate courses of the same concentration, general education courses, and courses satisfying provisional conditions for admission cannot be counted toward the total required degree credit hours. Students enrolled through integrated BS/MS program should consult the Graduate Advisor or Record for details on fulfilling the integrated degree requirement.

Comprehensive Examination

Degree candidates are required to pass an oral comprehensive examination. The examination is to be administered in the form of a presentation of the thesis or research project to the student's Supervising Committee. The Supervising Committee consists of minimum two (for non-thesis option) or three (for thesis option) graduate faculty members; two of the members including the Chair of the Committee must be graduate faculty members affiliated with the M.S. in MatE program. Students must register for 1 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.

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 Devices. The Ph.D. degree 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 is expected to hold a master's degree before being granted admission to the program. Only exceptional, well prepared, and highly competitive candidates should apply to enter the Ph.D. program directly upon receiving a bachelor's degree.
- Applicants with a master's degree must have a grade point average of 3.3 or better in their master's degree program. 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 who would like to transfer in coursework from another institution or applicants admitted without an earned master's degree in electrical engineering may apply a maximum of 27 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 satisfactory score, as evaluated by the Doctoral Studies Committee for Electrical Engineering, is required on the Graduate Record Examination (GRE). The GRE score will be considered with other criteria in making admission or competitive scholarship decisions and will not be used as the sole criterion for consideration of the applicant or as the primary criterion to end consideration of the applicant.
- 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, 79 on the TOEFL iBT, or 6.5 on the International English Language Testing System (IELTS).
- 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 or IELTS 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 81 semester credit hours beyond the bachelor's degree or 54 semester credit hours beyond the master's degree, passing

of qualifying examinations I and II, passing of a dissertation proposal examination, passing of a final oral defense, and acceptance of the Ph.D. dissertation. A two-semester residency research period is required.

The core courses for the five concentrations are listed below:

EE 5123	Computer Architecture (Computer Engineering)	3
EE 5143	Linear Systems and Control (Systems and Control)	3
EE 5163	Digital Signal Processing (Digital Signal Processing)	3
EE 5183	Foundations of Communication Theory (Communications)	3
EE 5693	Dielectric and Optoelectronic Devices (Electronic Materials and Devices)	3

The course requirements for 81 credit hours include 45 technical course credits, 18 research credits identified as EE 7951, EE 7952, and EE 7953 Doctoral Research and 18 dissertation credits identified as EE 7991 through EE 7993 Doctoral Dissertation. At least two courses must be taken from core 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.

The course requirements for 54 credit hours include 18 technical course credits, 18 research credits identified as EE 7951, EE 7952, and EE 7953 Doctoral Research and 18 dissertation credits identified as EE 7991 through EE 7993 Doctoral Dissertation. At least three courses must be taken from the five core courses and at least two courses from outside electrical engineering with approval of the Electrical Engineering Graduate Program Committee. An advanced graduate course (non-laboratory intensive) with a specified core course as prerequisite may be used, upon approval of the Graduate Advisor of Record, to satisfy the given core course requirement, if the student took the core (or equivalent) course for credit in a different degree program or at another institution. No more than 6 credits of independent study including those earned towards the Master's degree should be included. One credit hour of EE 6971 Special Problems is required and up to 3 credit hours of EE 6971 or EE 6991 Research Seminar can be included. A Master's degree with at least 30 semester credit hours received in a closely-related field is needed for this option.

In general, undergraduate courses, general education courses, and courses satisfying provisional conditions for admission cannot be counted toward the total required degree credit hours.

The preliminary program of study must be approved by the student's dissertation advisor and the Graduate Program Committee prior to taking the Doctoral Qualifying Examination, and must be submitted subsequently upon the Dissertation Committee's approval, 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 Ph.D. in Electrical Engineering qualifying examination contains two components: (I) Knowledge Competencies through fulfillment of graduate coursework in both primary and secondary concentration areas and (II) Communication and Research Competencies through submission of a written research proposal followed by an oral presentation to the Candidacy Examination Committee. Successful completion of a candidacy examination is required for formal admission into the Electrical Engineering Doctoral program.

I. Knowledge Competencies

In order to establish knowledge competencies, the student must have a Preliminary Program of Study on file and must submit his or her request in writing to the Graduate Advisor of Record after completion of required coursework. The student must take and pass the concentration-specific written Qualifying Examination to demonstrate readiness to pursue a Ph.D. in the chosen field. The written exam is offered each winter and summer prior to the start of the Spring and Fall semesters. Other courses taken at UTSA that satisfy knowledge competencies are three courses including one core course of the student's primary area and two core courses representing the student's secondary areas, with a grade point average (GPA) of no less than 3.3. No courses with a GPA of less than 3.0 can be counted to satisfy the knowledge competency. An advanced graduate course (non-laboratory intensive) with a specified core course as prerequisite may be used, upon the approval of the Graduate Advisor of Record, to satisfy the given core course requirement, if the student took the core (or equivalent) course for credit in a different degree program or at another institution.

II. Communication and Research Competencies

The purpose of the Exam on Communication and Research Competency is to evaluate the student's capability to communicate technical materials, in both written and oral forms, in a clear, concise, and well-organized manner.

The Exam on Communication and Research Competency is scheduled during each Fall and Spring semester within one semester after fulfillment of Knowledge Competencies. A Ph.D. supervising professor from the ECE Department should be identified prior to scheduling the exam. The examination includes a written research proposal and an oral presentation on an assigned topic relevant to the student's area of concentration.

The Candidacy Examination Committee is a three-member subcommittee of the ECE Graduate Committee established to evaluate each candidate. A majority decision is required for passing the exam.

Full-time students who fail their first attempt at the candidacy exams may make a second attempt within one semester or prior to the end of the fourth long semester since the student's admission to the Ph.D. program, whichever is earlier. No more than two attempts to pass the candidacy exams are permitted.

When both the Knowledge Competency and the Communication and Research Competency requirements are successfully satisfied, the Chair of the Graduate Program Committee will notify the student of his or her formal admission as a candidate to the Electrical Engineering Doctoral program. If a student passes the candidacy exam provisionally with coursework recommendations, including English as a Second Language

(ESL) courses, the student will not be advanced to the Dissertation Proposal Examination until all provisional conditions are met.

Dissertation Proposal Examination

Students should take the dissertation proposal exam after they have passed the candidacy exam (and have satisfied provisional conditions, if any), but no later than the seventh long semester after enrolling in the program. The student must be registered and be in good academic standing to hold the dissertation proposal examination. The approved Dissertation Committee, chaired by the student's Supervising Professor, conducts the dissertation proposal exam.

The dissertation proposal exam consists of a written review of the student's dissertation research and future research plans, their defense in an oral presentation, followed by a closed oral exam administered by committee members. The committee shall examine the student's knowledge in the subject area, make recommendations for modifying the research plan, alert the student to related work, and identify potential complications. The committee may recommend additional research and/or coursework as it sees necessary. Major deviation from the proposed research requires the approval of the Dissertation Committee.

Unanimous approval of the Committee is required for the student to pass the exam. Students who fail their first attempt at the dissertation proposal exam are allowed to make a second attempt within one year. No more than two attempts to pass the dissertation proposal exam are permitted.

Final Oral Dissertation Defense

After admission to candidacy and passing the dissertation proposal exam, the next steps are conducting dissertation research, writing the dissertation and passing the final oral defense. The final oral defense is administered and evaluated by the student's Dissertation Committee. 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.

Integrated B.S./M.S. Program

The integrated B.S./M.S. (Bachelor of Science and Master of Science) program administered by the Department of Electrical and Computer Engineering (ECE) is designed for highly motivated and qualified B.S. students to obtain both an undergraduate degree and an advanced degree within an accelerated timeline. Through this program, motivated B.S. students can start working with the faculty advisors on research projects as early as in their senior year.

Program Admission Requirements

Applications to the B.S./M.S. program must be submitted after the completion of 75 but before 90 semester credit hours of coursework, usually when a student is enrolled in his or her junior year or in the sixth semester of the B.S. program.

The B.S./M.S. program applicants must have a minimum of 3.3 grade point average for both cumulative and within the designated major. For qualified applicants, the department will waive the GRE exam requirement. To apply for the program, students need to:

- Apply online under the category of Integrated B.S./M.S. (B.S. in Electrical Engineering, or Computer Engineering and M.S. in Electrical Engineering, Computer Engineering, or Advanced Materials Engineering); and

- Submit an official UTSA transcript and a Proposed Program of Study with an approval from B.S./M.S. advisors.

Submission of both recommendation letters and a personal statement is optional but highly recommended for consideration of scholarships.

Degree Requirements

B.S. Degree Requirement

The current undergraduate degree programs in Electrical Engineering and Computer Engineering require 126 semester credit hours for completion with fifteen of these hours (five 3-hour courses) as technical electives. Students accepted into the Integrated B.S./M.S. program will be required to complete 117 undergraduate semester credit hours and 9 graduate semester credit hours to replace three of the five undergraduate technical elective courses toward the B.S. degree, provided that students pass the corresponding challenge exams for the three undergraduate elective courses. The graduate courses include one of the required core graduate courses and other two technical electives from the same area of concentration. Students may enroll in a cross-listed course and take a challenge exam following the UTSA's challenge exam procedure to earn undergraduate credits for the graduate course taken (see Footnote 1). Credits earned by challenging UTSA undergraduate courses by examination apply to Bachelor degree requirements. Grades of "CR" are not included in the UTSA grade point average calculation.

A graduate core course taken as an undergraduate must be completed with a grade of "B" or better. If a grade lower than "B" is received, it can be counted as an undergraduate technical elective, but in order to stay in the Integrated B.S./M.S. program, a student must pass one of the graduate core courses with a grade of "B" or better. Undergraduate students not able to satisfy this requirement, or simply wishing to voluntarily withdraw from the Integrated B.S./M.S. program, must use a combination of five undergraduate technical electives and graduate courses to satisfy the original 126-hour regular degree program requirement in order to receive their B.S. degree. Students continuing on in the Integrated B.S./M.S. program will apply 117 undergraduate semester credit hours and 9 semester credit hours of technical elective courses by passing the challenging exams to their B.S. degrees. The 9 graduate semester credit hours taken as an undergraduate will be counted towards the M.S. degree requirement.

M.S. Degree Requirement

A student enrolled in B.S./M.S. program can graduate by completing requirements for a thesis or nonthesis (project) option.

I. Thesis Option: The students must complete 30 credit hours including 6 hours of thesis work.

II. Nonthesis Option: The students must complete 33 credit hours including 3 hours of project work.

B.S./M.S. Classification

Once admitted to the B.S./M.S. combined program, students are allowed to take graduate courses as undergraduate students. Students admitted to the Integrated B.S./M.S. program will be reclassified from undergraduate to graduate student status when they have completed 126 semester credit hours of coursework (of any combination of graduate and undergraduate hours) toward their degrees.

- 1 Currently the **Challenging a UTSA Course policy** at UTSA applies only to undergraduate courses; thus, this mechanism is valid only if the same graduate course is cross-listed with an undergraduate course or until the procedure is extended to graduate courses.

Advanced Materials Engineering (MATE) Courses

MATE 5103. Principles of Materials Engineering: Fundamentals of Structure, Chemistry, and Physical Properties. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing or consent of instructor. Overviews of the fundamental underpinnings of structure-property relations of materials, which determines their behavior at the macro-, micro-, nano-, molecular- and atomic-levels, as used in passive and active components and systems for applications such as sensing, actuation, energy conversion and storage.

MATE 5113. Functions, Evaluations and Synthesis Technology of Advanced Materials. (3-0) 3 Credit Hours.
Prerequisite: MATE 5103 or consent of instructor. Introduction to state-of-the-art materials processing, properties evaluation, and performance optimization of semiconductor, electroceramics, composites, nanomaterials, and thin films.

MATE 5213. Sensing and Sensor Materials. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing or consent of instructor. Fundamentals of design, fabrication, and evaluation of advanced sensing materials and modern sensor technology.

MATE 5223. Structure-Chemistry-Property Relations in Materials Science and Engineering. (2-3) 3 Credit Hours.
Prerequisite: Graduate standing or consent of instructor. Principles that govern assembly of crystal structures, building models of many of the technologically important crystal structures, and discussion of the impact of structure on the various fundamental mechanisms responsible for important and unique physical properties. Theory and principles are introduced along with hands-on experience of building structure models. Major topics include: Symmetry and Crystal Physics; Density, Mechanical Strength, and Anisotropy; Electronic Transport in Materials; and Thermal Properties.

MATE 5233. Anisotropy and Crystalline Materials. (2-3) 3 Credit Hours.
Prerequisite: MATE 5103 or consent of instructor. Symmetry operations through coordinate transformation matrices and stereographic projections. Tensor operations applied to anisotropic crystals, polar and axial symmetries. Principle and design of sensor applications including pyroelectricity, pyromagnetism, thermal expansion, dielectric constant, magnetic susceptibility, piezoelectricity, piezomagnetism, electrostriction, magnetostriction, index of refraction, and nonlinear optical effects. Mathematica is used to model and analyze a variety of tensor properties.

MATE 5243. Optic and Nonlinear Optical Materials. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing or consent of instructor. Mechanisms of polarization nonlinearity, electromagnetic wave propagation in optical and nonlinear optic materials, optoelectronic materials and their device applications.

MATE 5253. Magnetic Materials and Electromagnetic Engineering. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Fundamental understanding of material responses to applied electromagnetic fields, correlated with time inversion symmetry, material chemistry, crystal structure, and microstructure for controlling and engineering electronic and magnetic properties.

MATE 5393. Topics in Advanced Materials Engineering. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Topics to be selected on the structure and properties, preparation and processing, characterization and performance evaluation of materials, computational modeling and simulation, with emphasis on ceramics, electronic materials, engineered composites for sensor, actuator, energy conversion and storage, or biomedical applications. May be repeated for credit as topics vary for a given concentration.

MATE 5513. Fundamentals of Microfabrication and Application. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of 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.

MATE 5523. Biosensors: Fundamentals and Applications. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of 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.

MATE 5533. Biomaterials. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Fundamentals in applications of biomaterials science and engineering principles and concepts for repairing, replacing, and protecting human tissues and organs.

MATE 5543. Current Analytical Tools for Biomaterials Characterizations. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. This course introduces the fundamentals of biomaterials characterizations and its limitations. May be repeated for credit when topics vary.

MATE 6941. Master's Project. (0-0) 1 Credit Hour.

Prerequisites: Consent of the Graduate Advisor of Record and Project Advisor. Conducted under the guidance of the Supervising Professor and the advice of the Master's Nonthesis Committee. The nonthesis project will be an independent investigation or research in the chosen concentration and is generally completed in one semester. Additionally, the nonthesis investigation will be documented, evaluated by the Master's Nonthesis Committee, and placed in the student's record indicating successful completion of the project. May be repeated for credit, but not more than 3 hours will apply to the Master's degree.

MATE 6942. Master's Project. (0-0) 2 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and Project Advisor. Conducted under the guidance of the Supervising Professor and the advice of the Master's Nonthesis Committee. The nonthesis project will be an independent investigation or research in the chosen concentration and is generally completed in one semester. Additionally, the nonthesis investigation will be documented, evaluated by the Master's Nonthesis Committee, and placed in the student's record indicating successful completion of the project. May be repeated for credit, but not more than 3 hours will apply to the Master's degree.

MATE 6943. Master's Project. (0-0) 3 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and Project Advisor. Conducted under the guidance of the Supervising Professor and the advice of the Master's Nonthesis Committee. The nonthesis project will be an independent investigation or research in the chosen concentration and is generally completed in one semester. Additionally, the nonthesis investigation will be documented, evaluated by the Master's Nonthesis Committee, and placed in the student's record indicating successful completion of the project. May be repeated for credit, but not more than 3 hours will apply to the Master's degree.

MATE 6951. Directed Research in Advanced Materials Engineering. (0-0) 1 Credit Hour.

Prerequisites: Graduate standing and permission in writing 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 3 hours will apply to the Master's degree.

MATE 6952. Directed Research in Advanced Materials Engineering. (0-0) 2 Credit Hours.

Prerequisites: Graduate standing and permission in writing 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 3 hours will apply to the Master's degree.

MATE 6953. Directed Research in Advanced Materials Engineering. (0-0) 3 Credit Hours.

Prerequisites: Graduate standing and permission in writing 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 3 hours will apply to the Master's degree.

MATE 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

MATE 6981. Master's Thesis Research. (0-0) 1 Credit Hour.

Prerequisites: Consent of the Graduate Advisor of Record and Thesis Advisor. Thesis research and preparation conducted under the guidance of the Supervising Professor and the advice of the Master's Thesis Committee. The thesis is an original contribution to scholarship, based on intense independent investigation or graduate research in the chosen concentration. Thesis option students are required to successfully present and defend their thesis which serves as the oral comprehensive examination for the thesis option. Final approval of the thesis by the Graduate School will serve as an indication of the successful completion of the research. 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.

MATE 6982. Master's Thesis Research. (0-0) 2 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and Thesis Advisor. Thesis research and preparation conducted under the guidance of the Supervising Professor and the advice of the Master's Thesis Committee. The thesis is an original contribution to scholarship, based on intense independent investigation or graduate research in the chosen concentration. Thesis option students are required to successfully present and defend their thesis which serves as the oral comprehensive examination for the thesis option. Final approval of the thesis by the Graduate School will serve as an indication of the successful completion of the research. 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.

MATE 6983. Master's Thesis Research. (0-0) 3 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and Thesis Advisor. Thesis research and preparation conducted under the guidance of the Supervising Professor and the advice of the Master's Thesis Committee. The thesis is an original contribution to scholarship, based on intense independent investigation or graduate research in the chosen concentration. Thesis option students are required to successfully present and defend their thesis which serves as the oral comprehensive examination for the thesis option. Final approval of the thesis by the Graduate School will serve as an indication of the successful completion of the research. 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.

Computer Engineering (CPE) Courses**CPE 6941. Graduate Project. (0-0) 1 Credit Hour.**

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.

CPE 6942. Graduate Project. (0-0) 2 Credit Hours.

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.

CPE 6943. Graduate Project. (0-0) 3 Credit Hours.

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.

CPE 6951. Independent Study. (0-0) 1 Credit Hour.

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.

CPE 6952. Independent Study. (0-0) 2 Credit Hours.

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.

CPE 6953. Independent Study. (0-0) 3 Credit Hours.

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.

CPE 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

CPE 6982. Master's Thesis. (0-0) 2 Credit Hours.

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.

CPE 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

Electrical Engineering (EE) Courses**EE 5103. Engineering Programming. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. Object oriented programming for engineering design problems using C++; software development for mathematical modeling and simulation of hardware systems; extraction and reporting (e.g., text processing) using scripting languages such as Perl; and individual class projects.

EE 5113. VLSI System Design. (3-1) 3 Credit Hours.

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, and chip design. (Formerly EE 5323 Topic 1: VLSI I. Credit cannot be earned for both EE 5113 and EE 5323 VLSI I.).

EE 5123. Computer Architecture. (3-0) 3 Credit Hours.

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.

EE 5143. Linear Systems and Control. (3-0) 3 Credit Hours.

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.

EE 5153. Random Signals and Noise. (3-0) 3 Credit Hours.

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.

EE 5163. Digital Signal Processing. (3-0) 3 Credit Hours.

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.

EE 5183. Foundations of Communication Theory. (3-0) 3 Credit Hours.

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.

EE 5193. FPGA and HDL. (3-0) 3 Credit Hours.

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.).

EE 5203. Multimedia Security Processing. (3-0) 3 Credit Hours.

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.).

EE 5223. Topics in Digital Design. (3-0) 3 Credit Hours.

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.

EE 5243. Topics in Systems and Control. (3-0) 3 Credit Hours.

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.

EE 5263. Topics in Digital Signal Processing and Digital Filtering. (3-0) 3 Credit Hours.

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.

EE 5283. Topics in Communication Systems. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. May be repeated for credit as topics vary. 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: 4G Wireless Communications. Concepts, theory, and object oriented modeling of 4G cellular systems in Matlab from the perspective of 3GPP Long Term Evolution (LTE). Coverage includes multi-carrier modulation, OFDMA, fading, multiple antenna systems, diversity, MIMO spatial multiplexing and space time coding, adaptive modulation and coding, H-ARQ and system ergodic and outage capacity. Multiuser Network Scheduling, Physical, Logical, Transport, Radio Bearer, and IP Channels, E-UTRA, and Evolved Packet Core Networks. Topic 5: Communication Networks. Introduction and layered network architecture. Point-to-point communication and data link control (error detection, automatic repeat request protocols, link initialization and disconnect protocols). Delay models in data networks (elements of queueing theory). Multiaccess communication (Aloha, collision resolution protocols, carrier sense multiple access, reservation-based protocols). Routing (packet switching, minimum weight spanning trees, shortest path routing). The Internet Protocol (IP). Transport layer protocols. Flow control. Topic 6: Engineering Optimization. Convex sets and functions. Convex optimization problems: Linear programming, quadratic programming, geometric programming, semidefinite programming. Optimality conditions. Lagrangian duality. Optimization algorithms: Gradient methods, Newton's method, Lagrange multiplier methods, interior point methods, subgradient methods. Applications in different areas of Electrical Engineering, such as Communications and Networking (power control in cellular networks, optimal transceiver design for multiaccess communication, optimal routing and optimal network flow), Signal Processing (least squares problems, regression models, sparsity-promoting regularizations), and Power Systems (economic dispatch, optimal power flow, electricity markets). Topic 7: Computer Network Security. Encryption techniques, symmetric ciphers, public key cryptography, Hash Functions, authentication, email security, IP security, Web security, wireless network security, firewalls. Topic 8: Error Correcting Code. Analysis of error control codes in communication systems, disk drives, satellite communications, and cellular systems, Galois Field Algebra, systematic and non-systematic codes, recursive codes, BCH Codes, Cyclic Codes, Syndrome Decoding, Convolutional Coding and Decoding, Soft Output Viterbi Algorithm (SOVA), BCJR Algorithm, Iterative Codes, Turbo Codes in 4G Cellular Low Density Parity Check Codes (LDPC), Erasure Codes in data base systems.

EE 5293. Topics in Microelectronics. (3-0) 3 Credit Hours.

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.

EE 5323. Topics in VLSI Design. (3-0) 3 Credit Hours.

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. Digital system design verification; logic and fault simulation; testbench guidelines; functional coverage; VLSI manufacturing test; fault modeling; testability measures; Design for Testability (DFT); and Automatic Test Pattern Generation (ATPG). Topic 4: VLSI Performance Analysis and Optimization. Delay models, delay calculation, signal integrity effects, timing analysis, performance variability, performance optimization, and delay test. May be repeated for credit as topics vary.

EE 5343. Intelligent Control and Robotics. (3-0) 3 Credit Hours.

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.

EE 5353. Topics in Multimedia Signal Processing. (3-0) 3 Credit Hours.

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 vectors, 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.

EE 5373. Wireless Communication. (3-0) 3 Credit Hours.

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.

EE 5403. Advanced Dielectric and Optoelectronic Engineering Laboratory. (2-4) 3 Credit Hours.

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.

EE 5413. Principles of Microfabrication. (1-6) 3 Credit Hours.

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.)

EE 5423. Topics in Computer Architecture. (3-0) 3 Credit Hours.

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.

EE 5443. Discrete-Time Control Theory and Design. (3-0) 3 Credit Hours.

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.

EE 5453. Topics in Software Engineering. (3-0) 3 Credit Hours.

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; and 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, and 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. Topic 4: Advanced Engineering Programming. Programming in the cloud, advanced engineering design problems and techniques using C++ and Java, advanced data structures and complexity analysis of algorithms, dynamic programming using Perl and Python, and large-scale and real-world group and individual projects. May be repeated for credit as topics vary.

EE 5473. Fiber Optic Communication. (3-0) 3 Credit Hours.

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.

EE 5503. Introduction to Micro and Nanotechnology. (2-3) 3 Credit Hours.

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.)

EE 5583. Topics in Digital Communication. (3-0) 3 Credit Hours.

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.

EE 5593. Topics in Advanced Sensor Devices. (3-0) 3 Credit Hours.

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.

EE 5693. Dielectric and Optoelectronic Devices. (3-0) 3 Credit Hours.

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.

EE 6343. Advanced Topics in Systems and Control. (3-0) 3 Credit Hours.

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.

EE 6363. Advanced Topics in Signal Processing. (3-0) 3 Credit Hours.

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.

EE 6383. Advanced Topics in Communications. (3-0) 3 Credit Hours.

Prerequisites: Consent of Graduate Advisor of Record and Dissertation Director. Current topics in the communications area. May be repeated for credit as topics vary.

EE 6493. Advanced Topics in Electronic Materials and Devices. (2-3) 3 Credit Hours.

Prerequisites: EE 5693 and EE 5503 or EE 5593 or consent of instructor. 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.

EE 6931. Graduate Research Internship. (0-0) 1 Credit Hour.

Prerequisite: Graduate standing in electrical and computer engineering and consent of instructor. Research associated with enrollment in the Graduate Research Internship Program. The grade report for the course is either "CR" (satisfactory performance on Graduate Research Internship) or "NC" (unsatisfactory performance on Graduate Research Internship).

EE 6932. Graduate Research Internship. (0-0) 2 Credit Hours.

Prerequisite: Graduate standing in electrical and computer engineering and consent of instructor. Research associated with enrollment in the Graduate Research Internship Program. The grade report for the course is either "CR" (satisfactory performance on Graduate Research Internship) or "NC" (unsatisfactory performance on Graduate Research Internship).

EE 6933. Graduate Research Internship. (0-0) 3 Credit Hours.

Prerequisite: Graduate standing in electrical and computer engineering and consent of instructor. Research associated with enrollment in the Graduate Research Internship Program. The grade report for the course is either "CR" (satisfactory performance on Graduate Research Internship) or "NC" (unsatisfactory performance on Graduate Research Internship).

EE 6941. Graduate Project. (0-0) 1 Credit Hour.

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.).

EE 6942. Graduate Project. (0-0) 2 Credit Hours.

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.).

EE 6943. Graduate Project. (0-0) 3 Credit Hours.

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.).

EE 6951. Independent Study. (0-0) 1 Credit Hour.

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.

EE 6952. Independent Study. (0-0) 2 Credit Hours.

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.

EE 6953. Independent Study. (0-0) 3 Credit Hours.

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.

EE 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

EE 6971. Special Problems. (1-0) 1 Credit Hour.

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.

EE 6972. Special Problems. (2-0) 2 Credit Hours.

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.

EE 6973. Special Problems. (3-0) 3 Credit Hours.

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.

EE 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

EE 6982. Master's Thesis. (0-0) 2 Credit Hours.

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.

EE 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

EE 6991. Research Seminar. (1-0) 1 Credit Hour.

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 1 hour will apply to the Master's degree, regardless of discipline.

EE 7443. Nonlinear Control Systems. (3-0) 3 Credit Hours.

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.

EE 7951. Doctoral Research. (0-0) 1 Credit Hour.

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.

EE 7952. Doctoral Research. (0-0) 2 Credit Hours.

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.

EE 7953. Doctoral Research. (0-0) 3 Credit Hours.

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.

EE 7991. Doctoral Dissertation. (0-0) 1 Credit Hour.

Prerequisites: Consent of the Doctoral Advisor of Record and Dissertation Advisor. May be repeated for a maximum credit of 18 hours.

EE 7992. Doctoral Dissertation. (0-0) 2 Credit Hours.

Prerequisites: Consent of the Doctoral Advisor of Record and Dissertation Advisor. May be repeated for a maximum credit of 18 hours.

EE 7993. Doctoral Dissertation. (0-0) 3 Credit Hours.

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

The Department of Mechanical Engineering offers a Master of Science degree in Advanced Manufacturing and Enterprise Engineering and Master of Science and Doctor of Philosophy degrees in Mechanical Engineering.

- Master of Science Degree in Advanced Manufacturing and Enterprise Engineering (p. 173)
- Master of Science Degree in Mechanical Engineering (p. 175)
- Doctor of Philosophy Degree in Mechanical Engineering (p. 175)

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 three concentration areas, namely Advanced Manufacturing, Enterprise Engineering, and Sustainable Systems Engineering.

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. Admission will be based on a combination of factors: a bachelor's degree in engineering, science 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 a satisfactory undergraduate grade point average (GPA) in engineering, science or relevant coursework.

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 course deficiencies, if any, 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 be counted toward the graduate degree requirements. 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.

Thesis Option

A. 3 semester credit hours of a Required Mathematics Course selected from one of the following:

EGR 5023	Numerical Techniques in Engineering Analysis	3
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	
EGR 6013	Advanced Engineering Mathematics I	
EGR 6023	Advanced Engineering Mathematics II	

B. 9 semester credit hours of Required Topical Courses selected from the following: 9

ME 5503	Lean Manufacturing and Lean Enterprises	
ME 5563	Computer Integrated Manufacturing	
ME 5583	Advanced Enterprise Process Engineering	
ME 5593	Advanced Topics in Manufacturing and Enterprise Engineering	
ME 5603	Advanced Manufacturing Systems Engineering	
ME 5703	Advanced Enterprise Systems Engineering	

C. 12 semester credit hours of Prescribed Electives approved by student's advisor (see table below) 12

D. Degree candidates must complete the following course requirements for the thesis option: 6

ME 6983	Master's Thesis	
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Total Credit Hours 30

Nonthesis Option

A. 3 semester credit hours of a Required Mathematics Course selected from one of the following: 3

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	
EGR 6013	Advanced Engineering Mathematics I	
EGR 6023	Advanced Engineering Mathematics II	

B. 9 semester credit hours of Required Topical Courses selected from the following: 9

ME 5503	Lean Manufacturing and Lean Enterprises	
ME 5563	Computer Integrated Manufacturing	
ME 5583	Advanced Enterprise Process Engineering	
ME 5593	Advanced Topics in Manufacturing and Enterprise Engineering	
ME 5603	Advanced Manufacturing Systems Engineering	
ME 5703	Advanced Enterprise Systems Engineering	

C. 18 semester credit hours of Prescribed Electives approved by student's advisor (see table below) 18

D. Degree candidates must complete the following course requirement for the nonthesis option: 3

ME 5973	Special Project	
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Total Credit Hours 33

¹ Special Project, by definition, requires an oral presentation of the nonthesis project work to the student's advisory committee (chaired by a tenured or tenure-track graduate faculty member) at the end of the semester.

Comprehensive Examination (Oral Defense)

Degree candidates are required to successfully defend the thesis or master's project (oral comprehensive examination). The oral defense is in the form of a presentation of the thesis or special project to the student's advisory committee, chaired by a graduate faculty member affiliated with the M.S. in AMEE program. Students must register for one semester credit hour of Comprehensive Examination for the semester

in which the defense is to be taken, if they are not enrolled in any other courses.

Prescribed Electives

CE 5613	Environmental Chemistry	3
CE 5623	Advanced Treatment Processes for Water Quality Control	3
CE 5703	Special Topics in Hydraulics and Hydrology	3
CE 5733	Special Topics in Environmental Engineering	3
CS 5233	Artificial Intelligence	3
CS 5253	Expert Systems	3
CS 5623	Simulation Techniques	3
EE 5143	Linear Systems and Control	3
EE 5243	Topics in Systems and Control	3
EE 5343	Intelligent Control and Robotics	3
EE 5413	Principles of Microfabrication	3
EGR 5023	Numerical Techniques in Engineering Analysis	3
EGR 5213	Topics in Systems Modeling	3
EGR 5233	Advanced Quality Control	3
EGR 6013	Advanced Engineering Mathematics I	3
EGR 6023	Advanced Engineering Mathematics II	3
ES 5023	Environmental Statistics	3
IS 5143	Information Technology	3
IS 6433	Supervisory Control and Data Acquisition	3
ME 5113	Advanced Systems Dynamics and Control	3
ME 5143	Advanced Dynamics	3
ME 5503	Lean Manufacturing and Lean Enterprises	3
ME 5513	Advanced Mechanism Design	3
ME 5533	Advanced Machine Design	3
ME 5553	Advanced Design of Cams and Gears	3
ME 5563	Computer Integrated Manufacturing	3
ME 5573	Facilities Planning and Design	3
ME 5583	Advanced Enterprise Process Engineering	3
ME 5593	Advanced Topics in Manufacturing and Enterprise Engineering	3
ME 5603	Advanced Manufacturing Systems Engineering	3
ME 5703	Advanced Enterprise Systems Engineering	3
ME 5713	Mechanical Behavior of Materials	3
ME 6563	Flexible Automation and Manufacturing Systems	3
ME 6573	Robotics Design and Analysis	3
ME 6953	Independent Study	3
MOT 5163	Management of Technology	3
MOT 5233	Advanced Topics in Project Management	3
MOT 5313	Emerging Technologies	3
MS 5003	Quantitative Methods for Business Analysis	3
MS 5023	Decision Analysis and Production Management	3
MS 5343	Logistics Systems Management	3
MS 5393	Topics in Production/Operations Management	3
MS 5453	Management and Control of Quality	3
STA 5093	Introduction to Statistical Inference	3
STA 5103	Applied Statistics	3
STA 5803	Process Control and Acceptance Sampling	3

Students in both thesis and nonthesis options, upon completion of the first 9 semester credit hours of their program, must select a Thesis/Project 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/Project 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). Similarly, nonthesis students, in consultation with their project advisor, must form a Project Committee before enrolling in ME 5973 Special Project.

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/or 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.

Thesis Option

A. 3 semester credit hours of a required mathematics course:	3
EGR 6013 Advanced Engineering Mathematics I	
B. Degree candidates must complete two core courses selected from the following list:	6
ME 5113 Advanced Systems Dynamics and Control	
ME 5243 Advanced Thermodynamics	
ME 5413 Elasticity	
ME 5613 Advanced Fluid Mechanics	
C. Designated electives (with approval of the student's committee chair)	15
D. Thesis	6

ME 6983 Master's Thesis

Total Credit Hours	30
Nonthesis Option	
A. 3 semester credit hours of a required mathematics course:	3
EGR 6013 Advanced Engineering Mathematics I	
B. Degree candidates must complete two core courses selected from the following list:	6
ME 5113 Advanced Systems Dynamics and Control	
ME 5243 Advanced Thermodynamics	
ME 5413 Elasticity	
ME 5613 Advanced Fluid Mechanics	
C. Designated electives (with approval of the student's committee chair)	21
D. Special Project	3
ME 5973 Special Project	
Total Credit Hours	33

In addition to the coursework and other university-wide 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. The Graduate Advisor of Record will advise new students who have not selected a Thesis Advisor.

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 Project Advising Committee.

Doctor of Philosophy Degree in Mechanical Engineering

The Department of Mechanical Engineering offers advanced coursework integrated with research leading to the Doctor of Philosophy degree in Mechanical Engineering. The program has three concentrations: Thermal and Fluid Systems, Design and Manufacturing Systems, Mechanics and Materials. The Ph.D. degree in Mechanical 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 Mechanical Engineering degree program are as follows:

- Students must meet the University admission requirements as outlined in the graduate catalog.
- Students whose native language is not English must have a satisfactory English test score to meet the University admission requirements.
- Satisfactory GRE (Graduate Record Examination) scores, as evaluated by the Graduate Program Committee of the Department of Mechanical Engineering, are required in combination with other criteria for admission to the Doctor of Philosophy in Mechanical Engineering degree program.
- Outstanding students, who do not hold a Master's degree, may enter the Doctor of Philosophy program on provisional status directly upon receiving a bachelor's degree in mechanical engineering or a closely related field, with the approval of the Graduate Studies Committee.

Degree Requirements and Program Study

The degree requires 90 semester credit hours of course and research work beyond the bachelor's degree or 60 semester credit hours beyond the master's degree, and passing of Qualifying Examinations, Dissertation Proposal, Dissertation Defense and acceptance of the Ph.D. dissertation.

Required coursework and the timeline for expected progress are given below. In general, undergraduate courses, general education courses, and prerequisites for graduate courses do not count towards the required number of credit hours.

Students with the Master of Science degree may transfer a maximum of thirty (30) semester credit hours previously earned toward their doctoral degree with the approval of the Graduate Program Committee and the credit transferring will be approved on a course-by-course basis to satisfy the formal coursework requirements of the degree.

Degree Curriculum

A. Common Core Courses:	6
1. Required course:	
ME 6113	Experimental Techniques in Engineering (required)
2. Choose one of the following:	
EGR 6013	Advanced Engineering Mathematics I
EGR 6023	Advanced Engineering Mathematics II
B. Technical Core Courses. Among the three areas listed below, students are required to take two courses (6 semester credit hours) in their major area of study, and any one course (3 semester credit hours) from either of the remaining two areas:	9
Thermal and Fluid Systems:	
ME 5243	Advanced Thermodynamics
ME 5613	Advanced Fluid Mechanics
Design and Manufacturing Systems:	
ME 5113	Advanced Systems Dynamics and Control
ME 5503	Lean Manufacturing and Lean Enterprises
Mechanics and Materials:	
ME 5413	Elasticity
ME 5713	Mechanical Behavior of Materials
C. Technical Elective Courses	9
Students are required to take at least three elective courses in consultation with their Ph.D. advisor.	
D. Seminar	1
ME 7991	Research Seminar

E. Doctoral Research and Dissertation	
Doctoral Research (20 credit hours required)	20
ME 7951	Doctoral Research
ME 7952	Doctoral Research
ME 7953	Doctoral Research
Doctoral Dissertation (after admitted for candidacy) (15 credit hours required)	15
ME 7981	Doctoral Dissertation
ME 7982	Doctoral Dissertation
ME 7983	Doctoral Dissertation
Total Credit Hours	60

Doctoral Candidacy

All students seeking a doctoral degree must be admitted to candidacy in order to become eligible to continue their research leading to the Doctoral degree. The requirement for admission to candidacy is passing the qualifying examination and the dissertation proposal defense.

Written Qualifying Examinations

The qualifying examination of the Ph.D. in Mechanical Engineering program consists of written questions in both common and major areas of research interest of the student. The purpose of the written qualifying examination is to ensure that students pursuing a doctoral degree in Mechanical Engineering have the essential depth and breadth of knowledge basis.

The written qualifying examination is given in June and January of each year. Upon approval by their Ph.D. advisor, students wishing to take the examination must submit their request using the designated form to the Graduate Advisor of Record before October 31 (for January exam) and March 31 (for June exam). The written examination will be administered in the first full week of June and the second week of January each year. Normally, students who have completed the coursework listed under sections A and B of the curriculum in the course list and are in good academic standing take the written examination. The Department of Mechanical Engineering administers the written qualifying examination in the following four areas with the supporting courses:

1. Common area:
 - a. Advanced Engineering Mathematics
2. Technical area:
 - a. Thermal and Fluid Systems: *Advanced Thermodynamics*, *Advanced Fluid Mechanics*
 - b. Design and Manufacturing Systems: *Advanced System Dynamics and Controls*, *Lean Manufacturing and Lean Enterprises*
 - c. Mechanics and Materials: *Elasticity*, *Mechanical Behavior of Materials*

The written qualifying examination includes two (2) parts: Part 1-Common Area, which is mandatory for all students, and Part 2-Major Area, which is selected by student from the three technical areas based on their fields of study.

Retaking of Written Qualifying Examination and Dismissal from the Doctoral Program

A student may be allowed to take the examination a second time either in January or June the following year, if they fail the first time. However, no more than two attempts are permitted. Should a student fail the qualifying

exam for a second time, he or she will be permanently dismissed from the doctoral program. The dismissed students may apply for the Master's degree in Mechanical Engineering by transferring the credits earned from the doctoral program upon the approval of the Graduate Program Committee of the department.

Doctoral Dissertation Proposal and Final Dissertation Defense

The student should first consider research topics for his/her dissertation under the supervision of his/her advisor, and then write and defend a dissertation proposal based on his/her preliminary studies. The final dissertation defense should take place within two semesters after passing the dissertation proposal. Doctoral students have a time to degree completion of eight years comprised of six years from admissions to candidacy and two years for dissertation.

For more information on policies and procedures, please see the Ph.D./ME Handbook online at: <http://engineering.utsa.edu/me/programs/curriculum.html>.

Mechanical Engineering (ME) Courses

ME 5013. Topics in Mechanical Engineering. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Current topics in mechanical engineering, such as advanced fracture mechanics, lean manufacturing, advanced manufacturing engineering and advanced energy systems. May be repeated for credit with consent of Graduate Committee as topics vary.

ME 5113. Advanced Systems Dynamics and Control. (3-0) 3 Credit Hours.

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.")

ME 5143. Advanced Dynamics. (3-0) 3 Credit Hours.

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.

ME 5153. Structural Dynamics. (3-0) 3 Credit Hours.

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.

ME 5183. Advanced Mechanical Vibration. (3-0) 3 Credit Hours.

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.

ME 5243. Advanced Thermodynamics. (3-0) 3 Credit Hours.

Prerequisite: ME 3293. Concepts and postulates of macroscopic thermodynamics; formulation of thermodynamic principles; exergy stability of thermodynamic systems, principles of irreversible thermodynamics, chemical equilibria.

ME 5263. Combustion. (3-0) 3 Credit Hours.

Prerequisite: ME 4293. 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.

ME 5273. Alternative Energy Sources. (3-0) 3 Credit Hours.

Prerequisite: ME 3293. Solar, nuclear, wind, hydrogen, and geothermal energy sources. Resources, production, utilization, economics, sustainability, and environmental considerations. (Same as CE 5643. Credit cannot be earned for both ME 5273 and CE 5643.)

ME 5283. Power Plant System Design. (3-0) 3 Credit Hours.

Prerequisites: ME 4293 and ME 4313. 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.

ME 5303. Advanced Heat and Mass Transfer. (3-0) 3 Credit Hours.

Prerequisite: ME 4313. 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.

ME 5343. Convection. (3-0) 3 Credit Hours.

Prerequisite: ME 4313. Derivation of equations of convection of mass, momentum, and energy; scale analysis; boundary layer solutions; classical, laminar convection problems; turbulent convection; natural convection.

ME 5353. Radiation. (3-0) 3 Credit Hours.

Prerequisite: ME 4313. Thermal radiation laws, geometric factors, black bodies, gray enclosures, nongray systems, combined conduction, convection, and radiation.

ME 5413. Elasticity. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Strain and stress, constitutive relations for linear elastic solids, plane problems, variational principles. (Formerly EGR 5543. Credit cannot be earned for both ME 5413 and EGR 5543.)

ME 5453. Advanced Strength of Materials. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Failure theories, energy methods, advanced topics in bending, torsion, and stress concentration. (Formerly EGR 5553. Credit cannot be earned for both ME 5453 and EGR 5553.)

ME 5463. Fracture Mechanics. (3-0) 3 Credit Hours.

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.)

ME 5473. Viscoelasticity. (3-0) 3 Credit Hours.

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.)

ME 5483. Finite Element Methods. (3-0) 3 Credit Hours.

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.)

ME 5493. Fundamentals of Robotics. (3-0) 3 Credit Hours.

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.

ME 5503. Lean Manufacturing and Lean Enterprises. (3-0) 3 Credit Hours.

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; and Lean Supply Chain Design and Management. Hands-on Value Stream Mapping project is required.

ME 5513. Advanced Mechanism Design. (3-0) 3 Credit Hours.

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.

ME 5533. Advanced Machine Design. (3-0) 3 Credit Hours.

Prerequisite: ME 3823 or an equivalent. Advanced problems in machine design, including bearings, brakes, clutches, gears, shafts, springs, and advanced stress analysis.

ME 5543. Probabilistic Engineering Design. (3-0) 3 Credit Hours.

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. (Same as BME 6333. Credit cannot be earned for both BME 6333 and ME 5543.)

ME 5553. Advanced Design of Cams and Gears. (3-0) 3 Credit Hours.

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.

ME 5563. Computer Integrated Manufacturing. (3-1) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Advanced concepts and models related to computer-aided design, manufacturing, process planning, production planning and scheduling, and manufacturing execution systems. Laboratory work includes computer-based manufacturing applications and programming of automated production equipment.

ME 5573. Facilities Planning and Design. (3-0) 3 Credit Hours.

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.

ME 5583. Advanced Enterprise Process Engineering. (3-0) 3 Credit Hours.

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.

ME 5593. Advanced Topics in Manufacturing and Enterprise Engineering. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Current topics in the manufacturing engineering area. May be repeated for credit as topics vary.

ME 5603. Advanced Manufacturing Systems Engineering. (3-0) 3 Credit Hours.

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.

ME 5613. Advanced Fluid Mechanics. (3-0) 3 Credit Hours.

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.

ME 5633. Gas Dynamics. (3-0) 3 Credit Hours.

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.

ME 5653. Computational Fluid Dynamics. (3-0) 3 Credit Hours.

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.

ME 5703. Advanced Enterprise Systems Engineering. (3-0) 3 Credit Hours.

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.)

ME 5713. Mechanical Behavior of Materials. (3-0) 3 Credit Hours.

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.

ME 5733. Advanced Medical Device Design. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Topics include classification of medical devices, the design process, implementation, and evaluation, IP protection, FDA approval process, and human factors in medical device design.

ME 5743. Composite Materials. (3-0) 3 Credit Hours.

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.)

ME 5753. Fluid Dynamics in Natural Systems. (3-0) 3 Credit Hours.

Prerequisite: ME 5613 or consent of instructor. Fundamental principles of turbulent fluid flows in natural systems with a focus on atmospheric flows, coastal flows, wind energy and physiological flows. Topics include classical and statistical theory of turbulence and energy cascading, spectral analysis of turbulence, atmospheric boundary layer, aerodynamics of wind turbines, flow dynamics in diseased and normal coronary artery.

ME 5803. Principles of Microfabrication. (1-6) 3 Credit Hours.

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.).

ME 5883. Introduction to Micro and Nanotechnology. (2-3) 3 Credit Hours.

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.).

ME 5963. Topics in Bioengineering. (3-0) 3 Credit Hours.

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.

ME 5973. Special Project. (0-0) 3 Credit Hours.

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.

ME 6043. Continuum Mechanics. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. The general purpose of the class is to introduce continuum mechanics, the equations of motion, various reference frames, and constitutive modeling. Topics covered in the class include the stress and strain tensors, equations of motion, finite elasticity, shock waves, plasticity theory, virtual displacements and nonlocal formulations.

ME 6113. Experimental Techniques in Engineering. (2-3) 3 Credit Hours.

Prerequisites: Graduate standing and consent of instructor. Laboratory-based course focused on experimental testing, accounting for sources of errors, and analysis including uncertainty, graphing, and curve fitting. Modern transducers and measurement and data acquisition techniques will be discussed and utilized in the context of engineering laboratories and a course project.

ME 6133. Advanced Control of Mechanical Systems. (2-3) 3 Credit Hours.

Prerequisite: Graduate standing in engineering. Input-output and state space representation of discrete time mechanical systems; controllability, observability, and stability; design and analysis of digital control systems in transform and time domain; state observer; linear quadratic optimal control, stochastic state estimation, linear quadratic Gaussian problem, loop transfer recovery, adaptive control and model reference adaptive systems, self-tuning regulators, repetitive control, application to mechanical systems including hard disk drives, intelligent vehicle, motor drives, etc.

ME 6253. Bioheat Transfer. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Principles and applications of heat transfer in soft tissue. Topics may include fundamental conservation laws and governing equations of heat transfer, coupling of fluid and mass transport, and thermal activated nanoparticle transvascular transport. (Same as BME 6253. Credit can be earned for both ME 6253 and BME 6253.).

ME 6333. Advanced Conduction. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. This course covers methods to calculate the distribution of temperature and heat transfer in objects. Class topics include steady-state conduction in one or more dimensions, unsteady-state conduction in one or more dimensions, exact analytic methods, approximate analytic methods, numerical techniques, nonlinear conduction in one dimension, and inverse conduction in one dimension.

ME 6563. Flexible Automation and Manufacturing Systems. (3-0) 3 Credit Hours.

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.

ME 6573. Robotics Design and Analysis. (3-0) 3 Credit Hours.

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.

ME 6663. Advanced Fatigue and Fracture. (3-0) 3 Credit Hours.

Prerequisites: ME 5463 and graduate standing in engineering or consent of instructor. Application of engineering concepts in fatigue and fracture mechanics to actual structural failure issues faced by various industries, such as aerospace, powerplant, oil/gas, and others. Review of concepts in fatigue, damage tolerance, and probabilistic fracture mechanics. Application of concepts to modern engineering problems.

ME 6813. Biomaterials. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in engineering or consent of instructor. Fundamentals in applications of material 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.).

ME 6833. Biomechanics. (3-0) 3 Credit Hours.

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.)

ME 6853. Advanced CFD and Heat Transfer. (3-0) 3 Credit Hours.

Prerequisite: ME 5613 or consent of instructor. Topics include large-scale simulation tools for turbulent flows including large-eddy-simulation (LES), direct numerical simulation (DNS) and turbulence modeling for range of incompressible, buoyancy driven and compressible flows. Generalized numerical framework for numerical solution of Navier-Stokes equations.

ME 6893. Topics in Biomechanics. (3-0) 3 Credit Hours.

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.)

ME 6951. Independent Study. (0-0) 1 Credit Hour.

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.

ME 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ME 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

ME 6973. Special Problems. (3-0) 3 Credit Hours.

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.

ME 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

ME 6982. Master's Thesis. (0-0) 2 Credit Hours.

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.

ME 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

ME 7941. Independent Doctoral Study. (0-0) 1 Credit Hour.

Prerequisites: Graduate standing in Ph.D. in Mechanical Engineering program and permission in writing (form available) of the student's advisor. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For Ph.D. 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.

ME 7942. Independent Doctoral Study. (0-0) 2 Credit Hours.

Prerequisites: Graduate standing in Ph.D. in Mechanical Engineering program and permission in writing (form available) of the student's advisor. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For Ph.D. 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.

ME 7943. Independent Doctoral Study. (0-0) 3 Credit Hours.

Prerequisites: Graduate standing in Ph.D. in Mechanical Engineering program and permission in writing (form available) of the student's advisor. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For Ph.D. 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.

ME 7951. Doctoral Research. (0-0) 1 Credit Hour.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7952. Doctoral Research. (0-0) 2 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7953. Doctoral Research. (0-0) 3 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7954. Doctoral Research. (0-0) 4 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7955. Doctoral Research. (0-0) 5 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7956. Doctoral Research. (0-0) 6 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7958. Doctoral Research. (0-0) 8 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor. May be repeated for credit. A minimum of 18 credit hours of Doctoral Research is required.

ME 7981. Doctoral Dissertation. (0-0) 1 Credit Hour.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor, after being admitted for Ph.D. candidacy. May be repeated for credit. A minimum of 15 credit hours of Doctoral Dissertation is required. (Formerly ME 7993-8.).

ME 7982. Doctoral Dissertation. (0-0) 2 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor, after being admitted for Ph.D. candidacy. May be repeated for credit. A minimum of 15 credit hours of Doctoral Dissertation is required. (Formerly ME 7993-8.).

ME 7983. Doctoral Dissertation. (0-0) 3 Credit Hours.

Prerequisites: Consent of the Graduate Advisor of Record and primary thesis advisor, after being admitted for Ph.D. candidacy. May be repeated for credit. A minimum of 15 credit hours of Doctoral Dissertation is required. (Formerly ME 7993-8.).

ME 7991. Research Seminar. (1-0) 1 Credit Hour.

Required for all Ph.D. students to satisfy one semester of research seminar. May be repeated, but no more than one hour will be applied to the Doctoral degree requirements.

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Department of Anthropology

The Department of Anthropology offers the Master of Arts Degree in Anthropology and the Doctor of Philosophy Degree in Anthropology.

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Master of Arts Degree in Anthropology

The Master of Arts program in Anthropology supports the holistic ideal of Americanist anthropology 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 includes 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; medical anthropology of the Border region; conservation ecology in the Americas, Africa, and Island Pacific; and indigenous and environmental politics in Africa, Island Pacific, and lowland and Andean South America.

Application Procedures

The Anthropology Department admits Master's students once a year in the Fall. The departmental deadline for applications is March 1.

In addition to satisfying the University-wide graduate admission requirements, applicants should have a 3.3 grade point average in the last 60 hours of coursework and have successfully taken 12–18 hours of coursework in anthropology. This coursework should include courses across the subdisciplines of anthropology.

Applicants for admission to the M.A. program in Anthropology must complete an online application for admission through the UTSA Graduate School (<http://graduateschool.utsa.edu/>). For all applicants, including graduate degree-seeking, non-degree-seeking, and special graduate students (see Chapter 1, Admission, of this catalog for definitions), the application to the Master of Arts program in Anthropology consists of an application form, official academic transcripts, an essay (statement of purpose), writing sample, and three letters of recommendation. For

graduate degree-seeking applicants, Graduate Record Examination (GRE) scores must also be submitted to the Graduate School.

Essay: Please write a statement telling us about your intentions for entering UTSA's M.A. program in Anthropology. This letter should be approximately 500–750 words in length (approximately two to three double-spaced pages). This statement should include information on:

- undergraduate coursework and other relevant experiences (how did these prepare you for graduate work in Anthropology),
- area of subdisciplinary and regional specialization, as well as particular research interests,
- how your academic interests match with faculty, departmental and university resources,
- at least two faculty who would be suitable advisors; and
- how a graduate degree in Anthropology will further your career goals.

Writing Sample: It is preferred that the writing sample be a 10–25 page term or research paper.

Letters of Recommendation: At least two of the three required recommendation letters will preferably be from faculty who have worked closely with the applicant in either the classroom, laboratory, or other research site.

GRE: For graduate degree-seeking applicants, GRE scores must also be submitted to the Graduate School. These scores will be considered as only one element in the evaluation of applicants.

Other Test Scores: 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.

Applications will not be reviewed until complete.

Applicants can request graduate degree-seeking, non-degree-seeking, or special graduate student status. A graduate degree-seeking applicant admitted to the program may receive unconditional, conditional, or probationary admission status. Non-degree-seeking students and special graduate students may be limited in the courses they are permitted to take. Admission with non-degree-seeking or special graduate student status does not ensure subsequent admission as a degree-seeking student.

Applicants will be evaluated on the basis of demonstrated potential for success in graduate study in Anthropology as indicated by a combination of prior undergraduate academic performance, the application essay, research interests, writing sample, letters of recommendation, and, if applicable, GRE test scores. Admission is competitive. Satisfying minimum requirements does not guarantee admission.

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:	9
ANT 5023 History, Method, and Theory of Archaeology	
ANT 5033 Theory in Cultural Anthropology	
ANT 5073 Advanced Biological Anthropology	
B. 3 semester credit hours of a dedicated methods class, as approved by the student's advisor.	3
C. 15 semester credit hours of elective courses chosen in consultation with the student's advisor and subject to the following conditions:	15
1. Students will normally take a minimum of 9 semester credit hours of electives in regular, organized graduate anthropology courses (this excludes ANT 6443 Supervised Field Research, ANT 6933 Internship in Anthropology, and ANT 6953 Independent Study).	
2. Students are expected to develop a primary regional or topical expertise. Knowledge of this region or topic will be evaluated as part of the comprehensive examination (see below).	
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.	6
Total Credit Hours	33

Doctor of Philosophy Degree in Anthropology

UTSA's Ph.D. program in Anthropology offers training in anthropology's traditional subdisciplines to further basic and applied research into ecological and environmental concerns. 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. Theoretical and applied emphases include political and cultural ecology; landscape perspectives; agrarian economy and ecology; the archaeology of complexity; indigenous and environmental politics; primate and evolutionary ecology; medical anthropology; perspectives on sociocultural change; myth, ritual and language; and conservation, biology and practice. Geographic research areas include: American Southwest, Texas, Northwest Mexico, Andean South America, Mesoamerica and Maya Lowlands (archaeology); Southeast Asia, Africa, and Neotropics (biological anthropology); and United States, Mexico, U.S.-Mexico borderlands, Lowland South America, Africa, and Island Pacific (cultural anthropology).

The regulations for this degree comply with the general University regulations (refer to Chapter 2, General Academic Regulations, and Chapter 5, Doctoral Degree Regulations).

Application Procedures

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), a writing sample, and three letters of recommendation. Applicants must also submit Graduate Record Examination (GRE) scores with their application. These scores will be considered as only 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

All students are expected to master skill sets in research, analysis, academic writing, and pedagogy. They are required to take a minimum of 78 semester credit hours beyond the baccalaureate degree (exclusive of organized coursework required to remove conditions of admission). In addition, students must successfully pass a qualifying examination, a doctoral dissertation proposal defense, and a doctoral dissertation defense.

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. 12 semester credit hours of Doctoral Core courses:	12
ANT 5023 History, Method, and Theory of Archaeology	
ANT 5033 Theory in Cultural Anthropology	
ANT 5073 Advanced Biological Anthropology	
ANT 6603 Ecological Anthropology	
B. 6 semester credit hours of methods courses, as approved by the student's advisor.	6
C. 33 semester credit hours of elective courses, as approved by the student's advisor. If students wish to take elective courses outside the Department, they first must seek approval from the Graduate Program Committee.	33
D. 3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of the qualifying examination and nearing the completion of organized coursework)	3

E. Doctoral Research and Dissertation (minimum 24 semester credit hours):

ANT 7011	Directed Doctoral Research
ANT 7012	Directed Doctoral Research
ANT 7013	Directed Doctoral Research
ANT 7021	Doctoral Dissertation
ANT 7022	Doctoral Dissertation
ANT 7023	Doctoral Dissertation

Total Credit Hours **78**

Qualifying Examination

Students may take the qualifying examination upon successful completion of 30 hours of coursework; this coursework must include all required Doctoral Core 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

Doctoral 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-ANT 7013) and Doctoral Dissertation (ANT 7021-ANT 7023) 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 the Anthropology 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 minimum requirements:

- | | |
|--|----|
| A. 3 semester credit hours of ANT 6603 Ecological Anthropology | 3 |
| B. A minimum of 18 semester credit hours of additional coursework, as approved by the student's advisor and chosen from the following domains: | 18 |

1. Doctoral Core courses (students may be exempted from some core courses, with the approval of the Graduate Program Committee, if they have taken equivalent coursework at their M.A.-conferring institutions).
2. Methods courses, as indicated by the student's areas of interest and approved by the student's advisor.

3. Elective Courses (if students wish to take elective courses outside the Department, they first must seek approval from 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) 3

D. Doctoral Research and Dissertation (minimum 24 semester credit hours): 24

ANT 7011	Directed Doctoral Research
ANT 7012	Directed Doctoral Research
ANT 7013	Directed Doctoral Research
ANT 7021	Doctoral Dissertation
ANT 7022	Doctoral Dissertation
ANT 7023	Doctoral Dissertation

Total Credit Hours 48

Qualifying Examination

Students may take the qualifying examination upon successful completion of 30 hours of coursework; this coursework must include required Doctoral Core 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-ANT 7013) and Doctoral Dissertation (ANT 7021-ANT 7023) 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).

Anthropology (ANT) Courses

ANT 5023. History, Method, and Theory of Archaeology. (3-0) 3 Credit Hours.

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.

ANT 5033. Theory in Cultural Anthropology. (3-0) 3 Credit Hours.

This course surveys the main conceptual, methodological, and theoretical developments in cultural anthropology. (Formerly titled "Paradigms of Americanist Anthropology.").

ANT 5043. Seminar in Laboratory Methods in Anthropology. (3-0) 3 Credit Hours.

This seminar reviews the physical and technical aspects of analysis of anthropological materials. May be repeated for credit when topics vary.

ANT 5073. Advanced Biological Anthropology. (3-0) 3 Credit Hours.

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.

ANT 5283. Hunters and Gatherers. (3-0) 3 Credit Hours.

A study of the major issues archaeologists address concerning the cultural ecology and cultural evolution of hunters and gatherers around the world.

ANT 5313. Seminar in Archaeological Research Techniques. (3-0) 3 Credit Hours.

This course addresses key archaeological research strategies involved in the acquisition and analysis of archaeological data. Topics may include survey and excavation strategies as well as analyses of various archaeological materials, such as ceramics or lithics. The course highlights the integration of these techniques into broader research designs and their application to important questions about the past. May be repeated for credit when topics vary.

ANT 5413. Seminar in the Prehistory of Texas and Adjacent Areas. (3-0) 3 Credit Hours.

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.

ANT 5453. Seminar on the Archaeology of the American Southwest and Adjacent Regions. (3-0) 3 Credit Hours.

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.

ANT 5483. Landscape and Settlement. (3-0) 3 Credit Hours.

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.

ANT 5553. Field Course in Archaeology. (3-0) 3 Credit Hours.

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.

ANT 5556. Field Course in Archaeology. (2-12) 6 Credit Hours.

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.

ANT 5563. Seminar in Andean Archaeology and Ethnography. (3-0) 3 Credit Hours.

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.

ANT 5573. Anthropology and Science. (3-0) 3 Credit Hours.

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.

ANT 5583. Teaching Anthropology. (3-0) 3 Credit Hours.

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.

ANT 5603. Ancient Civilizations. (3-0) 3 Credit Hours.

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).

ANT 5613. Seminar in Resource Frontiers. (3-0) 3 Credit Hours.

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.

ANT 5623. Archaeology of Mexico. (3-0) 3 Credit Hours.

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.

ANT 5633. Peoples of Mexico and Central America since 1492. (3-0) 3 Credit Hours.

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.

ANT 5643. Primates in Ecological Communities. (3-0) 3 Credit Hours.

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.

ANT 6133. Seminar in Medical Anthropology. (3-0) 3 Credit Hours.

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.

ANT 6213. Topics in the Anthropology of Native North America. (3-0) 3 Credit Hours.

An organized course examining topics of current interest to anthropologists with a focus on North America. May be repeated for credit.

ANT 6223. The Archaeology of Household and Residence. (3-0) 3 Credit Hours.

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.

ANT 6233. Topics in the Anthropology of Complex Societies. (3-0) 3 Credit Hours.

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.

ANT 6303. Seminar in Research Design and Proposal Writing. (3-0) 3 Credit Hours.

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.

ANT 6353. Field Research Methods in Cultural Anthropology. (3-0) 3 Credit Hours.

The study and practice of field research methods of cultural anthropology emphasizing participant observation and use of informants.

ANT 6443. Supervised Field Research. (0-0) 3 Credit Hours.

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, but not more than 3 hours may be applied to the Doctoral degree.

ANT 6446. Supervised Field Research. (0-0) 6 Credit Hours.

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, but not more than 3 hours may be applied to the Doctoral degree.

ANT 6503. Seminar in Cultural Resource Management. (3-0) 3 Credit Hours.

This seminar reviews the legislative basis, practical application, and current state of cultural resource management in Texas and the United States.

ANT 6513. Maya Civilization. (3-0) 3 Credit Hours.

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).

ANT 6603. Ecological Anthropology. (3-0) 3 Credit Hours.

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.

ANT 6623. Seminar in Analytical Methods in Archaeology. (3-0) 3 Credit Hours.

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.)

ANT 6643. Seminar in Culture and Economy. (3-0) 3 Credit Hours.

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.

ANT 6653. Spatial Techniques in Anthropology. (3-0) 3 Credit Hours.

This course explores topics in the theories and techniques of spatial analysis, the operation of geographic information systems, and the use of digital and remotely sensed imagery. May be repeated for credit when topics vary.

ANT 6663. Research Methods in Ecological Anthropology. (3-0) 3 Credit Hours.

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. May be repeated for credit when topics vary.

ANT 6703. Human Population Ecology. (3-0) 3 Credit Hours.

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.

ANT 6713. Topics in Primatological Research. (3-0) 3 Credit Hours.

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.")

ANT 6723. Seminar in Culture, Environment, and Conservation. (3-0) 3 Credit Hours.

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.

ANT 6803. Medical Ecology. (3-0) 3 Credit Hours.

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.

ANT 6823. Human-Animal Relations. (3-0) 3 Credit Hours.

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.

ANT 6853. Topics in Human Evolution. (3-0) 3 Credit Hours.

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.

ANT 6863. Evolution of Human Diet. (3-0) 3 Credit Hours.

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.

ANT 6873. Energy, the Brain and the Gut in Primate and Human Evolution. (3-0) 3 Credit Hours.

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.

ANT 6903. Anthropology of Gender. (3-0) 3 Credit Hours.

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.

ANT 6923. Conservation of Primates and Other Threatened Species. (3-0) 3 Credit Hours.

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.

ANT 6933. Internship in Anthropology. (0-0) 3 Credit Hours.

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.

ANT 6951. Independent Study. (0-0) 1 Credit Hour.

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.

ANT 6952. Independent Study. (0-0) 2 Credit Hours.

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.

ANT 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ANT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

ANT 6973. Special Problems. (3-0) 3 Credit Hours.

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.

ANT 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

ANT 6982. Master's Thesis. (0-0) 2 Credit Hours.

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.

ANT 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

ANT 6991. Pre-Doctoral Research. (0-0) 1 Credit Hour.

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, but not more than 3 hours will apply to the Doctoral degree.

ANT 6992. Pre-Doctoral Research. (0-0) 2 Credit Hours.

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, but not more than 3 hours will apply to the Doctoral degree.

ANT 6993. Pre-Doctoral Research. (0-0) 3 Credit Hours.

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, but not more than 3 hours will apply to the Doctoral degree.

ANT 7003. Dissertation Proposal. (0-0) 3 Credit Hours.

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).

ANT 7011. Directed Doctoral Research. (0-0) 1 Credit Hour.

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.

ANT 7012. Directed Doctoral Research. (0-0) 2 Credit Hours.

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.

ANT 7013. Directed Doctoral Research. (0-0) 3 Credit Hours.

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.

ANT 7021. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

ANT 7022. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

ANT 7023. Doctoral Dissertation. (0-0) 3 Credit Hours.

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

The Department of Art and Art History offers the Master of Fine Arts Degree in Art and the Master of Arts Degree in Art History.

- Master of Fine Arts Degree in Arts (p. 189)
- Master of Arts Degree in Art History (p. 190)

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 <http://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 or as a PowerPoint presentation on CD or USB flash drive. The portfolio (slide or digital) must have an attached sheet listing titles, dates, dimensions, and media of each work. 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.

Departmental Requirements

All M.F.A. program graduate students are required to accrue a minimum of 60 clock hours of service to the “student-run” UTSA Satellite Space in the form of preparatory duties, Gallery sitting and maintenance on the exhibition space.

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 End Progress Reviews, Advancement Review (available after completion of 24 semester credit hours of the program of study), a Candidacy Review (available in the fourth semester after completion of 36 to 42 semester credit hours of the program of study), 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.

1. A focused program of study in studio art (ART) including ART 6023 Graduate Studio Seminar	30
2. Art electives outside the student’s specialized area of study	12
3. Free Elective	3
4. Art history and criticism (AHC) including AHC 5123 Seminar in Research Methods and Writing	12
5. ART 6843 Master of Fine Arts Exhibition	3
Total Credit Hours	60

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; modern and contemporary art history and criticism in the United States and internationally; 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 5000 or 6000 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 <http://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. Students accepted into the Master of Arts degree program in Art History are required to maintain a minimum of 3 semester credit hours of enrollment for all Fall and Spring semesters while and until the degree is completed. Failure to enroll will result in forfeiture of the student’s status as an accepted candidate in the program. Exceptions to this requirement are granted only due to extraordinary circumstances as determined by the review and approval of the Graduate Advisor of Record and the Department Chairperson.

A. 3 semester credit hour required:

AHC 5123	Seminar in Research Methods and Writing (must be taken in student’s first year)	3
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B. 21 semester credit hours of art history electives approved by 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. 6

D. 6 semester credit hours of AHC 6983 Master's Thesis.	6
Total Credit Hours	36

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 must be taken during or immediately after the semester in which students complete their coursework and before completion of the thesis.

Art History and Criticism (AHC) Courses

AHC 5123. Seminar in Research Methods and Writing. (3-0) 3 Credit Hours.

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.

AHC 5813. Topics in Art History. (3-0) 3 Credit Hours.

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.

AHC 5823. Topics in Mesoamerican Pre-Columbian Art. (3-0) 3 Credit Hours.

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.

AHC 5833. Topics in Spanish Art. (3-0) 3 Credit Hours.

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.

AHC 5843. Topics in Latin American Colonial Art. (3-0) 3 Credit Hours.

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.

AHC 5853. Topics in Contemporary Latin American Art. (3-0) 3 Credit Hours.

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.

AHC 5863. Topics in Contemporary U.S. Art. (3-0) 3 Credit Hours.

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.

AHC 6813. Practicum in Art History and Criticism. (0-0) 3 Credit Hours.

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.

AHC 6833. Art Gallery and Museum Practices. (0-0) 3 Credit Hours.

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.

AHC 6843. Project in Art History. (0-0) 3 Credit Hours.

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.

AHC 6913. Seminar in Art History. (3-0) 3 Credit Hours.

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.

AHC 6953. Independent Study. (0-0) 3 Credit Hours.

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.

AHC 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

AHC 6983. Master's Thesis. (0-0) 3 Credit Hours.

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 Credit (C) which indicates satisfactory progress or Non-Credit (NC) which indicates unsatisfactory progress for each semester of enrollment. Students receiving an evaluation of Non-Credit (NC) will be placed on program probation and students receiving two evaluations of Non-Credit will be reviewed for a determination of removal from the degree program. The Instructor of Record will make the determination of Credit (NC) or Non-Credit (NC) for each semester of enrollment. Determination of continuation within the program, in the event of two Non-Credit (NC) evaluations, will be made by a majority vote of the full-time graduate faculty of the Art History faculty.

Art (ART) Courses**ART 5153. Painting/Drawing. (0-6) 3 Credit Hours.**

Prerequisite: B.F.A. or equivalent. The exploration of painting/drawing's broad capacity for conceptual and formal inquiry. May be repeated for credit.

ART 5353. Printmaking. (0-6) 3 Credit Hours.

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.

ART 5453. Photography. (0-6) 3 Credit Hours.

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.

ART 5553. Sculpture. (0-6) 3 Credit Hours.

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.

ART 5753. Ceramics. (0-6) 3 Credit Hours.

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.

ART 5953. New Media. (0-6) 3 Credit Hours.

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. (Formerly titled "Video/Digital.")

ART 6013. Practicum in the Visual Arts. (0-0) 3 Credit Hours.

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.

ART 6023. Graduate Studio Seminar. (0-6) 3 Credit Hours.

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.

ART 6843. Master of Fine Arts Exhibition. (0-0) 3 Credit Hours.

Prerequisite: Completion of studio course requirements in the major. Concentrated studio activity in the major field of study emphasizing preparation of work for the required concluding M.F.A. exhibition, in consultation with the Graduate Advisor of Record and upon approval of the Graduate Program Committee in the program.

ART 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ART 6973. Special Problems. (0-6) 3 Credit Hours.

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.

Museum Studies (MSM) Courses**MSM 5003. Foundations of Museum Studies. (3-0) 3 Credit Hours.**

An introduction to the history of museums and the practices of contemporary cultural institutions. Course includes a general overview of the field of museum studies, including curatorship, collections management, fieldwork, exhibits, interpretation, educational and public programming, marketing, fundraising, and administration.

MSM 5813. Topics in Museum Studies. (3-0) 3 Credit Hours.

Advanced examination of one or more topics in the museum profession. May be repeated for credit when topics vary.

Department of Communication

The Department of Communication offers the Master of Arts Degree in 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 ¹	3
COM 5013	Communication Theory	3
COM 5023	Quantitative Research Methods	3
COM 5033	Qualitative Research Methods	3
COM 5103	Theories and Applications of Communication	3

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 the following may be applied to the Master's degree.

COM 6931	Directed Readings
COM 6932	Directed Readings
COM 6933	Directed Readings
COM 6941	Internship in Communication
COM 6942	Internship in Communication
COM 6943	Internship in Communication

COM 6951	Independent Study
COM 6952	Independent Study
COM 6953	Independent Study

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 18 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.

Total Credit Hours	36
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1. COM 5003 Introduction to Graduate Studies in Communication must be taken in the student's first semester of graduate coursework.

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 is normally taken in the semester in which the candidate is due to complete his or her graduate study. Enrollment in COM 6961 Comprehensive Examination 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 will also orally defend the final thesis or project before the committee.

Communication (COM) Courses

COM 5003. Introduction to Graduate Studies in Communication. (3-0) 3 Credit Hours.

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.

COM 5013. Communication Theory. (3-0) 3 Credit Hours.

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.

COM 5023. Quantitative Research Methods. (3-0) 3 Credit Hours.

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.

COM 5033. Qualitative Research Methods. (3-0) 3 Credit Hours.

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.

COM 5103. Theories and Applications of Communication. (3-0) 3 Credit Hours.

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.

COM 5113. Communication and College Level Instruction. (3-0) 3 Credit Hours.

Prerequisite: Admission to the Master of Arts Program in Communication or consent of instructor. This course facilitates understanding of the major issues in teaching at the college level. In this graduate-level seminar, emphasis will be placed on the conceptualization, design, development, and management of college-level courses in communication and other allied areas. Assignments will include syllabi development, assignment development, grading rubrics, lesson plans, record keeping methods, and short written assignments describing personal development as a college-level instructor.

COM 5213. Relational Communication. (3-0) 3 Credit Hours.

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.

COM 5223. Small Group Communication. (3-0) 3 Credit Hours.

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.

COM 5313. Health Communication. (3-0) 3 Credit Hours.

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.

COM 5323. Special Topics in Health Communication. (3-0) 3 Credit Hours.

Prerequisite: COM 5103. This seminar will focus on significant and timely topics in the health communication field. Students may be exposed to healthcare issues such as provider-recipient communication, interdisciplinary team communication, decision-making, social identity, family dynamics, the role of culture in health and disease, new media, healthcare promotion, or community outreach. Broadly, students will gain insight about applied health communication topics and discover the multiple career options available for communication majors in health contexts.

COM 5413. Seminar in Organizations. (3-0) 3 Credit Hours.

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.

COM 5423. Organizational Implementation of Integrated Communication. (3-0) 3 Credit Hours.

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.

COM 5613. New Media Design and Production I. (3-0) 3 Credit Hours.

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.

COM 5623. New Media Design and Production II. (3-0) 3 Credit Hours.

Prerequisite: COM 5613. Advanced study of information design theories and practice. Emphasizes new media production techniques. The course includes integration of theory with research and/or practice.

COM 5813. International Communication. (3-0) 3 Credit Hours.

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.

COM 5823. Intercultural Communication. (3-0) 3 Credit Hours.

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.

COM 5973. Topics in Communication. (3-0) 3 Credit Hours.

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.

COM 6931. Directed Readings. (1-0) 1 Credit Hour.

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.

COM 6932. Directed Readings. (2-0) 2 Credit Hours.

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.

COM 6933. Directed Readings. (3-0) 3 Credit Hours.

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.

COM 6941. Internship in Communication. (0-0) 1 Credit Hour.

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.

COM 6942. Internship in Communication. (0-0) 2 Credit Hours.

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.

COM 6943. Internship in Communication. (0-0) 3 Credit Hours.

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.

COM 6951. Independent Study. (0-0) 1 Credit Hour.

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.

COM 6952. Independent Study. (0-0) 2 Credit Hours.

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.

COM 6953. Independent Study. (0-0) 3 Credit Hours.

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.

COM 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

COM 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

COM 6982. Master's Thesis. (0-0) 2 Credit Hours.

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.

COM 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

COM 6991. Master's Project. (0-0) 1 Credit Hour.

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.

COM 6992. Master's Project. (0-0) 2 Credit Hours.

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.

COM 6993. Master's Project. (0-0) 3 Credit Hours.

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

The Department of English offers the following: Master of Arts Degree in English, Graduate Certificate in Creative Writing, Graduate Certificate in Rhetoric and Composition and Doctor of Philosophy Degree in English.

- Master of Arts Degree in English (p. 196)
- Doctor of Philosophy Degree in English (p. 196)

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:		
ENG 5013	Introduction to the Graduate Study of Literature (normally must be taken in the student's first semester)	3
ENG 5053	Topics in Literary Genres	3
2. Prescribed electives:		
a.	ENG literary study from before 1700, at least 3 semester credit hours must be ENG 5943 Topics in Major English Authors	6
b.	ENG literary study between 1700 and 1900	6
c.	ENG literary study after 1900	6

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

Total Credit Hours

36

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 or ENG 6986 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 under extraordinary circumstances. Under normal circumstances, the Comprehensive Examination may be taken only twice.

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 General Academic Regulations, and 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 the General 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:

ENG 5183	Theory and Practice of Teaching Composition (if a course equivalent has already been taken)	3
or ENG 6023	Rhetoric and Composition: Text and Context	
ENG 6013	Theoretical and Research Methods	3
ENG 6053	Latina/o Studies: Text and Context	3

B. Seminars:

ENG 7053	Seminar: Latina/o Studies	3
ENG 7063	Seminar: Issues in Culture	3
ENG 7073	Seminar: Theory and Criticism	3

C. Electives:

1. Select one of the following prescribed electives:	3
ENG 6023 Rhetoric and Composition: Text and Context (if not taken to fulfill core requirement)	
ENG 6033 Language and Linguistics	
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. ¹	12

D. Doctoral research:

ENG 7311	Doctoral Dissertation	1
ENG 7313	Doctoral Dissertation	3
Total Credit Hours		37

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.

- Graduate Certificate in Creative Writing (p. 198)
- Graduate Certificate in Rhetoric and Composition (p. 198)

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.

Graduate Certificate in Rhetoric and Composition

The Graduate Certificate in Rhetoric and Composition is a 12-semester-credit-hour concentration available to degree-seeking students who have been admitted to any UTSA graduate program, as well as special graduate students who meet all the requirements outlined in the UTSA Graduate Catalog.

The Graduate Certificate in Rhetoric and Composition offers coursework in advanced, interdisciplinary study of language and language instruction, encompassing theoretical, applied, and pedagogical aspects of discourse. This certificate is designed for graduate students interested in working at the master's or doctoral level in rhetoric and composition and will be particularly valuable for doctoral students focusing on one of the two areas of emphasis in the Ph.D. in English program, Rhetoric and Composition. This certificate will also enhance students' employment credentials as college and university writing instructors or professional writers in corporate, nonprofit, and educational settings. This certificate offers further professional development at the graduate level for teachers already teaching English Language Arts at the high school level.

Requirements for the Graduate Certificate in Rhetoric and Composition comprise 12 semester credit hours, including:

ENG 5133	Development of Rhetoric and Composition	3
Select 3 of the following:		9
ENG 5183	Theory and Practice of Teaching Composition	
ENG 6023	Rhetoric and Composition: Text and Context	
ENG 6033	Language and Linguistics	
ENG 7113	Supervised Teaching in English	
Total Credit Hours		12

Courses may be repeated when topics vary but not more than 6 hours of any one course may be applied to the certificate. No course in which a grade lower than "B" is earned may be used to complete a Graduate Certificate in Rhetoric and Composition. In order to receive this certificate, students must maintain a 3.0 or better grade point average in the above courses.

Individuals interested in the Graduate Certificate in Rhetoric and Composition should contact the Graduate Office of the Department of English.

English (ENG) Courses

ENG 5013. Introduction to the Graduate Study of Literature. (3-0) 3 Credit Hours.

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.

ENG 5053. Topics in Literary Genres. (3-0) 3 Credit Hours.

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.

ENG 5133. Development of Rhetoric and Composition. (3-0) 3 Credit Hours.

Survey of the development of rhetorical theory, with emphasis on how present composition theory and practice reflect earlier traditions.

ENG 5173. Theory and Practice of Teaching Literature. (3-0) 3 Credit Hours.

Critical study of literary pedagogy and applications of theory and research to the teaching of literature.

ENG 5183. Theory and Practice of Teaching Composition. (3-0) 3 Credit Hours.

Introduction to current scholarship in composition and applications to the teaching of writing.

ENG 5223. Medieval Literature. (3-0) 3 Credit Hours.

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.

ENG 5313. Renaissance Literature. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama of the sixteenth and seventeenth centuries, excluding Shakespeare and Milton.

ENG 5413. Restoration and Eighteenth-Century Literature. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama of the Restoration and the eighteenth century.

ENG 5513. Nineteenth-Century British Literature. (3-0) 3 Credit Hours.

Critical study of poetry and prose of nineteenth-century British writers.

ENG 5613. Nineteenth-Century American Literature. (3-0) 3 Credit Hours.

Critical study of poetry and prose of nineteenth-century American writers.

ENG 5633. Topics in the Study of Literature. (3-0) 3 Credit Hours.

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.

ENG 5733. British and American Literature, 1900–1950. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama of British and American writers from 1900 to 1950.

ENG 5743. British and American Literature, 1950–The Present. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama of British and American writers from 1950 to the present.

ENG 5753. World Literatures in English. (3-0) 3 Credit Hours.

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.

ENG 5763. Latina/o Literature. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama of Latina/o writers.

ENG 5773. Women and Literature. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama written by women and/or representing female identity.

ENG 5783. African American Literature. (3-0) 3 Credit Hours.

Critical study of poetry, prose, and drama of African American writers.

ENG 5933. Topics in American Literature. (3-0) 3 Credit Hours.

Critical study of selected American authors, themes, or cultural, historical, or aesthetic issues. May be repeated for credit when topics vary.

ENG 5943. Topics in Major English Authors. (3-0) 3 Credit Hours.

Critical study of the major works of one of the following authors: Chaucer, Shakespeare, Milton. May be repeated for credit when topics vary.

ENG 6013. Theoretical and Research Methods. (3-0) 3 Credit Hours.

Introduction to the theories and methods of professional literary research, including research in cross-cultural studies. (Formerly titled "Bibliography and Research.")

ENG 6023. Rhetoric and Composition: Text and Context. (3-0) 3 Credit Hours.

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.

ENG 6033. Language and Linguistics. (3-0) 3 Credit Hours.

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.

ENG 6043. Creative Writing. (3-0) 3 Credit Hours.

Prerequisites: Approval of instructor and Graduate Advisor of Record. Intensive workshop in creative writing. May be repeated for credit when topics vary.

ENG 6053. Latina/o Studies: Text and Context. (3-0) 3 Credit Hours.

Advanced study and research of Latina/o texts. May include some literature in translation. May be repeated once for credit when topics vary.

ENG 6063. Cross Cultural Issues: Text and Context. (3-0) 3 Credit Hours.

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.

ENG 6073. Theory and Criticism: Text and Context. (3-0) 3 Credit Hours.

Advanced study and research of topics and movements in literary theory and criticism. May be repeated once for credit when topics vary.

ENG 6951. Independent Study. (0-0) 1 Credit Hour.

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.

ENG 6953. Independent Study. (0-0) 3 Credit Hours.

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.

ENG 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

ENG 6973. Special Topics. (3-0) 3 Credit Hours.

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.

ENG 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

ENG 6986. Master's Thesis. (0-0) 6 Credit Hours.

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.

ENG 7053. Seminar: Latina/o Studies. (3-0) 3 Credit Hours.

Prerequisite: ENG 6013. Advanced and intensive research on key issues in Latina/o Studies. May be repeated once for credit when topics vary.

ENG 7063. Seminar: Issues in Culture. (3-0) 3 Credit Hours.

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.

ENG 7073. Seminar: Theory and Criticism. (3-0) 3 Credit Hours.

Prerequisite: ENG 6013. Advanced and intensive research on key issues in theory and criticism. May be repeated for credit when topics vary.

ENG 7083. Seminar: New Texts/New Contexts. (3-0) 3 Credit Hours.

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.

ENG 7113. Supervised Teaching in English. (3-0) 3 Credit Hours.

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.

ENG 7211. Directed Readings. (0-0) 1 Credit Hour.

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.

ENG 7213. Directed Readings. (0-0) 3 Credit Hours.

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.

ENG 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

ENG 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

ENG 7961. Qualifying Examination. (0-0) 1 Credit Hour.

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

The Department of History offers the Master of Arts Degree in History.

Master of Arts Degree in History

The Master of Arts (M.A.) degree in History offers students the opportunity to pursue the advanced study of history. The program is designed to develop students' skills in historical analysis and to expand students' understanding of the practice of history. M.A. students acquire competency in critical theoretical understandings of change over time and a broad knowledge of a thematic or geographic area. Students demonstrate this competence by designing and completing coursework and historical research projects or theses based on primary source research integrated with relevant historiographical knowledge.

Program Admission Requirements

In addition to satisfying the University-wide admission requirements, competitive applicants should have:

- 18 upper-division semester credit hours in history or courses with demonstrably significant historical content
- A grade point average of 3.2 or better (on a 4.0 scale) in the last 60 hours of undergraduate education or a 3.2 in graduate work; and a grade point average of 3.2 or better in all History courses taken.

In addition to submitting all University required application materials (e.g., application form, official transcripts), applicants must submit: 1) a 500-word statement describing how a M.A. in History will advance personal and professional goals; 2) Graduate Record Examination (GRE) scores from a GRE-administered examination—these scores will be considered as only one element in the evaluation of applicants; and 3) two letters of recommendation. It is strongly recommended that at least one of the letters be from a professor who can discuss and evaluate specifically your academic qualifications and potential for graduate study.

Submission of research-based writing samples are optional.

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. 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 30. This is exclusive of coursework or other study required for admission.

Degree candidates must complete the following requirements:

A. 3 semester credit hours:

HIS 5003	Introduction to History: Theories and Methods (Students must enroll in this course in the first semester of their program.)	3
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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 one of the following two sequences:

Sequence I:

HIS 6813	Proseminar in History	
HIS 6903	Research Seminar in History	

This sequence will vary in subject. A student must take HIS 6813 Proseminar in History and then HIS 6903 Research Seminar in History in consecutive long semesters. Note: HIS 5003 Introduction to History: Theories and Methods is a prerequisite for enrollment in HIS 6813.

Sequence II:

HIS 6983	Master's Thesis (repeated for a total of 6 hours)	
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A total of 6 semester credit hours of HIS 6983 can be applied towards the total 30 semester credit hours required for this degree. Students writing a thesis will complete HIS 6983 Master's Thesis (6 hours) in accordance with University-wide requirements as stated in this catalog. Students must be enrolled in HIS 6983 during the semester in which they graduate.

D. 18 semester credit hours of elective courses, chosen in consultation with the student's advisor: 18

At least 6 hours must be outside the student's focus area; focus areas are United States History and World History.

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.

Total Credit Hours 30

Note: Students are encouraged to pursue languages or other formal competencies as appropriate to their needs.

History (HIS) Courses

HIS 5003. Introduction to History: Theories and Methods. (3-0) 3 Credit Hours.

This course provides students with an introduction to the discipline of history. The course considers how historians conceptualize and conduct the study of history by asking historical questions, critically analyzing primary and secondary works, conducting archival and library research (both traditional and electronic), and developing and critiquing sets of arguments. The course considers competing approaches to the study of historical processes and how historians' categories of analysis change over time. (Students must enroll in this course in the first semester of their program.).

HIS 5053. Topics in Medieval Europe. (3-0) 3 Credit Hours.

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.

HIS 5063. Topics in Early Modern European History. (3-0) 3 Credit Hours.

An examination of the major historiographical and historical problems in early modern European history, from the fourteenth century to the seventeenth century.

HIS 5093. Designing a History Course. (3-0) 3 Credit Hours.

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.

HIS 5123. The American Revolution, 1763–1789. (3-0) 3 Credit Hours.

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.

HIS 5153. The Civil War and Reconstruction, 1850–1877. (3-0) 3 Credit Hours.

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.

HIS 5163. History of the U.S. South. (3-0) 3 Credit Hours.

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.

HIS 5193. The United States Since the Great Depression. (3-0) 3 Credit Hours.

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.

HIS 5203. U.S. Political History. (3-0) 3 Credit Hours.

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.

HIS 5263. History of the Spanish Borderlands. (3-0) 3 Credit Hours.

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.

HIS 5283. Race in United States History. (3-0) 3 Credit Hours.

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.

HIS 5293. The American West. (3-0) 3 Credit Hours.

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.

HIS 5313. South Texas: Rural and Urban. (3-0) 3 Credit Hours.

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.

HIS 5323. The U.S.–Mexico Border. (3-0) 3 Credit Hours.

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.

HIS 5423. Colonial Mexico. (3-0) 3 Credit Hours.

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.

HIS 5433. Modern Mexico. (3-0) 3 Credit Hours.

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.

HIS 5453. The French Revolution and the Greater Caribbean. (3-0) 3 Credit Hours.

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.

HIS 5653. Modern Chinese History. (3-0) 3 Credit Hours.

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.

HIS 5693. Indian Subcontinent. (3-0) 3 Credit Hours.

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. Topics will vary and may include India, Pakistan, Afghanistan, Nepal, Sri Lanka, and/or Bangladesh.

HIS 5733. Migration in Historical Context. (3-0) 3 Credit Hours.

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.

HIS 6113. Law and Society in America. (3-0) 3 Credit Hours.

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.

HIS 6153. History and Sexuality. (3-0) 3 Credit Hours.

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.).

HIS 6163. Women in the United States. (3-0) 3 Credit Hours.

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.

HIS 6173. Latina/os in the United States. (3-0) 3 Credit Hours.

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.

HIS 6193. U.S. Metropolitan History. (3-0) 3 Credit Hours.

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 “Comparative Urban History.”).

HIS 6323. Comparative Environmental History. (3-0) 3 Credit Hours.

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.

HIS 6413. Topics in U.S. History. (3-0) 3 Credit Hours.

Examines topics of current interest to historians of the United States. May be repeated for credit when topics vary.

HIS 6423. Topics in Modern European History. (3-0) 3 Credit Hours.

Examines topics of current interest to historians of Europe. May be repeated for credit when topics vary.

HIS 6433. Topics in Latin American History. (3-0) 3 Credit Hours.

Examines topics of current interest to historians of Latin America. May be repeated for credit when topics vary.

HIS 6443. Comparative Nationalism in the Modern World. (3-0) 3 Credit Hours.

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.

HIS 6463. Topics in African History. (3-0) 3 Credit Hours.

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.

HIS 6473. Topics in Asian History. (3-0) 3 Credit Hours.

Examines topics of current interest to historians of Asia. May be repeated for credit when topics vary.

HIS 6483. Topics in Comparative History. (3-0) 3 Credit Hours.

This course introduces students to comparative historical analysis and research. Studying historical processes, political, economic, intellectual and social movements in multiple contexts helps define questions about what is shared and what is unique, and to draw broad conclusions. By analyzing topics and thematic issues across time periods, regions, or in a transnational context, students will have the opportunity to develop skills in critical thinking, comparative methodologies, and historical explanation. May be repeated for credit when topics vary.

HIS 6813. Proseminar in History. (3-0) 3 Credit Hours.

Prerequisite: HIS 5003. 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.

HIS 6903. Research Seminar in History. (3-0) 3 Credit Hours.

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.

HIS 6913. Making History in the Digital Age. (3-0) 3 Credit Hours.

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.

HIS 6923. Teaching Practicum. (0-0) 3 Credit Hours.

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.

HIS 6951. Independent Study. (0-0) 1 Credit Hour.

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.

HIS 6952. Independent Study. (0-0) 2 Credit Hours.

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.

HIS 6953. Independent Study. (0-0) 3 Credit Hours.

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.

HIS 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

HIS 6973. Special Studies in History. (3-0) 3 Credit Hours.

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. (Formerly titled "Special Problems.")

HIS 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

HIS 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

HIS 6993. Internship in History. (0-0) 3 Credit Hours.

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

The Department of Modern Languages and Literature offers the Master of Arts Degree in Spanish and a Certificate in Spanish Translation Studies.

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 skills courses may not be included in this requirement. Students will have written and oral proficiencies assessed via performance in coursework 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. | 3 |
| B. 18 semester credit hours distributed as follows: | |
| 6 hours in culture (SPN) | 6 |
| 6 hours in Spanish language and linguistics (SPN and LNG) | 6 |
| 6 hours in literature (SPN) | 6 |
| C. 15 semester credit hours of electives in Spanish (SPN), Linguistics (LNG), Foreign Languages (FL) or other courses as approved by the Graduate Advisor of Record. | 15 |
| 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. | |

Total Credit Hours **36**

Graduate Certificate in Spanish Translation Studies

The Certificate in Spanish Translation Studies is a 15-hour option in Spanish graduate studies which introduces students to the theory and practice of translation (written) and interpreting (oral) between Spanish and English. Offerings include training in cultural competency, ethics, the practice of translation and interpreting in various settings, and current best practices.

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 including an introduction to theory and practice and the meta-language of translation studies. Courses in Spanish linguistics strengthen the interdisciplinary underpinnings of the Certificate, and the practicum, FL 6013 Practicum in Translation, provides training in and reinforcement of written and/or oral translation skills by means of a translation case study, a supervised internship, or a service learning project.

Students must complete the following requirements:

- | | | |
|--|--|-----------|
| A. 9 semester credit hours from the following: | | |
| FL 5043 | Principles of Translation and Interpreting | 3 |
| SPN 6083 | Theory and Practice of Translation or Interpreting | 3 |
| SPN 6973 | Special Problems | 3 |
| B. 3 semester credit hours from the following: | | |
| SPN 5023 | Writing and Editing in Spanish | 3 |
| SPN 5843 | History of the Spanish Language | |
| SPN 5853 | Spanish of the Southwest | |
| SPN 5883 | Spanish Morphology and Syntax | |
| SPN 5893 | Spanish Dialects | |
| C. FL 6013 Practicum in Translation | | 3 |
| Total Credit Hours | | 15 |

Students will take the Practicum 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.

Foreign Languages (FL) Courses

FL 5003. Foreign Language Studies. (3-0) 3 Credit Hours.

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.

FL 5013. Foreign Language Testing. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Consideration of content and approaches for measuring achievement and proficiency in various sub-skills of language and culture.

FL 5043. Principles of Translation and Interpreting. (3-0) 3 Credit Hours.

Prerequisite: Previous coursework or experience in translation or consent of instructor. Introduction to current and fundamental research in translation and interpreting studies. May be repeated when topics vary.

FL 5114. Individual Instruction in Elementary Language I. (0-0) 4 Credit Hours.

Opportunity to develop basic oral and written communication skills in the target language, along with enhanced comprehension skills in listening and reading.

FL 5124. Individual Instruction in Elementary Language II. (0-0) 4 Credit Hours.

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.

FL 5213. Individual Instruction in Intermediate Language I. (0-0) 3 Credit Hours.

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.

FL 5223. Individual Instruction in Intermediate Language II. (0-0) 3 Credit Hours.

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.

FL 5313. Individual Instruction in Advanced Language I. (0-0) 3 Credit Hours.

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.

FL 5323. Individual Instruction in Advanced Language II. (0-0) 3 Credit Hours.

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.

FL 6013. Practicum in Translation. (0-0) 3 Credit Hours.

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.

Linguistics (LNG) Courses

LNG 5013. Sociolinguistics. (3-0) 3 Credit Hours.

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.

LNG 5153. Topics in Contemporary Linguistics. (3-0) 3 Credit Hours.

Prerequisite: LNG 3813, an equivalent, or consent of instructor. Contemporary approaches to language analysis and description. May be repeated for credit when topics vary.

Spanish (SPN) Courses

SPN 5023. Writing and Editing in Spanish. (3-0) 3 Credit Hours.

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.

SPN 5123. Hispanic Film. (3-0) 3 Credit Hours.

Hispanic societies, history, culture, and language of film as interpreted by representative directors. May be repeated for credit when topics vary.

SPN 5373. Introduction to Graduate Spanish Studies. (3-0) 3 Credit Hours.

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.

SPN 5413. History of Ideas in the Hispanic World. (3-0) 3 Credit Hours.

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.

SPN 5463. Spanish Civilization. (3-0) 3 Credit Hours.

A study of the social, political, and cultural history of Spain from prehistory (the Caves of Altamira) to the present.

SPN 5473. Latin American Civilization. (3-0) 3 Credit Hours.

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.

SPN 5483. Studies in Hispanic Culture. (3-0) 3 Credit Hours.

Studies of different facets of Hispanic culture not normally available as part of regular course offerings. May be repeated for credit when topics vary.

SPN 5633. Spanish Medieval-Golden Age Literature. (3-0) 3 Credit Hours.

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.

SPN 5703. Modern Spanish Literature. (3-0) 3 Credit Hours.

Selected Spanish literary works from 1700 to the present. May be repeated for credit when topics vary.

SPN 5763. Latin American Literature to Modernism. (3-0) 3 Credit Hours.

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.

SPN 5773. Latin American Literature from Modernism to the Present. (3-0) 3 Credit Hours.

Studies in contemporary prose, poetry, and/or drama. May be repeated for credit when topics vary.

SPN 5803. Mexican American Literature. (3-0) 3 Credit Hours.

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.

SPN 5813. Studies in Hispanic Literature. (3-0) 3 Credit Hours.

Study in selected areas of Hispanic literature not normally available as part of regular course offerings. May be repeated for credit when topics vary.

SPN 5843. History of the Spanish Language. (3-0) 3 Credit Hours.

Chronological development of the Spanish language, focusing on areas such as phonology, morphology, and lexicon.

SPN 5853. Spanish of the Southwest. (3-0) 3 Credit Hours.

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.

SPN 5863. Spanish Phonetics and Phonology. (3-0) 3 Credit Hours.

The framework of articulatory phonetics, its application to Spanish and analysis of its phonological system. Additional areas may include theoretical approaches to phonology, applications for teaching, appreciation of regional variation, acoustic phonetics, etc.

SPN 5883. Spanish Morphology and Syntax. (3-0) 3 Credit Hours.

An opportunity for in-depth analysis of the Spanish language, focusing on the levels of word, phrase, and sentence.

SPN 5893. Spanish Dialects. (3-0) 3 Credit Hours.

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.

SPN 5903. Topics in Hispanic Linguistics. (3-0) 3 Credit Hours.

Study in selected areas of Hispanic linguistics not normally available as part of regular course offerings. May be repeated for credit when topics vary.

SPN 5943. Spanish Language and Culture. (3-0) 3 Credit Hours.

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.).

SPN 6011. Supervised Teaching in Spanish. (0-0) 1 Credit Hour.

Development and implementation of an undergraduate course in Spanish under the supervision of a member of the graduate faculty. May be repeated for credit.

SPN 6083. Theory and Practice of Translation or Interpreting. (3-0) 3 Credit Hours.

A survey of approaches to the practice and theory of translation and interpreting with hands-on practice in a variety of genres (for example, literary prose, poetry, essay, narration) and vocabularies (e.g., legal, medical, business). May be repeated for credit when topics vary.

SPN 6813. Seminar in Hispanic Studies. (3-0) 3 Credit Hours.

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.

SPN 6951. Independent Study. (0-0) 1 Credit Hour.

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.

SPN 6952. Independent Study. (0-0) 2 Credit Hours.

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.

SPN 6953. Independent Study. (0-0) 3 Credit Hours.

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.

SPN 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

SPN 6973. Special Problems. (3-0) 3 Credit Hours.

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.

SPN 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

Department of Music

The Department of Music offers the following: Master of Music Degree, Graduate Certificate in Keyboard Pedagogy, Graduate Certificate in Keyboard Performance, Graduate Certificate in Voice Pedagogy.

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, complete a statement of intent concerning graduate school, and successfully complete one of the following:

Instrumental and Choral Conducting

Audition in person or provide a recent video (DVD or private YouTube link) 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 high quality DVD or YouTube link) demonstrating the level of mastery in the proposed performance medium.

Music Education

Submit a digital video of classroom teaching (DVD or private YouTube link), documentation of teaching experience (résumé or curriculum vita), and a self-composed short essay (1-2 pages) that describes the reasons for becoming a teacher, commitment to music education, and future career goals.

Piano Pedagogy and Performance or Vocal Pedagogy and Performance

Audition in person (or with acceptable justification approved by the auditioning committee, provide a recent high quality DVD or private YouTube link) demonstrating the level of mastery in the proposed pedagogy and performance medium.

Students are required to take placement examinations in music theory, aural skills, and music history before taking graduate courses. A vocal pedagogy placement examination is required of all students with an emphasis in vocal performance and vocal pedagogy and performance. 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: 9

MUS 5133 Topics in Music Theory

MUS 5233 Introduction to Music Research

MUS 5263 Topics in Music History

B. 12 semester credit hours of studies in music selected according to 12 the area of emphasis and approved by the student's advisor:

Instrumental and Choral Conducting

MUS 5523 Rehearsal Techniques

MUS 5554 Music Performance—Performance Emphasis (two semesters)

MUS 6941 Recital

Vocal and Instrumental Performance

MUS 5533 Pedagogy of Musical Performance

MUS 5554 Music Performance—Performance Emphasis (two semesters)

MUS 6941 Recital

Piano Pedagogy and Performance

MUS 5533 Pedagogy of Musical Performance

MUS 5542 Music Performance (three semesters)

MUS 5572 Pedagogy of Classroom Instruction

MUS 6941 Recital

Vocal Pedagogy and Performance

MUS 5542 Music Performance (two semesters)

MUS 5554 Music Performance—Performance Emphasis (only in semester of recital)

MUS 6903 Project in Music Pedagogy

MUS 6941 Recital

Music Education

MUS 5403 Psychological Foundations of Music Education

MUS 5423 Foundations of Music Education

MUS 5523 Rehearsal Techniques

MUS 6423 Seminar in Music Education

C. 2-10 semester credit hours of music electives, approved by the student's advisor 2-10

Instrumental and Choral Conducting

MUS 5223 Ensemble Repertoire

MUS 6911 Recital Document

Vocal and Instrumental Performance

MUS 5433 Performance Repertoire

MUS 6911 Recital Document

Piano Pedagogy and Performance

MUS 5421	Practicum in Advanced Teaching	
MUS 5433	Performance Repertoire	
MUS 6903	Project in Music Pedagogy	
Vocal Pedagogy and Performance		
MUS 5421	Practicum in Advanced Teaching	
MUS 5433	Performance Repertoire	
MUS 5533	Pedagogy of Musical Performance	
MUS 5572	Pedagogy of Classroom Instruction	
MUS 6911	Recital Document	
Music Education		
MUS 5542	Music Performance	
D. 5-10 semester credit hours of additional electives, approved by the student's advisor, of which no more than 2 hours may be in a music ensemble. Non-music electives may be used with consent and approval of the student's advisor.		5-10
Total Credit Hours		31-36

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 must complete a total of 33 semester credit hours. Candidates for the Master of Music degree with an emphasis in 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.

In addition to the semester credit hours set forth above, candidates for the Master of Music degree are required to successfully pass comprehensive examinations tailored to the student's program and area of emphasis.

- Graduate Certificate in Keyboard Pedagogy (p. 208)
- Graduate Certificate in Keyboard Performance (p. 208)
- Graduate Certificate in Voice Pedagogy (p. 208)

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
MUS 5533	Pedagogy of Musical Performance (two semesters for a total of 6 credit hours)	6
MUS 5542	Music Performance	2
MUS 5572	Pedagogy of Classroom Instruction	2

MUS 6903	Project in Music Pedagogy	3
MUS 6971	Special Problems (Opportunity for specialized study with experts in the field.)	1
Total Credit Hours		15

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 for a total of 8 credit hours)	8
MUS 5583	Advanced Instrumental Techniques	3
MUS 5711	Graduate Ensemble (two semesters for a total of 2 credit hours)	2
MUS 6941	Recital (two recitals – one solo, one chamber – for a total of 2 credit hours)	2
Total Credit Hours		15

Individuals interested in pursuing the Certificate in Keyboard Performance should contact the Department of Music Keyboard Area Coordinator.

Graduate Certificate in Voice Pedagogy

The Certificate in Voice Pedagogy is designed for the active private voice teacher who is 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 on the last 60 hours of undergraduate work).

The Certificate in Voice Pedagogy requires the following 15 semester credit hours:

MUS 5421	Practicum in Advanced Teaching (three semesters for a total of 3 credit hours)	3
MUS 5533	Pedagogy of Musical Performance	3
MUS 5542	Music Performance	2
MUS 5572	Pedagogy of Classroom Instruction	2
MUS 6903	Project in Music Pedagogy	3
MUS 6972	Special Problems	2
Total Credit Hours		15

Students are required to take a placement examination in vocal pedagogy. Students who do not pass the placement examination will be required to take MUS 5023 Graduate Music Pedagogy Review, Graduate Music Pedagogy Review.

Individuals interested in pursuing the Certificate in Voice Pedagogy should contact the Department of Music Voice Area Coordinator.

Music (MUS) Courses

MUS 5003. Graduate Music Theory Review. (3-0) 3 Credit Hours.

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.

MUS 5013. Graduate Music History Review. (3-0) 3 Credit Hours.

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.

MUS 5023. Graduate Music Pedagogy Review. (3-0) 3 Credit Hours.

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.

MUS 5031. Graduate Music Diction Review. (1-0) 1 Credit Hour.

Designed to satisfy deficiencies indicated by the Lyric Diction Diagnostic Examination. A comprehensive review and study of the basic rules of German, French, and Italian lyric diction, using the International Phonetic Alphabet to analyze and transcribe vocal repertoire. Cannot be counted toward any Master of Music degree program.

MUS 5042. Graduate Aural Skills Review. (2-0) 2 Credit Hours.

Designed to satisfy deficiencies indicated by the Graduate Aural Skills Placement Examination. Offers an overview of sight-singing methodology and ear training techniques, as well as an opportunity to train in aural skills with an emphasis on rhythmic, melodic, and harmonic materials. 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.

MUS 5133. Topics in Music Theory. (3-0) 3 Credit Hours.

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.

MUS 5163. Composition. (0-0) 3 Credit Hours.

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. May be repeated for credit when topics vary. Topics may be taken concurrently.

MUS 5223. Ensemble Repertoire. (0-0) 3 Credit Hours.

Prerequisite: Graduate standing in music. A study of repertoire for ensembles including a historical perspective. Topics are (1) Choral; (2) Instrumental; and (3) Keyboard. May be repeated for credit.

MUS 5233. Introduction to Music Research. (3-0) 3 Credit Hours.

This course offers an opportunity for students to apply knowledge of references and sources included in graduate music courses, how to write and format research/scholarly papers, and about current research methods in the various fields of music. It may also help music teachers investigate topics related to teaching and learning. May be repeated for credit when topics vary. Topics may be taken concurrently.

MUS 5263. Topics in Music History. (3-0) 3 Credit Hours.

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) Music Since 1900; (7) World Music; and (8) Music Practices and Styles. May be repeated for credit when topics vary. Topics may be taken concurrently.

MUS 5403. Psychological Foundations of Music Education. (3-0) 3 Credit Hours.

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.

MUS 5421. Practicum in Advanced Teaching. (1-0) 1 Credit Hour.

Prerequisite: MUS 5533 or consent of instructor. Observation and teaching of an advanced undergraduate student under the direct supervision of a studio professor.

MUS 5423. Foundations of Music Education. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing in music and MUS 5233, or consent of instructor. Overview of principles, methodologies and practices of music education.

MUS 5433. Performance Repertoire. (0-0) 3 Credit Hours.

Prerequisite: Graduate standing in music. A study of the solo, chamber, and orchestral repertoire. May be repeated for credit when topics vary.

MUS 5511. Secondary Performance. (0-0) 1 Credit Hour.

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.

MUS 5523. Rehearsal Techniques. (0-0) 3 Credit Hours.

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; and (2) Instrumental. May be repeated for credit when topics vary. Topics may be taken concurrently.

MUS 5533. Pedagogy of Musical Performance. (3-0) 3 Credit Hours.

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.

MUS 5542. Music Performance. (0-0) 2 Credit Hours.

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.

MUS 5554. Music Performance—Performance Emphasis. (0-0) 4 Credit Hours.

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.

MUS 5572. Pedagogy of Classroom Instruction. (2-0) 2 Credit Hours.

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.")

MUS 5583. Advanced Instrumental Techniques. (0-0) 3 Credit Hours.

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; and (3) Keyboard. Designed primarily for instrumental music teachers.

MUS 5593. Elementary Music. (0-0) 3 Credit Hours.

Prerequisite: Graduate standing in music. A study of the current methods and materials used in teaching elementary music. Classroom instruments are also studied.

MUS 5711. Graduate Ensemble. (0-3) 1 Credit Hour.

The study of selected ensemble works through participation in rehearsal and performance. May be repeated for credit.

MUS 6313. The Use of Microcomputers in Music Education. (3-0) 3 Credit Hours.

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.

MUS 6413. Seminar in Piano Pedagogy. (3-0) 3 Credit Hours.

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.

MUS 6423. Seminar in Music Education. (3-0) 3 Credit Hours.

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.

MUS 6543. Diction for Singers. (3-0) 3 Credit Hours.

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.

MUS 6903. Project in Music Pedagogy. (0-0) 3 Credit Hours.

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.

MUS 6911. Recital Document. (0-0) 1 Credit Hour.

Prerequisites: Graduate standing in music, MUS 5233 or consent of instructor, and permission of the Graduate Advisor of Record and music performance instructor. The recital document is formally-written scholarly text addressing in depth the works performed on the candidate's degree recital. It is required of all students in the performance, vocal pedagogy and performance, and conducting emphases. The function of the recital document is twofold: (1) its preparation requires students to address the historical, cultural, analytical, and performance practice aspects of the musical works on the recital in order to achieve a depth of understanding that informs their performances and (2) the document serves as a model for the types of the professional writing, research, and analysis that are expected of academically trained professional musicians.

MUS 6913. Thesis in Music Education. (0-0) 3 Credit Hours.

Prerequisites: Permission of the Graduate Advisor of Record and project 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.

MUS 6941. Recital. (0-0) 1 Credit Hour.

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.

MUS 6951. Independent Study. (0-0) 1 Credit Hour.

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.

MUS 6952. Independent Study. (0-0) 2 Credit Hours.

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.

MUS 6953. Independent Study. (0-0) 3 Credit Hours.

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.

MUS 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.

MUS 6971. Special Problems. (1-0) 1 Credit Hour.

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.

MUS 6972. Special Problems. (2-0) 2 Credit Hours.

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.

MUS 6973. Special Problems. (3-0) 3 Credit Hours.

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 Philosophy and Classics

The Department of Philosophy and Classics offers the Master of Arts degree in Philosophy.

Master of Arts Degree in Philosophy

The Master of Arts degree in Philosophy offers students the opportunity for advanced study in a traditional Philosophy program. The course sequence aims at providing students with a broad background in philosophy, while honing students' philosophical skills to include rigorous thinking, the ability to give coherent arguments for one's own position, and to communicate reasoned arguments clearly and compellingly. The curriculum is flexible enough to encourage broad inquiry in discovery, critical thinking, applied philosophy, and creative enterprise for students. The M.A. program is intended for students who wish to develop an advanced competence in Philosophy prior to pursuit of the J.D., a further Ph.D. degree, or employment in and outside of academia. Students can develop the knowledge and skills in philosophy that are requisite for success at the highest levels of graduate work, as well as success in leadership, scholarship, and/or creative endeavors in business, the public sector, or non-profit environments.

Program Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, all applicants (including non-degree-seeking students) are

required to complete the Graduate School online graduate application for admission to the Master's of Arts program in Philosophy and must also submit GRE scores, two letters of recommendation, and a 500–750 word statement of intent. The Department strongly recommends each applicant submit a writing sample. Applicants will be evaluated on the basis of demonstrated potential for success in graduate study in Philosophy as indicated by a combination of prior undergraduate academic performance, the statement of intent, research interests, letters of recommendation, GRE test scores, and writing sample (optional). Admission is competitive. Satisfying minimum requirements does not guarantee admission.

GRE Test Scores: The Department uses GRE scores as only one of the many factors taken into consideration when evaluating applications. GRE scores are required for each applicant, and must also be submitted to the Graduate School.

Letters of Recommendation: Two letters of recommendation preferably from faculty who have worked closely with the applicant in either the classroom, laboratory, or other research site.

Statement of Intent: Please submit a 500–750 word, well-thought-out statement indicating why the M.A. program in Philosophy is a good fit for applicant's professional goals, and why applicant is a good fit for the Department. The statement should include information on:

- coursework and other relevant experiences that prepared the applicant for graduate work in Philosophy,
- particular research interests of the applicant,
- how that applicant's academic interests match with faculty, departmental and university resources,
- UTSA Philosophy faculty who may be suitable advisors
- how a graduate degree in Philosophy will further the applicant's professional and personal goals.

Writing Sample (optional): The Department strongly recommends that each applicant include a writing sample. The most effective writing samples demonstrate both that the applicant is a good writer and that the applicant has suitable potential as a philosophy graduate student. The Department prefers writing samples that are no longer than 20 pages in length.

Applications will not be reviewed until complete. Applicants may select to apply as either a degree-seeking, special graduate, or non-degree-seeking student. A graduate degree-seeking applicant admitted to the program may receive unconditional, conditional, or probationary admission status. Special graduate student and non-degree-seeking student status may be limited in the courses they are permitted. Admission with non-degree-seeking or special graduate student status does not ensure subsequent admission as degree-seeking student.

Degree Requirements

The minimum number of semester credit hours required for this degree is 30 (thesis), or 33 (non-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 Philosophy requires the following:

A. 6 semester credit hours of required basic courses:

PHI 5003	Logic	6
or PHI 5013	Advanced Logic	
PHI 5033	Philosophical Writing and Research	

B. Select one of the following history courses, depending on the student's area of interest:	3
PHI 5113 Ancient Philosophy	
PHI 5123 Modern Philosophy	
PHI 5133 Nineteenth Century Philosophy	
PHI 6143 Contemporary Analytic Philosophy	
PHI 6153 Contemporary Continental Philosophy	
C. Select one of the following general philosophy electives, depending on the student's area of interest:	3
PHI 5023 Ethical Theory	
PHI 5223 Epistemology	
PHI 5243 Metaphysics	
PHI 5253 Philosophy of Religion	
PHI 5263 Philosophy of Language	
PHI 5273 Social and Political Philosophy	
D. Select one of the following specialized advanced topics in philosophy, depending on the student's area of interest:	3
PHI 6033 Advanced Topics in Applied Ethics	
PHI 6973 Special Studies in Philosophy	
E. 9-12 semester credit hours of electives selected in consultation with Graduate Advisor:	9-12
F. In consultation with committee, student must select either:	6
PHI 6983 Master's Thesis	
or	
PHI 6943 Internship	
Total Credit Hours	30-33

Comprehensive Examination

In addition to the semester credit hour requirements set forth above, all candidates for the degree are required to pass the comprehensive examination. The examination will be administered once the student has successfully completed 18 semester credit hours as well as PHI 5033 Philosophical Writing and Research and either PHI 5003 Logic or PHI 5013 Advanced Logic. Satisfactory performance on the comprehensive examination is required for advancement to thesis research and writing. Students will select an examination from a list of topics prepared by the faculty and advertised in advance.

Philosophy (PHI) Courses

PHI 5003. Logic. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. This course aims to give students a strong grounding in the logical skills required for advanced philosophical study, focusing on first order logic with identity and introducing students to selected other relevant topics as appropriate, such as extensions to first order logic (e.g., modal, temporal, deontic logics), metalogic, set theory, probability theory or other topics of both logical and philosophical interest (e.g., counterfactuals). May be repeated for credit when the topics vary.

PHI 5013. Advanced Logic. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Rigorous definitions of syntax and semantics. Proofs of soundness and completeness of sentential and predicate logics; other topics in metatheory. May include extensions of and alternatives to classical logic and the philosophical significance of logic and metalogical results. May be repeated for credit when the topics vary.

PHI 5023. Ethical Theory. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Advanced study of ethical theories and the nature and scope of ethical requirements, value, virtue, duty and moral responsibility. Advanced study may emphasize specific approaches to ethics such as consequentialist, deontological, virtue theoretic, and contractarian or specific metaethical issues such as ethics and rationality. Readings will include selected classical and contemporary texts.

PHI 5033. Philosophical Writing and Research. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing. The course aims to enhance philosophical reading, critical evaluation and writing skills; it aims further to help develop techniques in research and refine oral communication and presentation skills.

PHI 5113. Ancient Philosophy. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. In-depth investigation of central figures and/or topics in ancient philosophy. Study may focus on a few major philosophical figures in the ancient world from the time of the pre-Socratics through to the Hellenistic and Neo-Platonic schools. Topics may include the nature of reality, theories of truth, ethical theories, psychological issues, political theory, or issues in logic and theories of meaning.

PHI 5123. Modern Philosophy. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Advanced study of major figures in modern philosophy such as Descartes, Locke, Berkeley, Hume, Spinoza, Leibniz, and Kant. Discussion may focus on the seminal work of one of more major thinkers such as the Meditations, Critique of Pure Reason, Ethics, or Theodicy.

PHI 5133. Nineteenth Century Philosophy. (3-0) 3 Credit Hours.

High-level examination of some of the major figures and topics in nineteenth-century philosophy and its intellectual background, including (but not limited to) these figures: Kant, Maimon, Bentham, Fichte, Schelling, Schopenhauer, Hegel, Kierkegaard, Marx, Mill, Nietzsche, Peirce, James, Dewey, Emerson, Thoreau; and these topics: philosophical aspects of German romanticism, idealism, utilitarianism, materialism, pragmatism, transcendentalism. May be repeated for credit when topics vary.

PHI 5223. Epistemology. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Advanced study in the theory of knowledge. The course will focus on the core questions of epistemology: What is knowledge? What, if anything, do we know? How do we know it? Discussion may focus on one or more major epistemological topics such as the nature of perception, belief, justification and truth; naturalized epistemology, theories of truth, internalist and externalist theories of justification; the sources of knowledge; skepticism; the epistemic role of social context in relativism, social construction, and feminist epistemology.

PHI 5243. Metaphysics. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Advanced investigation of some of the traditional metaphysical problems in Western philosophy such as the existence of God, the relationship between mind and body, determinism versus free will, universals and particulars, personal identity, persistence, material composition, and the nature of time and space.

PHI 5253. Philosophy of Religion. (3-0) 3 Credit Hours.

Study of key figures (such as Anselm, Augustine, Aquinas, Leibniz, Kant, Hegel, Kierkegaard, Plantinga) and/or the major concepts and issues in philosophy of religion (such as arguments for and against the existence of God, freedom, the problem of evil, faith and reason, the use of religious language, and the nature of God). May be repeated for credit when topics vary.

PHI 5263. Philosophy of Language. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Advanced study of some of the traditional issues in the philosophy of language, such as analyticity, apriority, theories of reference, necessity, truth, speech act theory, and philosophical theories of formal grammars. Advanced study may emphasize a major historical or contemporary figure in the philosophy of language such as Frege, Russell, Wittgenstein, Carnap, Quine, Lewis, Kripke and Kaplan.

PHI 5273. Social and Political Philosophy. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. An inquiry into some of the main philosophic issues arising from political life, such as the nature and justification of authority, rationality and justice, cosmopolitanism, democracy, natural rights, distributive and retributive justice, equality, and civil disobedience. Discussion may focus on specific issues and one or more major figures in political philosophy including Rawls, Habermas, Gauthier, Cohen, Nozick, Dworkin, and Scanlan.

PHI 6033. Advanced Topics in Applied Ethics. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. There are a vast number of major issues in applied ethics. The course will offer advanced analysis of some major moral issues in contemporary society such as abortion and the right to life, the beginning and the end of life, the status of human life, persons, potential persons, advance directives, genetic intervention, assisted reproduction, eugenics, disability, wrongful death and life, the notion of parenthood, discrimination, sexual morality, animal rights, punishment and desert, the morality of suicide, euthanasia, and war and pacifism. May be repeated for credit when the topics vary.

PHI 6143. Contemporary Analytic Philosophy. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Advanced study of the major trends in the development of the Anglo-American philosophical tradition since its inception at the end of the nineteenth century up to the present day. There is a vast number of major issues and movements including logical positivism, ordinary language philosophy, epistemic modality, metaphysical necessity, the nature of possible worlds, essentialism, the nature of moral judgments and properties, modal knowledge, the nature of reference and language and so on. Major thinkers in twentieth century analytic tradition include, among others, Frege, Russell, Moore, Carnap, Quine, Kripke, and Lewis.

PHI 6153. Contemporary Continental Philosophy. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. In depth examination of the character and consequences of several recent movements in European philosophy, including phenomenology, existentialism, hermeneutics, structuralism, postmodernism, deconstruction, and critical theory. Discussion may focus on one or more major figures including Heidegger, Gadamer, Habermas, Derrida, and Foucault.

PHI 6943. Internship. (0-0) 3 Credit Hours.

Prerequisites: Graduate standing and permission in writing 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.

PHI 6953. Independent Study. (0-0) 3 Credit Hours.

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.

PHI 6973. Special Studies in Philosophy. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing and consent of the graduate advisor. Organized course offering the opportunity for advanced study not normally or not often available as part of the regular graduate course offerings. Special Studies may be repeated for credit when topics vary.

PHI 6983. Master's Thesis. (0-0) 3 Credit Hours.

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 Political Science and Geography

The Department of Political Science and Geography offer the Master of Arts Degree in Political Science.

- Master of Arts Degree in Geography (p. 213)
- Master of Arts Degree in Political Science (p. 215)

Master of Arts Degree in Geography

The M.A. in Geography degree is designed to give graduate students the ability to analyze social processes and the physical environment across a range of cultures and historical periods, using appropriate methodologies and data management techniques. The program is especially designed to give students insights into a variety of regional social, environmental, and economic problems, and to exploit the strong international connections that the geography faculty have established. The program aims to provide rigorous training that prepares Master's students for entry into doctoral programs at UTSA and elsewhere, and to offer career advancement for terminal Master's students from the city and region. Faculty will encourage students to become involved in professional geography through pertinent internships, conference presentations, publication, and membership in the Association of American Geographers.

Program Admission Requirements

Students wishing to apply to the Master of Arts program in Geography must submit the following materials to the Graduate Admissions office:

1. an application form (available online at <http://graduateschool.utsa.edu>)
2. an application fee

3. official transcripts from all collegiate institutions attended including community colleges
4. a statement of purpose (750-1000 words) indicating your interests and goals in studying geography
5. two letters of recommendation from references who can speak to your qualifications for the graduate program (at least one 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 wide requirements and must have completed 18 semester credit hours (12 at the upper-division or graduate-level) in Geography or a related field. These should include an undergraduate methods course and a GIS course prior to taking the cognate graduate courses. For entry as a degree-seeking student, applicants should have at least a 3.0 grade point average (on a 4.0 scale) in the last 60 hours of undergraduate and graduate coursework. All applications are evaluated by an internal review committee to determine compliance with University and program requirements. Admission is competitive; thus, 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 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.

Degree Requirements

The minimum number of semester credit hours required for the degree is 36 for the nonthesis option, and 33 for the thesis option. *To be able to graduate in the minimum time period (two years) students should take all the GRG courses as they are offered each semester.*

All degree candidates must complete the following requirements:

Nonthesis Option

A. 18 semester credit hours of required courses:	18
GRG 5003	Research Design and Spatial Analysis
GRG 5433	Environmental Landscape Management
GRG 5513	Geography and Culture
GRG 5753	The Geography of Development and Underdevelopment
GRG 5903	Seminar in Political Geography
GRG 5913	Design and Management of Geographic Information Systems

B. 6 semester credit hours of prescribed elective courses in geography from the following: 6

GRG 5303	Economic Geography
GRG 5323	Seminar in Urban Geography
GRG 5353	Seminar in Historical Geography
GRG 5403	Seminar in Biogeography
GRG 5413	Climatology
GRG 5603	Geopolitics

C. 12 hours of free electives (outside geography) from among the following: 12

ANT 5483	Landscape and Settlement
ANT 6653	Spatial Techniques in Anthropology
ANT 6723	Seminar in Culture, Environment, and Conservation
GEO 6513	Advanced GIS
PAD 5503	Urban Planning and Society
POL 5793	International Political Economy
SOC 6043	Immigration and Society
URP 5363	Urban Planning Methods I
DEM 7093	GIS for Population Science

Other free electives may be allowed with the approval of the Geography Graduate Program Committee.

D. Comprehensive Examination

GRG 6961	Comprehensive Examination
Enrollment in GRG 6961 Comprehensive Examination will be required in the semester the comprehensive examination is taken, if registered for no other courses that semester.	

Total Credit Hours **36**

Thesis Option

A. 18 semester credit hours of required courses: 18

GRG 5003	Research Design and Spatial Analysis
GRG 5433	Environmental Landscape Management
GRG 5513	Geography and Culture
GRG 5753	The Geography of Development and Underdevelopment
GRG 5903	Seminar in Political Geography
GRG 5913	Design and Management of Geographic Information Systems

B. 6 semester credit hours of prescribed elective courses in geography from the following: 6

GRG 5303	Economic Geography
GRG 5323	Seminar in Urban Geography
GRG 5353	Seminar in Historical Geography
GRG 5403	Seminar in Biogeography
GRG 5413	Climatology
GRG 5603	Geopolitics

C. 3 hours of free electives (outside geography) from among the following: 3

ANT 5483	Landscape and Settlement
ANT 6653	Spatial Techniques in Anthropology
ANT 6723	Seminar in Culture, Environment, and Conservation
DEM 7093	GIS for Population Science

GEO 6513	Advanced GIS	
PAD 5503	Urban Planning and Society	
POL 5793	International Political Economy	
SOC 6043	Immigration and Society	
URP 5363	Urban Planning Methods I	
Other free electives may be allowed with the approval of the Geography Graduate Program Committee.		
C. Thesis		6
GRG 6893	Master's Thesis Proposal	
GRG 6983	Master's Thesis	
D. Comprehensive Examination		
GRG 6961	Comprehensive Examination	
Enrollment in GRG 6961 Comprehensive Examination will be required in the semester the comprehensive examination is taken, if registered for no other courses that semester.		
Total Credit Hours		33

Comprehensive Examination

Students will prepare for the Comprehensive 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 choose an exam committee, including an exam chairperson, in the semester before taking the Comprehensive Examination. The Comprehensive Examination will be evaluated as either “CR” (satisfactory performance) or “NC” (unsatisfactory performance). 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 a total of two times and only once a semester. Credit earned for the Comprehensive Examination will not count toward the 36 semester credit hours (nonthesis option) or 33 hours (thesis option) required for the Master’s degree.

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. completed application (available online at <http://graduateschool.utsa.edu>)
2. application fee
3. grade point average (GPA) of 3.0 or higher in the last 60 hours of coursework
4. results of the Graduate Record Examination (GRE) or Law School Admission Test (LSAT)

5. official transcripts from all collegiate institutions attended including community colleges
6. a statement of purpose (roughly 500 words or two typed pages) indicating your interests and goals in studying political science
7. 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. 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 thus 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.

Degree candidates must complete the following requirements:

- | | |
|---|----------------------------------|
| A. 6 semester credit hours of methodological core courses: | 6 |
| POL 5003 | Political Inquiry |
| POL 5013 | Research Methods |
| Plus 6 semester credit hours of breadth core courses from the following: | 6 |
| POL 5043 | International Politics |
| POL 5063 | Political Philosophy |
| POL 5153 | American Government and Politics |
| B. 18 semester credit hours 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. | 18 |
- Students specializing in American Government must complete:

POL 5153	American Government and Politics
Select 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 5163	American Political Development
POL 5173	Policy Process
POL 5183	Congress
POL 5193	Presidency
POL 5233	Political Creativity
POL 5403	Topics in Political Communications and Behavior
POL 5413	Seminar in Political Psychology
POL 5433	Electoral Behavior
POL 5463	Lobbying and Government Relations
POL 5503	Law and Courts
POL 5563	Seminar in Jurisprudence
POL 5623	Federalism

Students specializing in International Politics must complete:

POL 5043	International Politics
Select at least 9 semester credit hours from the following:	
POL 5093	Politics of U.S. National Security Policy Making
POL 5303	Topics in Comparative and International Politics
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	Foreign Policy Analysis
POL 5783	International Security
POL 5793	International Political Economy
POL 5823	Political Economy of the Americas
POL 5853	Economic Geography
POL 5873	Global Governance
POL 5903	Seminar in 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
Select at least 9 semester credit hours from the following:	
POL 5203	Topics in Political Theory
POL 5213	Seminar in American Political Thought
POL 5253	Theories of Immigration
POL 5273	Contemporary Political Theory and Social Policy
POL 5503	Law and Courts
POL 5563	Seminar in Jurisprudence

C. Students must complete core course requirements within the first 18 hours of coursework and immediately thereafter participate in a required assessment of progress in the program. Included in the assessment, the student must submit a plan of action for completing the remaining hours of coursework and an estimated date of program completion. Enrollment in POL 6893, Research Proposal will only be approved upon successful completion of the assessment.

D. POL 6893 Research Proposal 3

All students must successfully complete this course before enrolling in POL 6993, Master's Research Project, or POL 6983, Master's Thesis. Upon completion of POL 6893, students must pass an oral comprehensive examination that will include a defense of the research proposal conducted by a three-person faculty committee.

E. In consultation with their committee, students must select 3 semester credit hours from the following: 3

POL 6983 Master's Thesis

or

POL 6993 Master's Research Project

Total Credit Hours 36

Geography (GRG) Courses

GRG 5003. Research Design and Spatial Analysis. (3-0) 3 Credit Hours.

An investigation of the conceptualization and design of research and the analysis of spatial data. The course reviews pitfalls in research, the deductive and inductive approaches to research, the development of theory, the formulation of hypotheses, defining indicators for variables, modes of observation in data collection, sampling, and the testing of hypotheses with techniques appropriate to the level of analysis. Students will work with data sets to gain first-hand experience in research design and problem-solving.

GRG 5303. Economic Geography. (3-0) 3 Credit Hours.

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.)

GRG 5323. Seminar in Urban Geography. (3-0) 3 Credit Hours.

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.

GRG 5353. Seminar in Historical Geography. (3-0) 3 Credit Hours.

Graduate level study of historical landscapes, the role of the environment, boundaries, settlement origins and patterns, origins of agriculture and industry, and the history of geography. Regional focus includes Latin America, Anglo-America, and Texas. Regional emphasis and sub-regional coverage may vary.

GRG 5403. Seminar in Biogeography. (3-0) 3 Credit Hours.

Biogeography is the study of the distributions of biological diversity and the reasons for these spatial patterns. This course will evaluate species diversity and abundance at present and in the past, and why these variables change over time. Foundations in ecology will be provided as needed for the understanding of spatial patterning of species. The role of biogeography under increasing human impacts and in consideration of global climate change will also be explored.

GRG 5413. Climatology. (3-0) 3 Credit Hours.

In-depth treatment of the elements and causes and consequences of climate and weather on a global scale. The course includes the components of climate, climatic classifications, and the interpretation of patterns and formative processes of temperature, air pressure, winds, air masses, precipitation, and storms, including attention to regional weather patterns, tornadoes and hurricanes. Emphasis is on human impacts stemming from and influencing climatic phenomena.

GRG 5433. Environmental Landscape Management. (3-0) 3 Credit Hours.

An assessment of management practices and policies in a variety of landscapes. In-depth evaluations of ecosystem services and land use needs, and management practices that are used to address various land use goals. Emphasis will be placed on the role of spatial scale in management and in sustainable management practices.

GRG 5513. Geography and Culture. (3-0) 3 Credit Hours.

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.

GRG 5543. Gender and Cities. (3-0) 3 Credit Hours.

This course provides an introduction to the sub-discipline of feminist geography. It explores the distinctive contribution that geographers have made to the analysis of feminist theories. We examine how feminist scholars can benefit from geographical considerations and likewise, how geographers should recognize that space is socially produced and consequently, is gendered. As this course is offered at the graduate level, we will have a one computer lab to learn and critically think about geographic information systems (GIS) as one the most popular methodologies among geographers. Reading a wide range of interdisciplinary literature, we come to understand women and men experience cities in different ways, in relation to transportation choices, housing preferences, employment opportunities, and feelings toward urban public spaces.

GRG 5603. Geopolitics. (3-0) 3 Credit Hours.

Investigates the links between political power and geographic space, and the effects of geography (both human and physical) on international politics and international relations. Covers the ideas of Ratzel, Mahan, Mackinder, Spykman, Huntington, and others, in the German, French and Russian schools. Examines the role of geopolitics in current global political standoffs and conflicts.

GRG 5753. The Geography of Development and Underdevelopment. (3-0) 3 Credit Hours.

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.).

GRG 5903. Seminar in Political Geography. (3-0) 3 Credit Hours.

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.).

GRG 5913. Design and Management of Geographic Information Systems. (3-0) 3 Credit Hours.

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.).

GRG 6893. Master's Thesis Proposal. (0-0) 3 Credit Hours.

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 Geography. 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.

GRG 6951. Independent Study. (0-0) 1 Credit Hour.

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.

GRG 6952. Independent Study. (0-0) 2 Credit Hours.

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.

GRG 6953. Independent Study. (0-0) 3 Credit Hours.

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.

GRG 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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 GRG 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).

GRG 6963. Internship. (0-0) 3 Credit Hours.

Practical experience in a workplace setting in which classroom knowledge of geographic skills and concepts can be deepened and applied. May be repeated for credit to a maximum of 6 hours.

GRG 6966. Internship. (0-0) 6 Credit Hours.

Practical experience in a workplace setting in which classroom knowledge of geographic skills and concepts can be deepened and applied. May be repeated for credit to a maximum of 6 hours.

GRG 6973. Special Problems. (3-0) 3 Credit Hours.

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.

GRG 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

Political Science (POL) Courses**POL 5003. Political Inquiry. (3-0) 3 Credit Hours.**

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.

POL 5013. Research Methods. (3-0) 3 Credit Hours.

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.

POL 5023. Political Economy. (3-0) 3 Credit Hours.

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.

POL 5033. Political Communications and Behavior. (3-0) 3 Credit Hours.

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.

POL 5043. International Politics. (3-0) 3 Credit Hours.

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.

POL 5063. Political Philosophy. (3-0) 3 Credit Hours.

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.

POL 5083. Geo-Political Context of Homeland Security and Defense. (3-0) 3 Credit Hours.

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.

POL 5093. Politics of U.S. National Security Policy Making. (3-0) 3 Credit Hours.

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.

POL 5103. Topics in American Politics. (3-0) 3 Credit Hours.

An examination of an individual topic or set of issues in American politics. May be repeated for credit when topics vary.

POL 5113. Latino/a Politics. (3-0) 3 Credit Hours.

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.

POL 5133. Ethnic and Gender Politics. (3-0) 3 Credit Hours.

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.)

POL 5153. American Government and Politics. (3-0) 3 Credit Hours.

An examination of the major issues, problems, and processes of American government and administration.

POL 5163. American Political Development. (3-0) 3 Credit Hours.

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.

POL 5173. Policy Process. (3-0) 3 Credit Hours.

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.)

POL 5183. Congress. (3-0) 3 Credit Hours.

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.

POL 5193. Presidency. (3-0) 3 Credit Hours.

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.

POL 5203. Topics in Political Theory. (3-0) 3 Credit Hours.

An examination of an individual topic, theorist, or set of issues in political theory. May be repeated for credit when topics vary.

POL 5213. Seminar in American Political Thought. (3-0) 3 Credit Hours.

Consideration of American political thinking and its impact from the colonial era to the present with an emphasis on primary sources. Readings may include diverse works of a political, judicial, philosophical, theological, and literary nature. May be organized chronologically or topically.

POL 5233. Political Creativity. (3-0) 3 Credit Hours.

This course examines significant cases of institutional change and development. The course begins with a focus on theoretical debates about political innovation and institutional explanations of politics. We will review the debate about how institutions create political order and constrain individual action as well as leading critiques of order and constraint. We will consider how individual creative action is inseparable from the practice of politics and government. Individual action is partly about leaders and entrepreneurs, but innovation is also about other dimensions of political order which are subject to order-changing actions of a non-individualistic kind, involving embedded cognitive schemas, deliberative procedures and social learning, and historical conjunctures in which individual and collective agents create opportunities in concrete circumstances. Various cases will be taught in different semesters from the U.S. and other countries, such as race relations, political revolutions, policy innovations of various kinds, negotiation of equity commitments, post-crisis reconciliation exercises, and leadership.

POL 5253. Theories of Immigration. (3-0) 3 Credit Hours.

This course provides an overview of the most important concepts and trends in migration, immigration, transnationalism, citizenship, and integration policies as it pertains to a particular country or region.

POL 5273. Contemporary Political Theory and Social Policy. (3-0) 3 Credit Hours.

This course explores contemporary social policy from a normative perspective. Topics may include the nature of a just educational system; justice of universal health care; normative issues relating to reproduction and genetic technologies; social security reform; the proper role of the state in regulating and supporting families; and other policy topics.

POL 5303. Topics in Comparative and International Politics. (3-0) 3 Credit Hours.

An examination of an individual topic or set of issues in comparative and/or international politics. May be repeated for credit when topics vary.

POL 5323. Urban Geography. (3-0) 3 Credit Hours.

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.

POL 5333. European Politics. (3-0) 3 Credit Hours.

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.

POL 5363. Mexican Politics. (3-0) 3 Credit Hours.

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.

POL 5373. Human Rights. (3-0) 3 Credit Hours.

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.

POL 5403. Topics in Political Communications and Behavior. (3-0) 3 Credit Hours.

An examination of an individual topic or set of issues in political communications and behavior. May be repeated for credit when topics vary.

POL 5413. Seminar in Political Psychology. (3-0) 3 Credit Hours.

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.

POL 5433. Electoral Behavior. (3-0) 3 Credit Hours.

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.

POL 5463. Lobbying and Government Relations. (3-0) 3 Credit Hours.

This course explores both theoretical and practical themes related to the efforts of interest groups to shape the policy making process. Special focus is placed on the inner workings of legislatures at local, state, and national levels with the objective of increasing the governmental relations effectiveness of public interest groups, businesses, trade organizations, bureaucratic agencies, and unions.

POL 5503. Law and Courts. (3-0) 3 Credit Hours.

Examination of the role of courts in American politics and administration. May focus on American constitutional development, constitutional and legal interpretation, or judicial politics and behavior. May also incorporate a comparative perspective on the role of courts in constitutional systems. (Formerly titled "Constitutional Law and Judicial Decision-Making.").

POL 5563. Seminar in Jurisprudence. (3-0) 3 Credit Hours.

Examination of the philosophical and historical foundations of law. Topics may include theoretical accounts of the nature of law; competing theories of justice; problems of legal obligation and civil disobedience; and judicial modes of interpreting and applying law. Authors may include Plato, Aristotle, Cicero, Augustine, Aquinas, Hobbes, Austin, Holmes, Frank, Hart, Oakeshott, Rawls, Finnis, Dworkin, and Posner.

POL 5623. Federalism. (3-0) 3 Credit Hours.

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. (Formerly titled "Intergovernmental Relations in the United States.").

POL 5703. American Foreign Policy. (3-0) 3 Credit Hours.

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.

POL 5713. Comparative Political Systems. (3-0) 3 Credit Hours.

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.

POL 5723. International Organizations. (3-0) 3 Credit Hours.

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.

POL 5733. Political Actors and Systems in Latin America. (3-0) 3 Credit Hours.

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.

POL 5743. Electoral Systems in the Americas. (3-0) 3 Credit Hours.

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).

POL 5773. Foreign Policy Analysis. (3-0) 3 Credit Hours.

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.

POL 5783. International Security. (3-0) 3 Credit Hours.

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.

POL 5793. International Political Economy. (3-0) 3 Credit Hours.

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.

POL 5823. Political Economy of the Americas. (3-0) 3 Credit Hours.

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.

POL 5853. Economic Geography. (3-0) 3 Credit Hours.

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.)

POL 5873. Global Governance. (3-0) 3 Credit Hours.

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.

POL 5903. Seminar in Political Geography. (3-0) 3 Credit Hours.

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.)

POL 5943. Threat Environments and Homeland Security and Defense. (3-0) 3 Credit Hours.

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.

POL 6893. Research Proposal. (3-0) 3 Credit Hours.

Prerequisites: Permission of the Subfield Advisor, course instructor, and Graduate Advisor of Record. A course to assist students in developing a research proposal for a study in Political Science to be accomplished as either the Master's Research Project or the Master's Thesis. As part of this course, students will explore research questions and theoretical and methodological assumptions that characterize subfields in Political Science. Specific attention will be given to framing research questions, identifying an appropriate research methodology, organizing work tasks and timelines for completion, developing the relevant literature, and drafting a research proposal. Successful completion of this course requires passing an oral comprehensive examination that will include a defense of the research proposal conducted by a Research Project or Thesis committee. Students must complete this course before enrolling in POL 6993 or POL 6983. (Formerly titled "Master's Thesis Proposal.")

POL 6951. Independent Study. (0-0) 1 Credit Hour.

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.

POL 6952. Independent Study. (0-0) 2 Credit Hours.

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.

POL 6953. Independent Study. (0-0) 3 Credit Hours.

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.

POL 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

POL 6963. Internship. (0-0) 3 Credit Hours.

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.

POL 6966. Internship. (0-0) 6 Credit Hours.

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.

POL 6973. Special Problems. (3-0) 3 Credit Hours.

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.

POL 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

POL 6993. Master's Research Project. (3-0) 3 Credit Hours.

Prerequisites: POL 6893 and permission of the Graduate Advisor of Record and Research Project Committee. Research project 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 research project.

Department of Psychology

The Department of Psychology offers the Master of Science Degree in Psychology and the Doctor of Philosophy Degree in Psychology.

- Master of Science Degree in Psychology (p. 222)
- Doctor of Philosophy Degree in Psychology (p. 223)

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 program-specific Fall deadline (see The Graduate School website (<http://graduateschool.utsa.edu>)). 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 or psychological research methods. 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 Statistics for Psychology) and a psychological research methods course (equivalent to PSY 3403 Experimental Psychology).
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 professionals with the background to assess the candidate's academic or research potential in psychology (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/psychology/>).

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:	15
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:	9
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:	6
PSY 6513	Research Internship
PSY 6951	Independent Study
PSY 6953	Independent Study
PSY 6973	Special Topics in Psychology
D. Select one of the following options:	6
Option 1 (with thesis):	
PSY 6983	Master's Thesis

or PSY 6981 Master's Thesis
or PSY 6986 Master's Thesis

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.

Total Credit Hours

36

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 6981, PSY 6983, or PSY 6986 Master's Thesis.

Doctor of Philosophy Degree in Psychology

The Doctor of Philosophy degree in Psychology is designed for students who have completed a master's degree and are interested in pursuing advanced doctoral training in topics related to health and mental health, statistics, and research methods. Graduates will have a reputation for research excellence and make contributions to applied areas of knowledge, especially in settings related to military health. Graduates are expected to have strong skills in conducting research including data analysis and interpretation, using the most advanced research methods and statistical techniques. Graduates are also expected to be able to implement practical applications of psychological theory in military environments and to have the communication skills necessary to convey their theoretical and methodological expertise to others. In order to meet these objectives, the program provides students with the opportunity to acquire a strong conceptual background in Psychology and gives them opportunities for advanced training in quantitative and research methodologies. The program also provides students with opportunities to develop their scientific writing and oral communication skills and to apply their knowledge and skills in both laboratory settings and in ecologically-valid settings pertaining to military health.

Program Admission Requirements

All application materials must be submitted using the University's online application system and received by February 1. 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. Hold a 36-hour Master's degree in Psychology that required completion of a research-based master's thesis and courses comparable to those required by the UTSA Master of Science in Psychology program. Applicants who have not completed a Master's thesis, and/or did not take courses comparable to those required by the UTSA Psychology M.S. program, may be considered for

admission with conditional status pending successful completion of all deficiencies.

2. Submit a master's degree transcript documenting a grade point average (GPA) of 3.5 or higher. If a master's degree has not been completed, a transcript documenting a minimum GPA of 3.5 in the last 60 hours of coursework will be required for students seeking conditional admission to the program.
3. Graduate Record Examination (GRE) General Test scores no older than five years, which will be weighed in conjunction with the other material in the applicant's file.
4. Three letters of recommendation from behavioral researchers (e.g., graduate instructors, research advisors) indicating the applicant has the necessary academic and personal attributes for success in the program and has the potential for making significant contributions in the field of psychology.
5. A 3-page statement of career goals, research interests, and purpose for pursuing a Ph.D. in Psychology at UTSA. This statement will be evaluated and considered as part of the selection criteria for admission to the program.
6. Documentation of prior research experience. A completed master's thesis is the most common form of document submitted. Acceptable alternatives include a published research article, a manuscript prepared for publication, or a research paper submitted for credit in an independent or honors study project.
7. Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL). Minimum scores must be 550 on the paper version or 79 on the Internet version.

For consideration of conditional admission into the Ph.D. program in Psychology, applicants must have a bachelor's degree in Psychology or a related discipline with a grade point average of 3.5 or higher, and must have completed at least 18 upper-division and/or graduate hours in Psychology, including Experimental Methods and Statistics, with a grade point average of 3.5 or higher. All other requirements for admission, listed above, must be met. Students who do not possess a master's degree in Psychology or a related discipline are required to complete a program consisting of a minimum of 72 semester credit hours at UTSA. The Doctoral Program Committee will determine courses and/or research experience required in addition to the doctoral coursework for each conditionally-admitted student, which will normally include master's-level courses in Ethics, Research Design, Psychological Measurement, Inferential Statistics, Correlation and Regression, and a thesis-level research project, before the student is allowed to enroll in doctoral-level courses.

Degree Requirements

The degree requires a minimum of 48 semester credit hours beyond the master's degree, passing of qualifying written and oral examinations, and acceptance of the Ph.D. dissertation. The 48 hours of doctoral coursework include 9 hours of core courses, 12 hours of Advanced Topics seminars, 6 hours of Prescribed Electives, 9 hours of Doctoral Research, and 12 hours of Doctoral Dissertation. Students must maintain an overall grade point average of 3.0 to remain in good standing academically and to graduate. Degree requirements beyond the master's degree must be completed within six calendar years from the date on which the student enters the doctoral program.

Degree candidates admitted unconditionally to the program must complete the following requirements:

A. 9 semester credit hours of core courses:	9
PSY 7003	Multivariate Statistical Analysis
PSY 7013	Advanced Research Design
PSY 7023	Military Health Psychology
B. 12 semester credit hours chosen from the following Advanced Topics seminars:	12
PSY 7103	Advanced Topics in Biopsychology
PSY 7113	Advanced Topics in Clinical Psychology
PSY 7123	Advanced Topics in Applied Social Psychology
PSY 7133	Advanced Topics in Applied Cognitive Psychology
PSY 7143	Advanced Topics in Diversity and Health Disparities
C. 6 semester credit hours of prescribed electives chosen from the following:	6
KAH 5083	Epidemiology
PSY 6973	Special Topics in Psychology
PSY 7203	Grant Development
PSY 7213	Program Evaluation
STA 6253	Time Series Analysis and Applications
STA 6413	Nonparametric Statistics
STA 6113	Applied Bayesian Statistics
STA 6853	Categorical Data Analysis
D. 9 semester credit hours from a combination of the following research activities:	9
PSY 6513	Research Internship
PSY 7911	Doctoral Research
PSY 7912	Doctoral Research
PSY 7913	Doctoral Research
PSY 7914	Doctoral Research
PSY 7915	Doctoral Research
PSY 7916	Doctoral Research
E. 12 semester credit hours of Doctoral Dissertation from the following:	12
PSY 7921	Doctoral Dissertation
PSY 7922	Doctoral Dissertation
PSY 7923	Doctoral Dissertation
PSY 7924	Doctoral Dissertation
PSY 7925	Doctoral Dissertation
PSY 7926	Doctoral Dissertation
Total Credit Hours	48

Qualifying Examination

Students may take the qualifying examination upon successful completion of a minimum of 18 hours of coursework that includes 9 hours of core courses, 3 to 6 hours of Advanced Seminar Topics, and up to 3 hours of prescribed electives. The written examination will be constructed, administered and evaluated by a committee selected from the doctoral program faculty and approved by the Doctoral Program Committee. The written portion of the examination will cover the areas of the program's core courses and other specialized courses taken by the student, and will include a written grant proposal. The oral examination will be conducted by the dissertation committee and will be administered after a student has passed the written examination and before the student begins dissertation research. If a student does not pass one or both portions of the qualifying exam, he or she may be given a second

attempt to take the failed portion(s) with permission of the Doctoral Program Committee. No more than two attempts to pass either portion of the qualifying exam will be allowed.

Doctoral Dissertation Committee and Proposal Defense

Following successful completion of the qualifying examination, the student and the Supervising Professor will select a Dissertation Committee, the membership of which requires approval 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). Following the approved selection of a Dissertation Committee, students will be expected to write a dissertation proposal for a project that contributes original knowledge to the existing body of research. Students will be required to pass an oral defense of their dissertation proposal, conducted by the student's Dissertation Committee, which addresses the contribution to scholarly research as specified by University-wide requirements. Students must successfully defend the proposal in order to qualify for doctoral degree candidacy.

Advancement to Candidacy

Doctoral students can apply for admission to candidacy (ABD status) once they have met all requirements for the Doctoral degree other than their dissertation research. The requirements include successfully completing all coursework, passing the qualifying examination, submitting and successfully defending the dissertation proposal, and forming a Dissertation Committee approved by the University.

Dissertation and Final Defense

Following admission to candidacy, students must demonstrate their ability to conduct independent research by writing and successfully 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 help guide and critique the candidate's research. Students should be continually registered in Doctoral Dissertation (PSY 7921-PSY 7926) each semester the dissertation research is in progress. The completed dissertation must be defended publicly before the Dissertation Committee and approved by the committee. 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).

Psychology (PSY) Courses

PSY 5113. Professional Ethics and Standards. (3-0) 3 Credit Hours.

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.")

PSY 5213. Research Design. (3-0) 3 Credit Hours.

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.")

PSY 5303. Developmental Psychology. (3-0) 3 Credit Hours.

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.

PSY 5313. Seminar in Psychopathology. (3-0) 3 Credit Hours.

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.

PSY 5323. Individual Differences and Assessment. (3-0) 3 Credit Hours.

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.

PSY 5333. Social Psychology. (3-0) 3 Credit Hours.

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.").

PSY 5343. Human Cognition. (3-0) 3 Credit Hours.

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.

PSY 5353. Industrial/Organizational Psychology. (3-0) 3 Credit Hours.

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.

PSY 5363. Health Psychology. (3-0) 3 Credit Hours.

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.").

PSY 5383. Biological Psychology. (3-0) 3 Credit Hours.

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.

PSY 5393. Cross Cultural Psychology. (3-0) 3 Credit Hours.

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.

PSY 5413. Inferential Statistics. (3-0) 3 Credit Hours.

Prerequisite: PSY 5213. Application of selected parametric and nonparametric procedures to the analysis and interpretation of empirical data.

PSY 6113. Psychological Measurement. (3-0) 3 Credit Hours.

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.").

PSY 6213. Correlation and Regression Analyses. (3-0) 3 Credit Hours.

Prerequisite: PSY 5213 or consent of instructor. Application of selected multivariate procedures to the analysis and interpretation of empirical data.

PSY 6513. Research Internship. (0-0) 3 Credit Hours.

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.

PSY 6951. Independent Study. (0-0) 1 Credit Hour.

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.

PSY 6953. Independent Study. (0-0) 3 Credit Hours.

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.

PSY 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

PSY 6973. Special Topics in Psychology. (3-0) 3 Credit Hours.

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 or Doctoral degree.

PSY 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

PSY 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

PSY 6986. Master's Thesis. (0-0) 6 Credit Hours.

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.

PSY 7003. Multivariate Statistical Analysis. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. 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.

PSY 7013. Advanced Research Design. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. An examination of issues related to complex research designs to address health-related issues. Topics include multilevel modeling, complex sampling, experimental, quasi-experimental, and mixed designs.

PSY 7023. Military Health Psychology. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. Overview of research related to Military Health Psychology. Topics include military cultural competency, psychological assessment, population health, intervention, and treatment of health-related issues of importance to the military, such as depression, PTSD, substance-abuse, and combat-related injuries. Approaches to prevention and resiliency in military personnel and their family members are also covered.

PSY 7103. Advanced Topics in Biopsychology. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. Topics related to empirical and clinical findings that contribute to current knowledge of brain-behavior relationships and the structural and functional changes associated with specific clinical conditions will be examined. Topics include traumatic brain injury, neurotransmitter imbalance, and specific related disorders, and the effects of stress on brain structure and function. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Doctoral degree.

PSY 7113. Advanced Topics in Clinical Psychology. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. Topics related to the critical evaluation of prevention, assessment, and intervention strategies used to address clinical problems in a military environment will be examined. Topics include depression, PTSD, clinical issues related to injuries and rehabilitation, substance abuse, family and partner conflict, combat-related stress disorders, and promotion of resiliency. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Doctoral degree.

PSY 7123. Advanced Topics in Applied Social Psychology. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. Topics related to understanding social psychological approaches that can be applied to understanding the prevention, etiology, and treatment of health disorders and societal problems. Topics may include but are not limited to the self, impression formation, stigma, attitude formation and change, group and organizational dynamics, and cultural forces. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Doctoral degree.

PSY 7133. Advanced Topics in Applied Cognitive Psychology. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. Topics related to understanding cognitive psychological approaches that can be applied to understanding the prevention, etiology, and treatment of health disorders. Topics include memory, problem solving, strategy utilization, communication, spatial cognition, training and learning, cultural learning, and social information processing. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Doctoral degree.

PSY 7143. Advanced Topics in Diversity and Health Disparities. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. Topics related to differences in prevention, etiology, healthcare delivery, and response to intervention related to gender, racial/ethnic identity, socioeconomic group, and/or geographic region of origin. Topics include differences in the type and rate of specific health problems in different groups, differences in access and response to prevention and treatment interventions and differences in the role of organizational, family-based and social support in healthcare interventions. May be repeated for credit when topics vary, but not more than 6 hours may be applied to the Doctoral degree.

PSY 7203. Grant Development. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. This course will provide students with an overview of the grant writing process. Literature review, theoretical rationale, budget, evaluation protocols, and 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. (Credit cannot be earned for both PSY 7203 and KAH 5163.)

PSY 7213. Program Evaluation. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor or unconditional admission to Doctoral program. This course will review the process by which health-related programs are planned, implemented, and evaluated in various communities and work-related settings. Students in this course should have prior knowledge of health-related theories, multivariate statistics, and advanced research design. (Credit cannot be earned for both PSY 7213 and KAH 5133.)

PSY 7911. Doctoral Research. (0-0) 1 Credit Hour.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7912. Doctoral Research. (0-0) 2 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7913. Doctoral Research. (0-0) 3 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7914. Doctoral Research. (0-0) 4 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7915. Doctoral Research. (0-0) 5 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7916. Doctoral Research. (0-0) 6 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7921. Doctoral Dissertation. (0-0) 1 Credit Hour.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate. Preparation, writing, and successful defense of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7922. Doctoral Dissertation. (0-0) 2 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate. Preparation, writing, and successful defense of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7923. Doctoral Dissertation. (0-0) 3 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate. Preparation, writing, and successful defense of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7924. Doctoral Dissertation. (0-0) 4 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate. Preparation, writing, and successful defense of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7925. Doctoral Dissertation. (0-0) 5 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate. Preparation, writing, and successful defense of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

PSY 7926. Doctoral Dissertation. (0-0) 6 Credit Hours.

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director; must be a Ph.D. candidate. Preparation, writing, and successful defense of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree.

Department of Sociology

The Department of Sociology offers the Master of Science Degree in 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

Students applying for unconditional admission must satisfy University-wide and College-wide graduate admission requirements, and be recommended for admission by the Graduate Program Committee of the Department of Sociology. 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 must have a grade point average of at least 3.0 (on a 4.0 scale) in the last 60 hours of undergraduate and graduate work.

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 (or a non-degree-seeking student). This does not guarantee subsequent admission as a degree-seeking graduate student; such students must reapply for degree-seeking status.

Applicants for the Master's Program in Sociology must submit the following materials to the graduate admissions office:

1. an application form (available online at <http://graduateschool.utsa.edu/>)
2. an application fee
3. official transcripts from all collegiate institutions attended, including community colleges
4. Graduate Record Examination (GRE®) scores from a GRE-administered examination. This score will be considered as only one element in the evaluation of applicants. Applicants who have a grade point average of 3.5 or higher will not be required to submit GRE scores.
5. a personal statement (approximately 500 words, or two typed pages) indicating your interest and goals in studying sociology
6. three letters of recommendation from references who can speak to your qualifications for the graduate program (at least one of these must be from someone who can speak to your academic qualifications)
7. an academic writing sample (such as a paper written for a class, preferably a sociology class)

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. 9 semester credit hours of core courses:	9
SOC 5003	Sociological Theory
SOC 5063	Research Design
SOC 5073	Quantitative Research Methods
or SOC 5033	Qualitative Research Methods

B. 21 semester credit hours of prescribed electives from the following 21 courses:

SOC 5033	Qualitative Research Methods (if not taken under section A above)
SOC 5043	Evaluation Research
SOC 5053	Professionalization Seminar
SOC 5073	Quantitative Research Methods (if not taken under section A above)
SOC 5083	Advanced Quantitative Research Methods
SOC 5123	Family Contexts and Social Change
SOC 5133	Sociology of Health and Health Care
SOC 5143	Demography and Community Trends
SOC 5173	Religion, Health and Mortality
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 6063	Health and Health Disparities
SOC 6143	Sociology of Religion
SOC 6903	Topics in Advanced Sociology
SOC 6973	Special Problems

C. Students who opt to take the Exit Exam in lieu of Thesis or Internship must complete an additional 3 credit hours of sociology electives. Exit Exam must be taken in the final semester of the student's program.

D. 6 semester credit hours of Internship or Thesis: 6

Internship option. Students may participate in an internship (one of two nonthesis options) 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, including a formal defense of an internship proposal.

Thesis option. Students may select the thesis option after they have completed 24 semester credit hours. A formal defense of both the thesis proposal and the thesis is required.

Total Credit Hours 36

Sociology (SOC) Courses

SOC 5003. Sociological Theory. (3-0) 3 Credit Hours.

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.

SOC 5033. Qualitative Research Methods. (3-0) 3 Credit Hours.

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.

SOC 5043. Evaluation Research. (3-0) 3 Credit Hours.

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.

SOC 5053. Professionalization Seminar. (3-0) 3 Credit Hours.

This course assists students in navigating key benchmarks in the master's program, including the comprehensive examination, master's thesis, and internship. Issues of pedagogy (teaching), writing, and scholarship are also addressed, along with prospects students often consider upon completion of the master's degree (e.g., doctoral program admission, community college instruction, and the application of sociological skills in workplace settings).

SOC 5063. Research Design. (3-0) 3 Credit Hours.

Prerequisite: 3 semester credit hours of undergraduate research methods. Graduate-level methods of sociological inquiry. Topics may include the ethics of social inquiry, deductive and inductive reasoning, conceptualization and operationalization, sampling, experimental and quasi-experimental design, survey research, field research, unobtrusive research, and basic qualitative and quantitative data analysis.

SOC 5073. Quantitative Research Methods. (3-0) 3 Credit Hours.

Prerequisite: SOC 5063. Graduate-level social statistics. Topics may include analysis of contingency tables, analysis of variance, correlation, multiple linear and logistic regressions, and index construction and scaling with use of computer programs such as SPSS to analyze social data. (Formerly SOC 5013. Credit cannot be earned for both SOC 5013 and SOC 5073.)

SOC 5083. Advanced Quantitative Research Methods. (3-0) 3 Credit Hours.

Prerequisite: SOC 5073. Advanced social statistics. Topics may include categorical data analysis, event history analysis, structural equation modeling (LISREL), multi-level modeling or longitudinal data analysis with use of computer programs such as SPSS, STATA, SAS, Amos, or HLM to analyze social data. (Formerly SOC 5023. Credit cannot be earned for both SOC 5023 and SOC 5083.)

SOC 5123. Family Contexts and Social Change. (3-0) 3 Credit Hours.

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.

SOC 5133. Sociology of Health and Health Care. (3-0) 3 Credit Hours.

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.

SOC 5143. Demography and Community Trends. (3-0) 3 Credit Hours.

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.

SOC 5173. Religion, Health and Mortality. (3-0) 3 Credit Hours.

Explores the complex relationships between religion and mental health, physical health, and mortality risk. Attention will also be given to religious influences on factors that may affect health, including health behaviors, social ties and support systems, psychological resources, coping practices, and character strengths that may foster resilience. The distinction between religiousness and spirituality will be discussed.

SOC 5203. Social Stratification. (3-0) 3 Credit Hours.

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.

SOC 5213. Race and Ethnic Relations. (3-0) 3 Credit Hours.

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.

SOC 5223. Mexican Americans: Community, Culture, and Class. (3-0) 3 Credit Hours.

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.

SOC 5233. Sociology of Gender. (3-0) 3 Credit Hours.

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.")

SOC 5253. Border Studies. (3-0) 3 Credit Hours.

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.

SOC 5263. Cultural Studies. (3-0) 3 Credit Hours.

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.

SOC 5323. Sociology of Childhood. (3-0) 3 Credit Hours.

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.

SOC 5333. Language and Society. (3-0) 3 Credit Hours.

An examination of the work of important scholars in the study of language and social behaviors. Themes may include an overview of morphology communication, communicative interactions, societal segmentation and linguistic variation, language and gender, language acquisition, language policies, bilingual communities, and language in institutional encounters such as schools.

SOC 5343. Education and Reproduction of Inequality. (3-0) 3 Credit Hours.

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.

SOC 5353. Crime and Delinquency. (3-0) 3 Credit Hours.

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.

SOC 5363. Theory Building and Methods. (3-0) 3 Credit Hours.

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.

SOC 5403. Social Movements. (3-0) 3 Credit Hours.

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.

SOC 5423. Social Psychology. (3-0) 3 Credit Hours.

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.

SOC 6043. Immigration and Society. (3-0) 3 Credit Hours.

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.

SOC 6063. Health and Health Disparities. (3-0) 3 Credit Hours.

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.

SOC 6143. Sociology of Religion. (3-0) 3 Credit Hours.

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.

SOC 6903. Topics in Advanced Sociology. (3-0) 3 Credit Hours.

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.

SOC 6933. Exit Examination. (0-0) 3 Credit Hours.

Prerequisites: Permission of the Graduate Advisor of Record is required and the exam must be taken in final semester of program. This is an exam on sociological theory and methods. It is an in-house, closed book exam administered in two 4-hour sessions on one day at the end of each semester. The grade report for the course is either "CR" (satisfactory performance on the Exit Examination) or "NC" (unsatisfactory performance on the Exit Examination).

SOC 6951. Independent Study. (0-0) 1 Credit Hour.

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.

SOC 6953. Independent Study. (0-0) 3 Credit Hours.

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.

SOC 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

Prerequisite: Approval of the Sociology Graduate Program Committee to take 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).

SOC 6963. Internship. (0-0) 3 Credit Hours.

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.

SOC 6966. Internship. (0-0) 6 Credit Hours.

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.

SOC 6973. Special Problems. (3-0) 3 Credit Hours.

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.

SOC 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

SOC 6986. Master's Thesis. (0-0) 6 Credit Hours.

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.

College of Public Policy

- Department of Criminal Justice (p. 231)
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Department of Criminal Justice

Mission Statement

Our Mission is to provide criminal justice and criminology education, research, and service to students, practitioners, policymakers, and the community by creating an intellectually challenging environment that promotes collegiality and instills the highest level of ethical standards in the pursuit of informed justice policy and practice.

The Department of Criminal Justice offers a Master of Science degree in Criminal Justice and Criminology.

Master of Science Degree in Criminal Justice and Criminology

The Master of Science (M.S.) degree in Criminal Justice and Criminology is designed to provide students with competency in research, policy planning, evaluation, agency management, and preparation for continued graduate study in criminal justice and criminology. The program assists students to develop and apply research expertise toward the resolution of contemporary practice and policy issues.

Program Admission Requirements

To qualify for unconditional admission, applicants must satisfy University-wide graduate admission requirements and submit all transcripts as well as two letters of recommendation, a resume and a personal statement. Graduate Record Examination (GRE) General Test scores are optional. 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; and the recommendation of the Criminal Justice and Criminology Graduate Program 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 Graduate Program 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 three requirements:

A. 15 semester credit hours of core courses: ¹ 15

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

B. 15 semester credit hours of electives as follows: 15

1. At least 9 semester credit hours of prescribed electives should be taken from the required courses listed below:

CRJ 5323 Criminal Justice Program Evaluation

CRJ 6103 Seminar on Topics in Theory of Crime and Justice

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 6233 Minorities in the Criminal Justice System

CRJ 6303 Seminar on Topics in Policing and Crime Control

CRJ 6343 Study Abroad: International Criminal Justice

CRJ 6363 Paradigms of Justice Policy

CRJ 6383 Capstone Course

CRJ 6403 Seminar on Topics in Law, Society and Justice Policy

CRJ 6951 Independent Study

CRJ 6953 Independent Study

CRJ 6961 Comprehensive Examination

2. 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).

C. 6 semester credit hours consisting of one of the following options. 6

Student must complete the 15 credit hours of the core coursework and a minimum 9 credit hours of electives (total of 24 credit hours) to be eligible for one of the following options:

1. Nonthesis Option (Written Comprehensive Examination):

Students who select the nonthesis option are required to take the written comprehensive examination and complete two additional electives (6 hours). It is required that one of these additional electives be CRJ 6383 Capstone Course. It is graded as Credit/Non-Credit. This course provides a review of the five core courses from which all exam questions will be drawn. CRJ 6383 Capstone Course will operate as a stand-alone course. A student must complete this course to satisfy the requirements of the degree, but can also receive credit for this course without successfully completing the comprehensive exam. In the event that a student does not pass all five sections, the student must re-take the comprehensive exam in a subsequent semester. Students may only re-take the comprehensive exam twice after the initial attempt; students have one calendar year (two semesters) from their initial attempt to successfully pass the comprehensive exam. Students do not need to re-enroll in CRJ 6383 to re-take the comprehensive exam. Students not enrolled in any other courses would be required to enroll in 1 credit hour of CRJ 6961 Comprehensive Examination in the subsequent long semester in which the student wishes to re-take the comprehensive exam.

2. Thesis Option: This option is available only with permission from an instructor and the Graduate Advisor of Record. Students electing the Thesis option are required to enroll in CRJ 6993 or CRJ 6996 Master's Thesis for a total of 6 credit hours, which includes completion of an oral comprehensive exam (i.e., successful proposal defense). Students failing to complete all requirements of the thesis option within the 6 credit hours would be required to enroll for 1 credit hour of CRJ 6991 Master's Thesis if no other courses are being taken that term. The Master's thesis requires compliance with UTSA thesis requirements and a successful final thesis defense.

Total Credit Hours **36**

¹ NOTE: Students are expected to complete the majority of core courses prior to enrolling in elective courses. Students are encouraged to enroll in CRJ 5073 Research Methods, CRJ 5123 Justice Policy Formation and Implementation, and CRJ 6373 Crime Theory and Justice Policy in their first semester and CRJ 5083 Quantitative Analysis and CRJ 5133 Management of Justice Organizations in their second semester.

Criminal Justice (CRJ) Courses

CRJ 5073. Research Methods. (3-0) 3 Credit Hours.

Prerequisite: CRJ 3013 or equivalent. Introduction to methodologies used in justice research. Topics include research design, sampling theory, data collection, measurement, and analysis.

CRJ 5083. Quantitative Analysis. (3-0) 3 Credit Hours.

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.

CRJ 5123. Justice Policy Formation and Implementation. (3-0) 3 Credit Hours.

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.

CRJ 5133. Management of Justice Organizations. (3-0) 3 Credit Hours.

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.

CRJ 5323. Criminal Justice Program Evaluation. (3-0) 3 Credit Hours.

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.

CRJ 6103. Seminar on Topics in Theory of Crime and Justice. (3-0) 3 Credit Hours.

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.

CRJ 6123. Seminar on Topics in Research Methods. (3-0) 3 Credit Hours.

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.

CRJ 6203. Seminar on Topics in Corrections Policy. (3-0) 3 Credit Hours.

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.

CRJ 6213. Gender Issues in the Criminal Justice System. (3-0) 3 Credit Hours.

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.

CRJ 6233. Minorities in the Criminal Justice System. (3-0) 3 Credit Hours.

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.

CRJ 6303. Seminar on Topics in Policing and Crime Control. (3-0) 3 Credit Hours.

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.

CRJ 6343. Study Abroad: International Criminal Justice. (3-0) 3 Credit Hours.

Prerequisite: Permission of instructor. A lecture/seminar course associated with a study abroad program related to the study of cross-cultural differences in crime and applications of criminal justice systems and practice. Involves international travel and field trips. May be repeated for credit when the destination country varies.

CRJ 6363. Paradigms of Justice Policy. (3-0) 3 Credit Hours.

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.

CRJ 6373. Crime Theory and Justice Policy. (3-0) 3 Credit Hours.

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.

CRJ 6383. Capstone Course. (3-0) 3 Credit Hours.

Prerequisite: Completion of the 15 semester credit hours of core courses and a minimum of 9 semester credit hours of electives. This course is designed to prepare students for the comprehensive examination and covers topics including but not limited to: Research Methods, Quantitative Analysis, Justice Policy Formation and Implementation, Management of Justice Organizations, and Crime Theory and Justice Policy. The grade report for the course is either "CR" (satisfactory performance on the Comprehensive Examination) or "NC" (unsatisfactory performance on the Comprehensive Examination).

CRJ 6403. Seminar on Topics in Law, Society and Justice Policy. (3-0) 3 Credit Hours.

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.

CRJ 6951. Independent Study. (0-0) 1 Credit Hour.

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.

CRJ 6953. Independent Study. (0-0) 3 Credit Hours.

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.

CRJ 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

Prerequisite: Approval of the Graduate Advisor of Record to take the Comprehensive Examination. May be repeated as many times as approved by the Graduate Advisor of Record. 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).

CRJ 6983. Justice Policy Research Project. (0-0) 3 Credit Hours.

Prerequisite: 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.

CRJ 6986. Justice Policy Research Project. (0-0) 6 Credit Hours.

Prerequisite: 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.

CRJ 6991. Master's Thesis. (0-0) 1 Credit Hour.

Prerequisites: Completion of the core courses (15 semester credit hours), and at least 9 semester credit hours of electives (for a total of 24 hours of graduate work), and permission of the Graduate Advisor of Record and Faculty Thesis Advisor. Oral comprehensive examination, thesis preparation, and defense. May be repeated for credit but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon successful completion of the thesis.

CRJ 6993. Master's Thesis. (0-0) 3 Credit Hours.

Prerequisites: Completion of the core courses (15 semester credit hours), and at least 9 semester credit hours of electives (for a total of 24 hours of graduate work), and permission of the Graduate Advisor of Record and Faculty Thesis Advisor. Oral comprehensive examination, thesis preparation, and defense. May be repeated for credit but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon successful completion of the thesis.

CRJ 6996. Master's Thesis. (0-0) 6 Credit Hours.

Prerequisites: Completion of the core courses (15 semester credit hours), and at least 9 semester credit hours of electives (for a total of 24 hours of graduate work), and permission of the Graduate Advisor of Record and Faculty Thesis Advisor. Oral comprehensive examination, thesis preparation, and defense. May be repeated for credit but no more than 6 hours will apply to the Master's degree. Credit will be awarded upon successful completion of the thesis.

Department of Demography

The Department of Demography offers a Doctor of Philosophy degree in Applied Demography. The focus of the Ph.D. program is on the application of demographic analysis to policy issues encountered in the public and private sectors.

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.

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 departments that teach demography, 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 or 79 Internet 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 42 hours of organized coursework and a minimum of 12 hours of dissertation credits for a total of at least 54 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 their area of specialization. All students will be required to complete the core courses listed below and a set of courses in their chosen area of specialization.

All students are expected to enter the program with some proficiency and aptitude for utilizing statistical software (i.e., SAS, Stata, R). 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.

Program of Study

A. Core Research and Statistics Courses:

1. Required course:	3
DEM 7243	General Research Methods for Demographers
2. 9 semester credit hours selected from the following:	9
DEM 7023	Demographic Methods of Analysis II
DEM 7143	Applied Mathematical Demography
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

B. Core Demography Courses:

1. 9 semester credit hours selected from the following courses:	9
DEM 7013	Demographic Methods of Analysis I
DEM 7093	GIS for Population Science
DEM 7113	Social Demography and Community Trends
2. 6 semester credit hours of required courses:	6
DEM 7033	Mortality
DEM 7083	Fertility
3. 3 credit hours selected from the following courses:	3
DEM 7043	Migration
or	
DEM 7053	International Migration

C. Advanced Courses (a minimum of 12 semester credit hours selected from the following is required):

DEM 7063	Applied Demography in Policy Settings	12
DEM 7073	Disparities in Health and Health Care	
DEM 7123	Applied Demography in Education	
DEM 7153	Applied Demography in Public Health	
DEM 7173	Applied Demography in Urban and Regional Planning	
DEM 7183	Social and Economic Impact Assessment	
DEM 7253	Survey Methods for Demographers	
DEM 7413	Demographic Perspectives on Poverty	
DEM 7423	Demography of the Labor Force and Labor Markets	
DEM 7433	Demography of Race and Ethnicity	
DEM 7443	Demography of Adolescence and the Transition to Adulthood	
DEM 7783	Internship in Applied Demography	
D. Doctoral Dissertation (minimum 12 semester credit hours):		12
DEM 7911	Doctoral Dissertation	
DEM 7913	Doctoral Dissertation	
DEM 7916	Doctoral Dissertation	

Total Credit Hours **54**

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 timeline 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.

Demography (DEM) Courses

DEM 7013. Demographic Methods of Analysis I. (3-0) 3 Credit Hours.

Prerequisite: 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.").

DEM 7023. Demographic Methods of Analysis II. (3-0) 3 Credit Hours.

Prerequisite: DEM 7013 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.").

DEM 7033. Mortality. (3-0) 3 Credit Hours.

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.

DEM 7043. Migration. (3-0) 3 Credit Hours.

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.

DEM 7053. International Migration. (3-0) 3 Credit Hours.

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.

DEM 7063. Applied Demography in Policy Settings. (3-0) 3 Credit Hours.

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.

DEM 7073. Disparities in Health and Health Care. (3-0) 3 Credit Hours.

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.

DEM 7083. Fertility. (3-0) 3 Credit Hours.

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.

DEM 7093. GIS for Population Science. (3-0) 3 Credit Hours.

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.

DEM 7113. Social Demography and Community Trends. (3-0) 3 Credit Hours.

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.

DEM 7123. Applied Demography in Education. (3-0) 3 Credit Hours.

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.

DEM 7143. Applied Mathematical Demography. (3-0) 3 Credit Hours.

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.

DEM 7153. Applied Demography in Public Health. (3-0) 3 Credit Hours.

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.

DEM 7173. Applied Demography in Urban and Regional Planning. (3-0) 3 Credit Hours.

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.

DEM 7183. Social and Economic Impact Assessment. (3-0) 3 Credit Hours.

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.

DEM 7223. Advanced Methods for Life Table Analysis. (3-0) 3 Credit Hours.

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.

DEM 7243. General Research Methods for Demographers. (3-0) 3 Credit Hours.

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.

DEM 7253. Survey Methods for Demographers. (3-0) 3 Credit Hours.

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.").

DEM 7263. Spatial Demography. (3-0) 3 Credit Hours.

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 geodatabases 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.

DEM 7273. Statistics for Demographic Data I. (3-0) 3 Credit Hours.

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.").

DEM 7283. Statistics for Demographic Data II. (3-0) 3 Credit Hours.

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/S-plus statistical programming languages. (Formerly titled "Multivariate Statistical Analysis for Demographic Data.").

DEM 7413. Demographic Perspectives on Poverty. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. This seminar provides an overview of poverty in the United States from a comparative perspective. It addresses the determinants of poverty, with special attention given to different demographic groups, such as single women with children, race and ethnic minorities, and urban and rural residence. Among the topics to be discussed include the differences between the European and U.S. approach to measuring poverty; the relationship between welfare policies, population growth, and economic development; race and welfare; and the 1996 welfare reform in the United States and its consequences to date. Much emphasis will be given to poverty-abatement strategies.

DEM 7423. Demography of the Labor Force and Labor Markets. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. This course introduces students to the study of demographics characteristics of the labor force and of labor markets. It addresses such major social and economic trends as the increased labor force participation of women, the integration of formerly disenfranchised groups into white-collar occupations, and the emergence of a service society. Literature that can help explain these trends will come from gender studies, race and ethnicity, and post-industrialization, in addition to demographic research. Other topics to be discussed cover the study of occupational upgrading; employment, unemployment, and underemployment; regional shifts in employment; the work family relationship; and the role of social policy regarding work, family, and fertility.

DEM 7433. Demography of Race and Ethnicity. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. This course is designed to introduce students to the study of the demography of racial and ethnic groups in the United States with some attention to other parts of the world. Using theoretical perspectives drawn from the demographic and race and ethnic literatures, the course will examine demographic, social, and economic variations among major racial and ethnic groups. The course is divided into a series of broad topics covering the study of the demography of racial and ethnic groups including an overview of the construction of race and ethnicity; theoretical perspectives; the foundations of inequality; data and methodological issues; the three population processes (fertility, mortality, and migration); intermarriage and multiracial and pan-ethnic identities; marriage, family, and household arrangements; and labor market and socioeconomic outcomes.

DEM 7443. Demography of Adolescence and the Transition to Adulthood. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Demographers have long considered adolescence and early adulthood as a critical period when significant life choices are made. Important milestones overlap during these years as young people leave school, begin work, form romantic relationships, become independent from parents and begin forming their own families. This seminar explores the different factors that define the timing and progression of this transition and explores demographic and policy implications across different social and cultural contexts. It also highlights the relevance of the life course for the understanding of demographic processes.

DEM 7701. Professional Development Colloquium. (1-0) 1 Credit Hour.

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.

DEM 7783. Internship in Applied Demography. (0-0) 3 Credit Hours.

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.

DEM 7801. Directed Research. (0-0) 1 Credit Hour.

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.

DEM 7803. Directed Research. (0-0) 3 Credit Hours.

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.

DEM 7901. Special Topics. (1-0) 1 Credit Hour.

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.

DEM 7902. Special Topics. (2-0) 2 Credit Hours.

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.

DEM 7903. Special Topics. (3-0) 3 Credit Hours.

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.

DEM 7911. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

DEM 7913. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

DEM 7916. Doctoral Dissertation. (0-0) 6 Credit Hours.

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

The Department of Public Administration offers the Master of Public Administration, as well as the Graduate Certificate in Nonprofit Administration and Leadership.

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 educates responsible leaders and ethical public servants through a curriculum incorporating original research and practice. The program's diverse graduates, representing a wide range of professional and community backgrounds, serve the public locally, regionally, nationally, and internationally. Bridging research and practice, MPA graduates demonstrate 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 Internship or PAD 6966 Internship.

Degree candidates must complete the following requirements:

A. 25 semester credit hours of core courses:

PAD 5003	Introduction to Public Service Leadership and Management	3
PAD 5023	Research Design and Methods	3
PAD 5033	Theories of Public Organizations	3
PAD 5233	Applied Research I	3
PAD 5323	Public Policy Process	3
PAD 5363	Public Budgeting and Finance	3
PAD 5393	Economics for Public Affairs	3
PAD 6001	Leadership and Communication Skills Development Seminar	1
PAD 6923	Applied Research II	3

Normally, students enroll in PAD 5003, Introduction to Public Service Leadership and Management, and PAD 6001, Leadership and Communication Skills Development Seminar, during their initial semester.

B. 9 semester hours of prescribed electives, select three (3) from the following list:

PAD 5243	Management Information Systems	3
PAD 5303	Ethics in Government Administration	3
PAD 5313	Public Policy Analysis	3
PAD 5333	Program Evaluation	3
PAD 5343	Human Resource Management in the Public Sector	3
PAD 5443	Diversity Policies and Management	3
PAD 5913	Nonprofit Organizations	3
PAD 5923	Nonprofit Leadership and Management	3
PAD 5943	Strategic Planning and Management for Public and Nonprofit Organizations	3
PAD 6243	Administrative Law	3

C. 6 semester credit hours of Public Administration electives, chosen in consultation with the student's advisor.

D. 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.

Total Credit Hours

40

Graduate Certificate in Nonprofit Administration and Leadership

The Graduate Certificate in Nonprofit Administration and Leadership (NPAL) 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 5033	Theories of Public Organizations	3
PAD 5913	Nonprofit Organizations	3
PAD 5923	Nonprofit Leadership and Management	3

B. 6 semester credit hours selected from the following courses: 6

PAD 5343	Human Resource Management in the Public Sector	
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 5963	Nonprofit Financial Management	
PAD 6973	Special Topics (with permission from Advisor)	

Total Credit Hours

15

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.

Public Administration (PAD) Courses

PAD 5003. Introduction to Public Service Leadership and Management. (3-0) 3 Credit Hours.

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.").

PAD 5023. Research Design and Methods. (3-0) 3 Credit Hours.

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.").

PAD 5033. Theories of Public Organizations. (3-0) 3 Credit Hours.

This course provides an opportunity for students to synthesize, integrate, interpret, and reflect upon major theories of organizations. This course examines various concepts and approaches in use today in terms of their potential to improve (or inhibit) the performance of public organizations. Special emphasis is given to structural arrangements, human resource management skills necessary for increasingly diverse organizations and society, politics, power, organizational culture, and leadership process.

PAD 5103. Planning and Land Use Law. (3-0) 3 Credit Hours.

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.

PAD 5223. Urban Management. (3-0) 3 Credit Hours.

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.

PAD 5233. Applied Research I. (3-0) 3 Credit Hours.

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.")

PAD 5243. Management Information Systems. (3-0) 3 Credit Hours.

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.

PAD 5303. Ethics in Government Administration. (3-0) 3 Credit Hours.

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.

PAD 5313. Public Policy Analysis. (3-0) 3 Credit Hours.

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.

PAD 5323. Public Policy Process. (3-0) 3 Credit Hours.

This course provides 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, the complexities of decision-making, and the challenges and opportunities facing policy makers in a diverse, global society. (Formerly titled "Public Policy Formulation and Implementation.") (Credit cannot be earned for both PAD 5323 and POL 5173.)

PAD 5333. Program Evaluation. (3-0) 3 Credit Hours.

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.

PAD 5343. Human Resource Management in the Public Sector. (3-0) 3 Credit Hours.

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.

PAD 5363. Public Budgeting and Finance. (3-0) 3 Credit Hours.

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.")

PAD 5373. Social Policy. (3-0) 3 Credit Hours.

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.

PAD 5383. Housing Policy. (3-0) 3 Credit Hours.

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.

PAD 5393. Economics for Public Affairs. (3-0) 3 Credit Hours.

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.")

PAD 5443. Diversity Policies and Management. (3-0) 3 Credit Hours.

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.

PAD 5473. Land Use Policy. (3-0) 3 Credit Hours.

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.

PAD 5503. Urban Planning and Society. (3-0) 3 Credit Hours.

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.")

PAD 5513. Urban and Regional Economic Development. (3-0) 3 Credit Hours.

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.

PAD 5523. Community Sustainability. (3-0) 3 Credit Hours.

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.

PAD 5573. Public Policy and Policymaking in San Antonio. (3-0) 3 Credit Hours.

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.

PAD 5583. Urban Policy. (3-0) 3 Credit Hours.

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.

PAD 5913. Nonprofit Organizations. (3-0) 3 Credit Hours.

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.

PAD 5923. Nonprofit Leadership and Management. (3-0) 3 Credit Hours.

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.

PAD 5933. Fiscal Resource Development in Nonprofit Organizations. (3-0) 3 Credit Hours.

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.

PAD 5943. Strategic Planning and Management for Public and Nonprofit Organizations. (3-0) 3 Credit Hours.

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.

PAD 5953. Grant Development and Proposal Writing. (3-0) 3 Credit Hours.

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.

PAD 5963. Nonprofit Financial Management. (3-0) 3 Credit Hours.

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.

PAD 6001. Leadership and Communication Skills Development Seminar. (1-0) 1 Credit Hour.

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).

PAD 6243. Administrative Law. (3-0) 3 Credit Hours.

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.

PAD 6343. Study Abroad: International Public Administration. (3-0) 3 Credit Hours.

Prerequisite: Permission of instructor. A lecture/seminar course associated with a study abroad program related to the study and practice of comparative governance. Involves international travel and field trips. May be repeated for credit when the destination country varies.

PAD 6923. Applied Research II. (3-0) 3 Credit Hours.

In this course, the student will complete their professional research paper, using the skills and background developed in PAD 5233 Applied Research I.

PAD 6953. Independent Study. (0-0) 3 Credit Hours.

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.

PAD 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

PAD 6963. Internship. (0-0) 3 Credit Hours.

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.

PAD 6966. Internship. (0-0) 6 Credit Hours.

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.

PAD 6973. Special Topics. (3-0) 3 Credit Hours.

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.

The Department of Social Work offers the Master of Social Work degree.

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). Applicants with misdemeanor or felony charges or convictions may have difficulty being accepted by an agency to complete their field practicum, obtaining a social work license, and/or gaining

employment as a social worker in some settings. See the Texas State Board of Social Work Examiners Web site at <http://www.dshs.state.tx.us/socialwork/> for additional information.

The Master of Social Work degree program consists of two program tracks: a 60-semester-credit-hour program for students with undergraduate degrees that are not in social work, and a 36-semester-credit-hour program for students with undergraduate degrees in social work or at least 18 hours of graduate credit in social work.

36-hour program: Applicants for this program must have a bachelor's degree in social work (BSW) awarded from a CSWE-accredited program or have successfully completed a minimum of 18 graduate semester credit hours in a CSWE-accredited MSW program. The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies or to complete additional degree requirements not transferred, is 36 graduate credit hours.

60-hour program: Applicants for this program must have a bachelor's degree. The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies, is 60 graduate credit hours.

The 36-hour program is available only to students who have earned a BSW degree or successfully completed a minimum of 18 graduate semester hours from a program accredited by the Council on Social Work Education (CSWE).

Program Admission Requirements

Applicants must satisfy University-wide graduate admission requirements.

Admission requirements for all students include:

1. a completed UTSA Graduate School application;
2. official transcripts from all colleges and universities attended;
3. an application packet found on the Graduate School's website with instructions and required forms that includes the following:
 - a narrative statement addressing interest in and the fit with the UTSA MSW program not to exceed 1,250 words (approximately five pages). Make sure questions to be addressed are part of the packet;
 - 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;
4. 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 on the paper version, 79 on the internet version), or results of the International English Language Testing System (IELTS; not more than five years old and a score of not less than 6.5).

36-Hour Program

The 36-hour program is designed for applicants who have graduated with a bachelor's degree in social work (BSW) from a CSWE-accredited program or have successfully completed a minimum of 18 graduate semester credit hours in CSWE-accredited Master of Social Work program. The minimum number of semester credit hours required for this MSW program track is 36 semester credit hours, course deficiencies and required UTSA courses for the degree not completed elsewhere, if a transfer student, may require additional coursework.

36-Hour Program Admission Requirements. In addition to University-wide requirements and program admission requirements, applicants must have completed a BSW degree from a CSWE-accredited program within ten years from the date of application or have successfully completed a minimum of 18 graduate semester credit hours in a CSWE-accredited Master of Social Work program. BSW graduates with appropriate rationale, such as post-BSW practice experience, may apply and request an exception to the ten-year requirement in their application.

For admission to the 36-hour program, additional requirements include:

- 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 any graduate-level MSW coursework previously completed;
- a reference letter from either the BSW field director/coordinator or BSW program director if a BSW applicant, or from the MSW program director/chair if an applicant has completed MSW courses, attesting to good standing status in the CSWE-accredited social work program where the student has completed coursework;
- BSW applicants must 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;
- MSW applicants who have completed any portion of their foundation field practicum must 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;
- be in good standing at the last institution attended; and
- be recommended for admission by the UTSA Department of Social Work Graduate Program Committee.

60-Hour Social Work Program

The 60-hour social work program is designed for applicants who have undergraduate degrees in something other than social work. Non-BSW students must complete 24 semester credit hours of foundation courses and 36 hours of additional coursework in the MSW program. The minimum number of semester credit hours required for the 60-hour program track is 60 semester credit hours; course deficiencies may require additional coursework.

60-Hour Program Admission Requirements. In addition to University-wide requirements and program admission requirements, applicants must have completed an undergraduate degree in something other than social work.

For admission to the 60-hour program, additional requirements include:

1. a cumulative grade point average of at least 3.0 (on a 4.0 scale) in the last 60 semester credit hours of undergraduate and graduate-level coursework graduate-level coursework previously completed;
2. be in good standing at the last institution attended; and
3. be recommended for admission by the UTSA Department of Social Work Graduate Program Committee.

Classification and Academic Standing Requirements

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.

Please refer to department Web site for further information: <http://copp.utsa.edu/department/category/social-work/>.

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. Academic course credit cannot be granted for life or previous work experience.

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	3
SWK 5103	Social Problems and Social Welfare Policy Analysis	3
SWK 5113	Generalist Social Work Practice	3
SWK 5203	Social Work Research	3
SWK 5303	Foundations of Social Work I	3
SWK 5313	Foundations of Social Work II	3
SWK 5403	Foundation Field Practicum I and Integrative Seminar	3
SWK 5413	Foundation Field Practicum II and Integrative Seminar	3

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	3
SWK 5513	Culturally Competent Practice with Diverse Populations	3

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	3
SWK 5433	Advanced Field Practicum IV and Integrative Seminar	3
SWK 5443	Advanced Social Work Methods: Individuals	3
SWK 5463	Advanced Social Work Methods: Groups	3
SWK 5493	Advanced Social Work Methods: Community Practice	3
SWK 5523	Advanced Social Work Methods: Children and Families	3

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	3
SWK 5473	Advanced Social Work Methods: Policy Practice and Advocacy	3

E. 3 semester credit hours from the following electives. All students must complete one of the following courses:

SWK 5483	Multidimensional Assessment	3
or SWK 5633	Transformational Leadership in Social Work	

F. 3 semester credit hours of electives. All students must complete one of the following:

3 semester credit hours of free elective graduate coursework chosen in consultation with the student's faculty advisor

SWK 6953 Independent Study

SWK 6973 Special Topics in Culturally Competent Practice

Total Credit Hours **60**

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.)

Field Practicum

Students in the 60-semester-credit-hour program are expected to complete 900 clock hours of field experience under the supervision of an MSW social worker while in the program. Students complete a minimum of 450 clock hours over two semesters as part of their foundation coursework and an additional 450 clock hours over one or two semesters as part of their advanced coursework. Advanced standing students complete 450 clock hours of field practicum as part of their advanced coursework. The program's field office arranges the placement and oversees the placement process. Although a limited number of placements are available for students who work full-time, students are expected to be as flexible as possible to ensure successful placement.

Social Work (SWK) Courses

SWK 5013. Human Behavior and Social Environment: Dynamics of Individuals and Families. (3-0) 3 Credit Hours.

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.

SWK 5103. Social Problems and Social Welfare Policy Analysis. (3-0) 3 Credit Hours.

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.

SWK 5113. Generalist Social Work Practice. (3-0) 3 Credit Hours.

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 and the strengths and empowerment perspectives. 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.

SWK 5203. Social Work Research. (3-0) 3 Credit Hours.

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.

SWK 5233. Global Context of Social Work. (3-0) 3 Credit Hours.

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.

SWK 5243. Advanced Social Work Research: Practice and Program Evaluation. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing in social work and completion of all foundation courses. 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.

SWK 5303. Foundations of Social Work I. (3-0) 3 Credit Hours.

Prerequisites: Graduate standing in social work, completion of SWK 5013, SWK 5103, and 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.").

SWK 5313. Foundations of Social Work II. (3-0) 3 Credit Hours.

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.").

SWK 5403. Foundation Field Practicum I and Integrative Seminar. (2-8) 3 Credit Hours.

Prerequisites: Graduate standing in social work, completion of SWK 5013, SWK 5103, and 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 to pass this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

SWK 5413. Foundation Field Practicum II and Integrative Seminar. (2-8) 3 Credit Hours.

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 to pass this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

SWK 5423. Advanced Field Practicum III and Integrative Seminar. (2-8) 3 Credit Hours.

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, with an emphasis on advanced culturally competent practice with individuals, families, groups, organizations, and communities. 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 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 to pass this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

SWK 5433. Advanced Field Practicum IV and Integrative Seminar. (2-8) 3 Credit Hours.

Prerequisites: Graduate standing in social work, completion of all foundation coursework and all advanced courses other than those taken concurrently with SWK 5433. Taken during the student's last semester in the MSW Program, this course serves as the capstone course for the social work program. 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 as well as a weekly integrative seminar. The minimum 225-clock-hour internship addresses the continued independent learning and application of theory to culturally competent practice with individuals, families, groups, organizations, and communities 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 to pass this course; the field practicum and the integrative seminar each contribute 50 percent toward the final grade.

SWK 5443. Advanced Social Work Methods: Individuals. (3-0) 3 Credit Hours.

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.")

SWK 5463. Advanced Social Work Methods: Groups. (3-0) 3 Credit Hours.

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.

SWK 5473. Advanced Social Work Methods: Policy Practice and Advocacy. (3-0) 3 Credit Hours.

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.

SWK 5483. Multidimensional Assessment. (3-0) 3 Credit Hours.

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.

SWK 5493. Advanced Social Work Methods: Community Practice. (3-0) 3 Credit Hours.

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.")

SWK 5513. Culturally Competent Practice with Diverse Populations. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of graduate advisor; must be completed prior to enrollment in the foundation field practicum. Advanced standing and transfer students complete this course during their first semester in the program. 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.

SWK 5523. Advanced Social Work Methods: Children and Families. (3-0) 3 Credit Hours.

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 couples/family interventions and interventions in working with children and adolescents are incorporated in this course.

SWK 5633. Transformational Leadership in Social Work. (3-0) 3 Credit Hours.

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.)

SWK 6951. Independent Study. (0-0) 1 Credit Hour.

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.

SWK 6952. Independent Study. (0-0) 2 Credit Hours.

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.

SWK 6953. Independent Study. (0-0) 3 Credit Hours.

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.

SWK 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

SWK 6973. Special Topics in Culturally Competent Practice. (3-0) 3 Credit Hours.

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.

College of Sciences

- Department of Biology (p. 248)
 - Environmental Science (p. 258)
- Department of Chemistry (p. 263)
- Department of Computer Science (p. 269)
- Department of Geological Sciences (p. 274)
- Department of Mathematics (p. 278)
- Department of Physics and Astronomy (p. 282)

Department of Biology

The Department of Biology offers Master of Science degree in Biology, Biotechnology, and Environmental Science as well as a Doctor of Philosophy degree in Biology with concentrations in Cell and Molecular Biology and Neurobiology.

- Master of Science Degree in Biology (p. 248)
- Master of Science Degree in Biotechnology (p. 250)
- Master of Science Degree in Environmental Science (p. 258)
- Doctor of Philosophy Degree in Biology (p. 251)

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, including a reason why you wish to pursue an M.S. in Biology, 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. A minimum grade point average of 3.0 (on a 4.0 scale) is required for admission. 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-seeking students are required to complete a minimum of 36 semester credit hours that must 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

I. Thesis Options

A. Emphasis in Cell and Molecular Biology

The emphasis in Cell and Molecular Biology (CMB) is a thesis-track degree program designed to prepare students who may wish to pursue a Ph.D. in Biology with an emphasis in Cell and Molecular Biology at UTSA or elsewhere. The Master's level CMB emphasis provides a prospective student with the coursework and preliminary research background found in a successful CMB Ph.D. applicant. Core coursework is directly transferable toward the Ph.D. degree (if the student is accepted into the Ph.D. program), and elective coursework is also transferable if it was not used to fulfill requirements for the M.S. degree.

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5113	Principles of Biochemistry
BIO 5123	Principles of Molecular Biology
BIO 5133	Principles of Cell Biology

2. 6 semester credit hours of research support courses are required: 6

BIO 7041	Biology Colloquium (repeated for a total of 3 hours)
BIO 7051	Seminar in Life Sciences (repeated for a total of 3 hours)

3. 12 semester credit hours from the following research-based courses are required: 12

BIO 5973	Directed Research
or BIO 6953	Independent Study
BIO 6983	Master's Thesis (repeated for a total of 6 hours)

4. 12 semester credit hours of electives from the following list are required: 12

BIO 5233	Medicinal Plants
BIO 5463	Reproductive Biology
BIO 5543	Pharmacology and Toxicology
BIO 5633	Stem Cell Biology
BIO 5643	Bioinformatics and Computational Biology
BIO 5653	Biology of Disease
BIO 5663	Applications of Recombinant DNA Technology
BIO 5833	Membrane Structure and Function
BIO 6313	Molecular Biology and Biophysics of Ion Channels
BIO 6513	Drug Development

BIO 6973	Special Problems	
Total Credit Hours		36

B. Emphasis in Microbiology and Immunology

The emphasis in Microbiology and Immunology is a thesis-track degree program designed to prepare students who may wish to pursue a Ph.D. in Biology with an emphasis in Microbiology and Immunology at UTSA or elsewhere. This emphasis provides a prospective student with the coursework and preliminary research background found in a successful Ph.D. applicant. Core coursework is directly transferable toward the Ph.D. degree (if the student is accepted into the Ph.D. program), and elective coursework is also transferable if it was not used to fulfill requirements for the M.S. degree.

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5113	Principles of Biochemistry	
BIO 5123	Principles of Molecular Biology	
BIO 5133	Principles of Cell Biology	

2. 6 semester credit hours of research support courses are required: 6

BIO 7041	Biology Colloquium (repeated for a total of 3 hours)	
BIO 7051	Seminar in Life Sciences (repeated for a total of 3 hours)	

3. 12 semester credit hours from the following research-based courses are required: 12

BIO 5973	Directed Research	
or BIO 6953	Independent Study	

4. 12 semester credit hours of electives from the following list are required: 12

BIO 5543	Pharmacology and Toxicology	
BIO 5643	Bioinformatics and Computational Biology	
BIO 5663	Applications of Recombinant DNA Technology	
BIO 5743	Advanced Virology	
BIO 6513	Drug Development	
BIO 6543	Vaccine Development	
BIO 6573	Microbial Pathogenesis	
BIO 6803	Advanced Immunology and Immunochemistry	
BIO 6883	Bacterial Pathogenesis	
BIO 6973	Special Problems	

Total Credit Hours 36

C. Emphasis in Neurobiology

The emphasis in Neurobiology is a thesis-track degree program designed for potential students who may wish to pursue a Ph.D. in Biology with an emphasis in Neurobiology at UTSA. The Master's level Neurobiology emphasis provides a prospective student with the coursework and preliminary research background found in a successful Neurobiology Ph.D. applicant. Core and elective coursework is transferable and can count toward the Ph.D. degree (if the student is accepted into the Ph.D. program).

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5423	Neuroanatomy	
BIO 5433	Neurophysiology	
BIO 5443	Neurochemistry	

2. 6 credit hours of research support courses are required: 6

BIO 7041	Biology Colloquium (repeated for a total of 3 hours)	
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BIO 7051	Seminar in Life Sciences (repeated for a total of 3 hours)	
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3. 12 semester credit hours from the following research-based courses are required: 12

BIO 5973	Directed Research	
or BIO 6951	Independent Study	

BIO 6983	Master's Thesis (repeated for a total of 6 hours)	
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4. 12 semester credit hours of electives from the following list are required: 12

BIO 5453	Neuroendocrinology	
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BIO 5463	Reproductive Biology	
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BIO 5473	Developmental Neurobiology	
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BIO 5483	Computational Neuroscience	
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BIO 5493	Cognitive Neuroscience	
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BIO 5503	Sensory Physiology	
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BIO 5533	Human Electrophysiology	
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BIO 6233	Quantitative Biology	
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BIO 6313	Molecular Biology and Biophysics of Ion Channels	
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BIO 6483	Animal Behavior	
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BIO 6973	Special Problems	
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Total Credit Hours 36

II. Non-Thesis Options

A. Emphasis in Science Education

The emphasis in Science Education offers the opportunity for advanced study in the field of biology for students currently teaching science in schools or colleges and for those who plan on following this career path, or for those who wish to work in agencies concerned with science education policies and practice.

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5173	Principles of the Biological Sciences	
BIO 5183	Biology of Learning	

2. 6 credit hours of research support courses are required: 6

BIO 5193	Hands-On Scientific Learning	
BIO 7041	Biology Colloquium (repeated for a total of 3 hours)	

3. 12 semester credit hours of electives from the following list are required: 12

BIO 5233	Medicinal Plants	
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BIO 5423	Neuroanatomy	
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BIO 5433	Neurophysiology	
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BIO 5443	Neurochemistry	
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BIO 5453	Neuroendocrinology	
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BIO 5463	Reproductive Biology	
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BIO 5473	Developmental Neurobiology	
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BIO 5483	Computational Neuroscience	
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BIO 5493	Cognitive Neuroscience	
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BIO 5503	Sensory Physiology	
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BIO 5533	Human Electrophysiology	
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BIO 5543	Pharmacology and Toxicology	
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BIO 5633	Stem Cell Biology	
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BIO 5643	Bioinformatics and Computational Biology	
BIO 5663	Applications of Recombinant DNA Technology	
BIO 5743	Advanced Virology	
BIO 5833	Membrane Structure and Function	
BIO 6233	Quantitative Biology	
BIO 6313	Molecular Biology and Biophysics of Ion Channels	
BIO 6483	Animal Behavior	
BIO 6513	Drug Development	
BIO 6543	Vaccine Development	
BIO 6573	Microbial Pathogenesis	
BIO 6803	Advanced Immunology and Immunochemistry	
BIO 6883	Bacterial Pathogenesis	
BIO 6973	Special Problems	
4. 12 semester credit hours of electives from the following list are required:		12
C&I 6063	Research in Subject Matter Fields (consent of instructor required)	
C&I 6303	Advanced Methods in Subject-Matter Fields (consent of instructor required)	
C&I 6613	Nature and Meaning of Science in Education	
C&I 6623	Inquiry in Science Education	
C&I 6633	Science for All? Equity and Agency in Science Education	
C&I 6733	Fundamentals of Environmental Education	
C&I 6773	Environmental Education in the Curriculum	
Total Credit Hours		36

B. Open Emphasis

The open emphasis in Biology offers students the opportunity to acquire a sound preparation of the fundamentals in several areas of Biology, and to introduce students to recent advances in biological theory and methods.

1. 3 semester credit hours of the following core lecture courses are required: 3

BIO 5173	Principles of the Biological Sciences
BIO 5183	Biology of Learning

2. 9 credit hours of research support courses are required: 9

BIO 7041	Biology Colloquium (repeated for a total of 3 hours)
BIO 7051	Seminar in Life Sciences (repeated for a total of 3 hours)

and one of the following laboratory courses:

BIO 5033	Biotechnology Laboratory
BIO 5143	Advanced Nucleic Acids Laboratory
BIO 5163	Recombinant Protein Biotechnology Laboratory

3. 24 semester credit hours of electives from the following list are required: 24

BIO 5183	Biology of Learning
BIO 5233	Medicinal Plants
BIO 5423	Neuroanatomy
BIO 5433	Neurophysiology
BIO 5443	Neurochemistry
BIO 5453	Neuroendocrinology
BIO 5463	Reproductive Biology
BIO 5473	Developmental Neurobiology

BIO 5483	Computational Neuroscience	
BIO 5493	Cognitive Neuroscience	
BIO 5503	Sensory Physiology	
BIO 5533	Human Electrophysiology	
BIO 5543	Pharmacology and Toxicology	
BIO 5633	Stem Cell Biology	
BIO 5643	Bioinformatics and Computational Biology	
BIO 5663	Applications of Recombinant DNA Technology	
BIO 5743	Advanced Virology	
BIO 5833	Membrane Structure and Function	
BIO 6233	Quantitative Biology	
BIO 6313	Molecular Biology and Biophysics of Ion Channels	
BIO 6483	Animal Behavior	
BIO 6513	Drug Development	
BIO 6543	Vaccine Development	
BIO 6573	Microbial Pathogenesis	
BIO 6803	Advanced Immunology and Immunochemistry	
BIO 6883	Bacterial Pathogenesis	
BIO 6973	Special Problems	
Total Credit Hours		36

Comprehensive Examination

As specified by University regulations, candidates must pass a comprehensive examination administered by the student's Graduate Committee. For non-thesis 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 BIO 6963 Critical Thinking & Writing for the Biological Sciences 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 this 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. All students receive practical training through the completion of at least two laboratory courses. Additional coursework is selected from a list of approved lecture based and laboratory courses. The opportunity to gain research experience or develop further technical expertise is also possible through an internship in a biotechnology-based company.

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 admission 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 cell biology and biochemistry, and to have taken undergraduate courses in molecular biology and immunology. 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) as a condition of admission. In such cases, students should anticipate that additional time will be required to complete the degree. A minimum grade point average of 3.0 (on a 4.0 scale) is required for admission. Students who are denied admission to this 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 is limited.

Degree Requirements

Degree-seeking students are required to complete a minimum of 36 semester credit hours that must 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:

BIO 5001	Ethical Conduct in Research	1
BIO 5113	Principles of Biochemistry	3
BIO 5123	Principles of Molecular Biology	3
BIO 5133	Principles of Cell Biology	3
BIO 5762	Fundamentals of Immunology for Biotechnology	2

B. 3 semester credit hours in basic laboratory techniques are required:

BIO 5033	Biotechnology Laboratory	3
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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 Nucleic Acids Laboratory	
BIO 5163	Recombinant Protein Biotechnology Laboratory	
BIO 7571	Experimental Techniques in Biology	
BIO 7572	Experimental Techniques in Biology	
BIO 7573	Experimental Techniques in Biology	

D. Applications of Biotechnology electives 6-18

BIO 5543	Pharmacology and Toxicology	
BIO 5563	Proteomics	
BIO 5663	Applications of Recombinant DNA Technology	
BIO 5673	Analysis of Next Generation Sequence Data	

BIO 5783	Introduction to Good Manufacturing Practices and Good Laboratory Practices	
BIO 5971	Directed Research	
BIO 5972	Directed Research	
BIO 5973	Directed Research	
BIO 6323	Essentials of Biostatistics for Biotechnology	
BIO 6513	Drug Development	
BIO 6543	Vaccine Development	
BIO 7563	Practicum in Biotechnology	
BIO 7566	Practicum in Biotechnology	
BIO 7569	Practicum in Biotechnology	
BME 6923	Tissue Engineering	
BME 6933	Tissue-Biomaterials Interactions	
BME 6943	Biomaterials and Cell Signaling	
E. Management of Biotechnology		0-12
MOT 5163	Management of Technology	
MOT 5173	Technology Transfer: The Theory and Practice of Knowledge Utilization	
MOT 5223	Management of Professional Personnel	
MOT 5243	Essentials of Project and Program Management	
MOT 5313	Emerging Technologies	
MOT 5323	Biotechnology Industry	

Total Credit Hours

36

Biotechnology Internship

(Subject to availability.) The internship will require prior arrangement with biotechnology-based companies and approval of the Graduate Advisor of Record.

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 Critical Thinking & Writing for the Biological Sciences) in the following semester and retake the examination.

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 specialized tracks in Molecular Microbiology and Immunology and Stem Cell Biology. The Ph.D. in Biology is awarded to candidates who have displayed an in-depth understanding of the subject matter and demonstrated the ability to make an original contribution to knowledge in their specialized area of study.

The regulations for this degree comply with the general University regulations (refer to Chapter 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) paper version or 100 on the Internet version. 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 95 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 (21 semester credit hours required):	21
BIO 5423	Neuroanatomy
BIO 5433	Neurophysiology
BIO 5443	Neurochemistry
BIO 6233	Quantitative Biology
BIO 7113	Supervised Teaching in Biology
BIO 7413	Research Ethics and Responsible Conduct in Research
Select 3 semester credit hours of the following:	
BIO 7571	Experimental Techniques in Biology
BIO 7572	Experimental Techniques in Biology
BIO 7573	Experimental Techniques in Biology
B. Colloquia and seminars (19 semester credit hours minimum):	19
BIO 7041	Biology Colloquium ¹
BIO 7051	Seminar in Life Sciences ²
C. Doctoral research (43 semester credit hours minimum):	43
BIO 7211	Doctoral Research (before admission to candidacy)
BIO 7212	Doctoral Research (before admission to candidacy)
BIO 7213	Doctoral Research (before admission to candidacy)
BIO 7311	Doctoral Dissertation (for Ph.D. candidates)

BIO 7312	Doctoral Dissertation (for Ph.D. candidates)
BIO 7313	Doctoral Dissertation (for Ph.D. candidates)
D. Electives (12 semester credit hours minimum):	12
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.	
Total Credit Hours	95
1	Enrollment in BIO 7041 Biology Colloquium is required every Fall Semester and is optional in Spring Semesters.
2	Enrollment in BIO 7051 Seminar in Life Sciences is required each semester

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):	21
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 & BIO 7572	Experimental Techniques in Biology and Experimental Techniques in Biology
B. Colloquia (10 semester credit hours minimum—a minimum of 1 credit hour each semester throughout tenure in the program):	10
BIO 7041	Biology Colloquium
C. Doctoral research (45 semester credit hours minimum):	45
BIO 7212 & BIO 7213	Doctoral Research and Doctoral Research
BIO 7311	Doctoral Dissertation
BIO 7312	Doctoral Dissertation
BIO 7313	Doctoral Dissertation
D. Electives (9 semester credit hours minimum):	9
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.	
Total Credit Hours	85
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.

Stem Cell Biology Track

Stem Cell Biology is a rapidly emerging field rooted in basic principles of Cell and Molecular Biology that has provided new avenues to investigate normal cellular and developmental processes as well as novel approaches to learning more about and/or treating complex diseases and other debilitating conditions. The Stem Cell Biology Track will allow students pursuing their doctoral degree in Cell and Molecular Biology the opportunity to focus on Stem Cell Biology, including topics related to the basic biology of stem cells (from any species) as well as those related to translational research involving potential contributions of stem cells to tissue engineering or other therapeutic approaches. This will include, but is not limited to, molecular biology of stem cells, cell biology of stem cells, epigenetic programming in stem cells, maintenance of genetic integrity in stem cells, and the use of stem cells to study disease etiology, and will be based on studies of embryonic stem cells, induced pluripotent stem cells, germline stem cells, neural stem cells, mesenchymal stem cells or other tissue-specific stem cells, as well as stem cells from non-mammalian organisms including lower vertebrates, microorganisms and/or plants.

Students in this track will follow the standard curriculum and program of study for the concentration in Cell and Molecular Biology; however, their Doctoral Dissertation topic, proposal and research must be in an area related to Stem Cell Biology. Among the three elective courses required for the standard Cell and Molecular Biology program of study, students in this track will be required to take two courses focused on Stem Cell Biology—Cell Biology of Stem Cells and Molecular Biology of Stem Cells. Finally, students in the Stem Cell Biology track will be required to enroll in colloquia that address topics related to Stem Cell Biology. The overall program of study for this track may differ by no more than 12 semester credit hours from the standard program of study for the concentration in Cell and Molecular Biology and must be approved by the student's Dissertation Advisor, a subcommittee that will oversee the Stem Cell Biology Track, 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.

Biology (BIO) Courses

BIO 5001. Ethical Conduct in Research. (1-0) 1 Credit Hour.

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.).

BIO 5033. Biotechnology Laboratory. (0-6) 3 Credit Hours.

Prerequisite: Graduate standing. An organized course offering an introduction to routine procedures employed in the modern research laboratory.

BIO 5103. River Ecosystems. (3-0) 3 Credit Hours.

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. (Same as ES 5113. Credit cannot be earned for both BIO 5103 and ES 5113.).

BIO 5113. Principles of Biochemistry. (3-0) 3 Credit Hours.

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.

BIO 5123. Principles of Molecular Biology. (3-0) 3 Credit Hours.

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.

BIO 5133. Principles of Cell Biology. (3-0) 3 Credit Hours.

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.

BIO 5143. Advanced Nucleic Acids Laboratory. (0-6) 3 Credit Hours.

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. (Formerly titled "Advanced Molecular Biology Laboratory – DNA Techniques.").

BIO 5153. Advanced Molecular Biology Laboratory – RNA Techniques. (0-6) 3 Credit Hours.

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.

BIO 5163. Recombinant Protein Biotechnology Laboratory. (0-6) 3 Credit Hours.

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.).

BIO 5173. Principles of the Biological Sciences. (3-0) 3 Credit Hours.

Principles of biochemistry, cell and molecular biology with a focus on applications and current research appropriate for secondary school and community college biology. This course is designed for prospective and in-service science teachers who need to develop a deeper understanding of central ideas in biochemistry, cell and molecular biology.

BIO 5183. Biology of Learning. (3-0) 3 Credit Hours.

The course will introduce students to the field of neuroscience by surveying areas of biology and psychology relevant to education. In particular, the course focuses on understanding the neurobiological bases of how people learn and remember.

BIO 5193. Hands-On Scientific Learning. (0-6) 3 Credit Hours.

An introduction to the practical application of a variety of cell and molecular biology techniques. This course is intended to provide laboratory experience in selective aspects of modern biotechnology and their applications appropriate for Science Educators.

BIO 5233. Medicinal Plants. (3-0) 3 Credit Hours.

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.

BIO 5243. Advanced Plant Ecology. (3-0) 3 Credit Hours.

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.).

BIO 5273. Global Change Biology. (3-0) 3 Credit Hours.

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.

BIO 5363. Microbial Genetics and Recombinant DNA. (3-0) 3 Credit Hours.

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.).

BIO 5423. Neuroanatomy. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. The anatomy of the vertebrate nervous system.

BIO 5433. Neurophysiology. (3-0) 3 Credit Hours.

Prerequisite: BIO 3433 or an equivalent. The fundamentals of neurophysiology are presented from the cellular to the systems level.

BIO 5443. Neurochemistry. (3-0) 3 Credit Hours.

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.

BIO 5453. Neuroendocrinology. (3-0) 3 Credit Hours.

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.

BIO 5463. Reproductive Biology. (3-0) 3 Credit Hours.

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.

BIO 5473. Developmental Neurobiology. (3-0) 3 Credit Hours.

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.

BIO 5483. Computational Neuroscience. (3-0) 3 Credit Hours.

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.

BIO 5493. Cognitive Neuroscience. (3-0) 3 Credit Hours.

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.

BIO 5503. Sensory Physiology. (3-0) 3 Credit Hours.

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.

BIO 5523. Enzymes. (3-0) 3 Credit Hours.

Prerequisite: BIO 3513 or an equivalent. A study of enzyme structure and mechanism, inhibitors, cofactor, kinetics, and regulation.

BIO 5533. Human Electrophysiology. (3-0) 3 Credit Hours.

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.

BIO 5543. Pharmacology and Toxicology. (3-0) 3 Credit Hours.

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.

BIO 5553. Toxicology. (3-0) 3 Credit Hours.

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.

BIO 5563. Proteomics. (3-0) 3 Credit Hours.

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.).

BIO 5633. Stem Cell Biology. (3-0) 3 Credit Hours.

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. (Formerly titled "Cytodifferentiation.").

BIO 5643. Bioinformatics and Computational Biology. (3-0) 3 Credit Hours.

Prerequisites: BIO 2313 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. (Credit cannot be earned for both BIO 5643 and BIO 5623.).

BIO 5653. Biology of Disease. (3-0) 3 Credit Hours.

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.

BIO 5663. Applications of Recombinant DNA Technology. (3-0) 3 Credit Hours.

A course on recombinant DNA technology, concentrating on major DNA manipulation methods, including their use in vaccine and bioactive protein production, gene therapy, plant genetic engineering along with ethical and safety considerations.

BIO 5673. Analysis of Next Generation Sequence Data. (3-0) 3 Credit Hours.

The course has two major goals: 1) A general understanding of next-generation sequencing technologies; 2) An understanding of the benefits in applying next generation sequencing technology for life sciences research. The emphasis will be on applications for microbial infectious diseases research.

BIO 5713. Ornithology. (3-0) 3 Credit Hours.

A course covering various aspects of the biology of birds, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be included. (Same as ES 5763. Credit cannot be earned for both BIO 5713 and ES 5763.).

BIO 5733. Advanced Medical Mycology. (3-0) 3 Credit Hours.

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.

BIO 5743. Advanced Virology. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in Biology. A detailed study of the diversity of viruses and biochemical mechanisms for their replication. (Formerly titled "Biochemical Virology.").

BIO 5753. Conservation Biology. (3-0) 3 Credit Hours.

The class topics will include the nature of the biosphere, threats to its integrity, and ecologically sound responses to these threats. Also included will be the origin and preservation of biotic diversity, how the rich variety of plant and animal life arose, how it has been maintained by natural processes, and how its destruction can be prevented. (Same as ES 5753. Credit cannot be earned for both BIO 5753 and ES 5753.).

BIO 5762. Fundamentals of Immunology for Biotechnology. (2-0) 2 Credit Hours.

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.

BIO 5783. Introduction to Good Manufacturing Practices and Good Laboratory Practices. (3-0) 3 Credit Hours.

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.

BIO 5793. Wildlife Management. (3-0) 3 Credit Hours.

An introduction to wildlife management including ecological principles dealing with ecosystems, natural communities, and populations. The importance of animal behavior, the availability of food, cover, wildlife diseases, predators, hunting, and trapping will be included. Field trips may be included. (Same as ES 5773. Credit cannot be earned for BIO 5793 and ES 5773.).

BIO 5833. Membrane Structure and Function. (3-0) 3 Credit Hours.

Prerequisite: BIO 3513 or an equivalent. A study of the composition, organization, transport functions, and permeability of natural and model membranes.

BIO 5971. Directed Research. (0-0) 1 Credit Hour.

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.

BIO 5972. Directed Research. (0-0) 2 Credit Hours.

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.

BIO 5973. Directed Research. (0-0) 3 Credit Hours.

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.

BIO 6133. Methods in Field Biology. (3-0) 3 Credit Hours.

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.).

BIO 6213. Advanced Ecology. (3-0) 3 Credit Hours.

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.).

BIO 6233. Quantitative Biology. (3-0) 3 Credit Hours.

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.

BIO 6313. Molecular Biology and Biophysics of Ion Channels. (3-0) 3 Credit Hours.

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.

BIO 6323. Essentials of Biostatistics for Biotechnology. (3-0) 3 Credit Hours.

Basic, intermediate, and advanced (but not bioinformatics) statistical vocabulary, concepts, and methods commonly used in the biotechnology industry. A focus on tests for quality control and assurance of equipment and test systems to assess accuracy, precision, and bias related to test validations. Concepts and appropriate selections of test/study design using power analyses and estimations of sample sizes; also for clinical trials. Analytical calibration curves, frequency distributions, descriptive statistics, measures of central tendency and dispersion/error, probability, paired and unpaired, one-tailed and two-tailed t-tests, correlations, regression, one-way and two-way analysis of variance with repeated measures, parametric and nonparametric tests, post hoc tests for significance, reporting and interpretations of statistical results, validations of clinical tests for specificity, sensitivity, predictive values, likelihood ratios, receiver operating characteristic curves.

BIO 6483. Animal Behavior. (3-0) 3 Credit Hours.

Prerequisite: BIO 3413 or consent of instructor. An examination of neural, endocrine, genetic, and environmental determinants of behavior.

BIO 6513. Drug Development. (3-0) 3 Credit Hours.

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.

BIO 6543. Vaccine Development. (3-0) 3 Credit Hours.

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.

BIO 6573. Microbial Pathogenesis. (3-0) 3 Credit Hours.

The student will gain an understanding of the cellular and molecular mechanisms by which eukaryotic and viral pathogens cause disease and the host immune responses against these pathogens.

BIO 6663. Experimental Parasitology. (3-0) 3 Credit Hours.

Prerequisite: A course in parasitology or consent of instructor. A study of animal parasites, with special emphasis on the physiology of host-parasite interactions.

BIO 6803. Advanced Immunology and Immunochemistry. (3-0) 3 Credit Hours.

Prerequisite: BIO 4743 or consent of instructor. The study of current concepts of humoral and cell-mediated immunity, with emphasis on molecular mechanisms.

BIO 6883. Bacterial Pathogenesis. (3-0) 3 Credit Hours.

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.

BIO 6951. Independent Study. (0-0) 1 Credit Hour.

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.

BIO 6952. Independent Study. (0-0) 2 Credit Hours.

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.

BIO 6953. Independent Study. (0-0) 3 Credit Hours.

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.

BIO 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

BIO 6963. Critical Thinking & Writing for the Biological Sciences. (3-0) 3 Credit Hours.

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.

BIO 6973. Special Problems. (3-0) 3 Credit Hours.

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.

BIO 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

BIO 7041. Biology Colloquium. (1-0) 1 Credit Hour.

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.)

BIO 7051. Seminar in Life Sciences. (1-0) 1 Credit Hour.

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).

BIO 7113. Supervised Teaching in Biology. (0-0) 3 Credit Hours.

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.

BIO 7143. Principles of Biological Scientific Writing. (3-0) 3 Credit Hours.

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.

BIO 7211. Doctoral Research. (0-0) 1 Credit Hour.

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.

BIO 7212. Doctoral Research. (0-0) 2 Credit Hours.

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.

BIO 7213. Doctoral Research. (0-0) 3 Credit Hours.

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.

BIO 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

BIO 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

BIO 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

BIO 7413. Research Ethics and Responsible Conduct in Research. (3-0) 3 Credit Hours.

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.)

BIO 7563. Practicum in Biotechnology. (0-0) 3 Credit Hours.

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.

BIO 7566. Practicum in Biotechnology. (0-0) 6 Credit Hours.

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.

BIO 7569. Practicum in Biotechnology. (0-0) 9 Credit Hours.

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.

BIO 7571. Experimental Techniques in Biology. (0-2) 1 Credit Hour.

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.)

BIO 7572. Experimental Techniques in Biology. (0-4) 2 Credit Hours.

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.)

BIO 7573. Experimental Techniques in Biology. (0-6) 3 Credit Hours.

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.)

Environmental Science

The Environmental Science Academic Programs offer a Master of Science degree in Environmental Science with two options 1) thesis or 2) professional (nonthesis).

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.

- Master of Science Degree in Environmental Science (p. 258)
- Doctor of Philosophy Degree in Environmental Science and Engineering (p. 259)

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 regulations for this degree comply with the general University regulations as outlined in this catalog and indicated below.

The Master of Science in Environmental Science Program is multidisciplinary, and draws on faculty from many departments, including Biology, Chemistry, Civil and Environmental Engineering, and Geological Sciences. Specific information about faculty research can be found through departmental Web sites or by contacting individual faculty members. The 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.

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, and 2) one semester of environmental science. Applicants lacking these requirements will be asked to complete these deficiencies within the first 12 credit hours. Students who have not had any undergraduate course work in Environmental Law, will be required to take ES 5133 Fundamentals of Environmental Law during their first semester, which can be applied to the degree. Applications for admission 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 300 (if taken after August 1, 2011) or 1000 (if taken before August 1, 2011) 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, to the extent such information is available.

The Graduate Studies Committee, comprised of members selected from the graduate faculty, will be responsible for recommending acceptance into the program. 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 thesis option is recommended for students who are planning a career in environmental education, research, or who are planning to go on and earn a doctorate degree.

A professional (nonthesis) option is also available for those interested in developing skills and knowledge to assume professional research and/or managerial positions within public, private, and nonprofit organizations. The program is designed to develop skills in data analysis, oral and written communication, and interdisciplinary teamwork. This degree is considered a terminal degree and is not recommended for those students who want to consider earning a doctorate degree in environmental science.

Degree candidates are required to complete a minimum of 36 semester credit hours approved by the student's Graduate Advisor and Graduate Committee. Final approval is made by the Graduate Advisor of Record. These credit hours are subject to the following conditions:

Thesis Option Requirements

A. Required Organized Courses	12
ES 5013 Survey Topics in Environmental Science ¹	
ES 5023 Environmental Statistics	
ES 5503 Policy and Principles of Environmental Law	
ES 5981 Graduate Seminar in Environmental Science and Engineering (may be repeated) ²	
ES 6941 Environmental Science Colloquium (may be repeated) ²	
B. Organized courses within the College of Sciences in consultation with the student's Graduate Advisor and Graduate Committee	12
Up to 6 semester credit hours of approved upper-division undergraduate coursework may be applied.	
C. 12 semester credit hours of research:	12
ES 6953 Independent Study ³	
or ES 6951 Independent Study	
ES 6983 Master's Thesis (A total of 6 hours of Master's Thesis is required.)	
Total Credit Hours	36

- ¹ This course must be taken in the first two semesters of the program.
- ² A maximum of 3 semester credit hours in graduate seminar or 3 semester credit hours in colloquium are required. It may be any combination of hours from these courses.
- ³ A total of 6 hours of independent study hours may be applied in any combination from ES 6951 and ES 6953.

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.

Professional (Nonthesis) Option Requirements

A. Required Organized Courses	24
ES 5013 Survey Topics in Environmental Science ¹	
ES 5023 Environmental Statistics	
ES 5143 Technical Writing for Environmental Scientists	
ES 5233 Experimental Design and Analysis	

ES 5503 Policy and Principles of Environmental Law	
ES 6103 Environmental Assessment	
ES 6723 Application of Federal Environmental Law at the State Level	
And 3 hours of the following in any combination:	
ES 5981 Graduate Seminar in Environmental Science and Engineering	
ES 6941 Environmental Science Colloquium	
B. An additional 12 semester credit hours of approved graduate credit is required. This may include 6 hours of ES 6953 Independent Study. Up to 6 semester credit hours of approved upper-division undergraduate coursework and a maximum of 3 semester credit hours in a graduate seminar or 3 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 degree.	12
Total Credit Hours	36

- ¹ This course must be taken in the first two semesters of the program.

Professional students should consult the Graduate Advisor of Record on their program of study and organize a Graduate Committee during the first semester of residence. Candidates are required to pass a written comprehensive examination that will cover 1) fundamentals of environmental science, 2) data analyses and experimental design, 3) environmental law, and 4) an additional topic to be determined by the Graduate Committee. This written examination should be arranged by the student with the Graduate Advisor of Record and their Graduate Committee. 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 by the end of the first semester of the student's graduate program. Certain rules must be adhered to concerning the composition of the Graduate 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.

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 the Department of Civil and Environmental Engineering section of this catalog for details about this program.

Environmental Sciences (ES) Courses

ES 5013. Survey Topics in Environmental Science. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing. Analysis of the basic concepts and new scientific developments in environmental science. Case studies will cover a range of relevant topics to promote a thorough understanding of the emergent issues in environmental science. 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.)

ES 5023. Environmental Statistics. (3-0) 3 Credit Hours.

Prerequisites: ES 1314 and MAT 1033 or their equivalents, or consent of instructor. Emphasis on methods and applications of statistics for environmental science. Measure of location, variability, and association. Interpretation of categorical data, hypothesis testing, and use of statistical software programs and applications. (Formerly EES 5023. Same as GEO 5023. Credit can be earned for only one of the following: EES 5023, ES 5023, or GEO 5023.)

ES 5043. Global Change. (3-0) 3 Credit Hours.

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.)

ES 5063. Environmental Microbiology. (3-0) 3 Credit Hours.

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 and CE 5203. Credit can be earned for only one of the following: BIO 5063, CE 5203, EES 5063, or ES 5063.)

ES 5083. Mammalogy. (3-0) 3 Credit Hours.

Prerequisite: Graduate Standing. An advanced course covering various aspects of the biology of mammals, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be required.

ES 5093. Herpetology. (3-0) 3 Credit Hours.

Prerequisite: Graduate Standing. An advanced course covering various aspects of the biology of herpetofauna, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be required.

ES 5103. Applied Ecology. (3-0) 3 Credit Hours.

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. Credit cannot be earned for both EES 5103 and ES 5103.)

ES 5113. River Ecosystems. (3-0) 3 Credit Hours.

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 structure and function of aquatic and riparian ecosystems. Key ecological and hydrogeomorphology concepts and their application to environmental concerns are covered. Field trip required. (Same as BIO 5103. Credit cannot be earned for both BIO 5103 and ES 5113.) (Formerly titled "Freshwater Ecology.")

ES 5133. Fundamentals of Environmental Law. (3-0) 3 Credit Hours.

Prerequisite: Graduate Standing. This course exposes students to basic legal theories relevant to contemporary environmental practice, and provides an introduction to administrative law as well as six federal environmental statutes: the Clean Air Act, Clean Water Act, National Environmental Policy Act, Endangered Species Act, Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

ES 5143. Technical Writing for Environmental Scientists. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing. A course designed to give graduate students the skills necessary to write a manuscript for peer review and to prepare other professional materials for presentation or publication. Topics covered in this course include: searching the scientific literature; scientific writing style; writing graduate level papers, proposals, projects, and thesis components; preparing scientific presentations; presentation of data; using visual aids; and using word processing, spreadsheet, and presentation software.

ES 5213. Environmental Geology. (3-0) 3 Credit Hours.

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.)

ES 5233. Experimental Design and Analysis. (3-0) 3 Credit Hours.

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.)

ES 5243. Advanced Plant Ecology. (3-0) 3 Credit Hours.

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.)

ES 5493. Water Pollution Control. (3-0) 3 Credit Hours.

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.)

ES 5503. Policy and Principles of Environmental Law. (3-0) 3 Credit Hours.

Prerequisite: ES 3203 or ES 5133, or equivalent. This course exposes students to advanced policies and principles relevant to contemporary environmental practice, and provides advanced knowledge of the six federal environmental statutes: the Clean Air Act, Clean Water Act, National Environmental Policy Act, Endangered Species Act, Resource Conservation and Recovery Act, and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). (Same as PAD 5483. Credit can be earned for only one of the following: EES 5503, ES 5503, or PAD 5483.).

ES 5623. Environmental Chemistry. (3-0) 3 Credit Hours.

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. (Same as CE 5613. Credit cannot be earned for both ES 5623 and CE 5613).

ES 5753. Conservation and Restoration Ecology. (3-0) 3 Credit Hours.

The class topics will include the nature of the biosphere, threats to its integrity, and ecologically sound responses to these threats. Also included will be the origin and preservation of biotic diversity, how the rich variety of plant and animal life arose, how it has been maintained by natural processes, and how its destruction can be prevented. (Same as BIO 5753. Credit cannot be earned for both BIO 5753 and ES 5753.).

ES 5763. Ornithology. (3-0) 3 Credit Hours.

A course covering various aspects of the biology of birds, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be included. (Same as BIO 5713. Credit cannot be earned for both BIO 5713 and ES 5763.).

ES 5773. Wildlife Ecology. (3-0) 3 Credit Hours.

An introduction to wildlife management including ecological principles dealing with ecosystems, natural communities, and populations. The importance of animal behavior, the availability of food, cover, wildlife diseases, predators, hunting, and trapping will be included. Field trips may be included. (Same as BIO 5793. Credit cannot be earned for both BIO 5793 and ES 5773.).

ES 5783. Evaluation and Valuation of Ecosystem Services. (3-0) 3 Credit Hours.

This course will examine the flow of goods and services provided by the ecosystem that are important to sustaining human well-being. The value of ecosystem goods is generally set by trading the market place, while the value of ecosystem services is often ignored, yet also important in sustaining human well-being. This course will explore methods to evaluate and value these ecosystem services.

ES 5793. Environmental Remediation. (3-0) 3 Credit Hours.

Prerequisite: CHE 2603 or an equivalent. This course will focus on the fundamentals associated with environmental remediation in relation to overall environmental quality and protection. Topics covered include contaminant fate and transport; physical, chemical, and biological processes/characteristics of the air, soil, and water; remediation/restoration methods; environmental monitoring; environmental assessments; environmental regulations; and water/wastewater treatment.

ES 5971. Directed Research. (0-0) 1 Credit Hour.

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.).

ES 5972. Directed Research. (0-0) 2 Credit Hours.

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.).

ES 5973. Directed Research. (0-0) 3 Credit Hours.

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.).

ES 5981. Graduate Seminar in Environmental Science and Engineering. (1-0) 1 Credit Hour.

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.).

ES 6043. Soil Chemistry. (3-0) 3 Credit Hours.

Prerequisites: CHE 1113 and CHE 2603. Overview of basic soil science and soil chemistry. Examination of the interactions between soil solids, precipitates, and solution phases will include mineralogy, ion exchange, adsorption/desorption, soil colloid behavior, acidic/basic soils, salinity, solid/solution phase interactions, and biological features.

ES 6053. Sustainability and Renewable Energy. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing. This course provides an introduction to energy systems and renewable energy resources. It will be a scientific examination of the energy field and an emphasis on alternate energy sources, their technology, application, and how they can lead to a more sustainable future. The class will explore society's present needs and future energy demands, examine conv.

ES 6103. Environmental Assessment. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing. This course evaluates the framework of an impact assessment and details regarding the environment (air, water, soil), its pollutants (atmospheric, noise, water, solid waste), their impacts (physical, social, economic), relevant regulations, and pollution minimization or management strategies. Students will use this information to prepare a hypothetical Environmental Impact Statement (EIS). (Formerly EES 6103 and ES 5203. Credit can be earned for only one of the following: EES 6103, ES 5203, or ES 6103.).

ES 6113. Advanced Plant Physiology. (3-0) 3 Credit Hours.

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.).

ES 6133. Methods in Field Ecology. (3-0) 3 Credit Hours.

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.)

ES 6213. Advanced Ecology. (3-0) 3 Credit Hours.

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.)

ES 6273. Analyses of Environmental Problems. (3-0) 3 Credit Hours.

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.)

ES 6723. Application of Federal Environmental Law at the State Level. (3-0) 3 Credit Hours.

Prerequisite: ES 5503. This course exposes students the application of federal laws at the State level. The course will provide information on how environmental laws should be enforced, and whether the state or federal government should have the final word in specific environmental debates. (Formerly EES 6723. Credit can be earned for only one of the following: CE 6723, EES 6723, or ES 6723.)

ES 6813. Water Resources. (3-0) 3 Credit Hours.

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.)

ES 6941. Environmental Science Colloquium. (1-0) 1 Credit Hour.

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.)

ES 6951. Independent Study. (0-0) 1 Credit Hour.

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.)

ES 6953. Independent Study. (0-0) 3 Credit Hours.

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.)

ES 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.)

ES 6963. Internship. (0-0) 3 Credit Hours.

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.)

ES 6973. Special Problems. (3-0) 3 Credit Hours.

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.)

ES 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.)

ES 7211. Doctoral Research. (0-0) 1 Credit Hour.

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.)

ES 7212. Doctoral Research. (0-0) 2 Credit Hours.

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.)

ES 7213. Doctoral Research. (0-0) 3 Credit Hours.

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.)

ES 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.)

ES 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.)

ES 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

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 chemistry, bioorganic chemistry, biophysical chemistry, biochemistry, bioinorganic chemistry, environmental 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 (p. 263)
- Doctor of Philosophy Degree in Chemistry (p. 264)

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 earned a Bachelor of Arts or a Bachelor of Science degree from an accredited university with 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 550 and 600 (paper version) or 79 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
CHE 5313	Advanced Biochemistry	3
CHE 5453	Advanced Inorganic Chemistry	3
CHE 5643	Advanced Organic Chemistry	3
CHE 5843	Advanced Physical Chemistry	3
CHE 5981	Graduate Seminar in Chemistry (repeated for a total of 3 hours) ¹	3
CHE 6983	Master's Thesis (including an oral defense of the written thesis, repeated for a total of 6 hours)	6
Directed Research (3 semester credit hours):		3
CHE 6991	Directed Research	
CHE 6992	Directed Research	
CHE 6993	Directed Research	

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.

Total Credit Hours **33**

¹ 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.

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
CHE 5313	Advanced Biochemistry	3
CHE 5453	Advanced Inorganic Chemistry	3
CHE 5643	Advanced Organic Chemistry	3
CHE 5843	Advanced Physical Chemistry	3
CHE 5981	Graduate Seminar in Chemistry (repeated for a total of 3 hours) ¹	3

Directed Research (repeated for a total of 9 hours): 9

CHE 6991	Directed Research	
CHE 6992	Directed Research	
CHE 6993	Directed Research	
CHE 6994	Directed Research	
CHE 6995	Directed Research	
CHE 6996	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 6

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.

Total Credit Hours 33

¹ 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 Directed Research.

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. degree 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 earned 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 Ph.D. 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 56 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. 9 semester credit hours selected from the following: 9

CHE 5263	Advanced Analytical Chemistry	
CHE 5313	Advanced Biochemistry	
CHE 5453	Advanced Inorganic Chemistry	
CHE 5643	Advanced Organic Chemistry	
CHE 5843	Advanced Physical Chemistry	

B. Colloquia and seminars (maximum 12 semester credit hours required): 12

CHE 5981	Graduate Seminar in Chemistry	
CHE 7911	Chemistry Research Colloquium	

C. Doctoral research (minimum 56 semester credit hours required):
CHE 5922 Research and Teaching Practice and Ethics 2
Select a minimum of 19 hours of the following: 19

CHE 6991	Directed Research	
CHE 6992	Directed Research	
CHE 6993	Directed Research	
CHE 6994	Directed Research	
CHE 6995	Directed Research	
CHE 6996	Directed Research	
CHE 6997	Directed Research	
CHE 6998	Directed Research	

Select a minimum of 23 hours of the following: 23

CHE 7921	Doctoral Research
CHE 7922	Doctoral Research
CHE 7923	Doctoral Research
CHE 7924	Doctoral Research
CHE 7925	Doctoral Research
CHE 7926	Doctoral Research
CHE 7927	Doctoral Research
CHE 7928	Doctoral Research

Select a minimum of 12 hours of the following: 12

CHE 7931	Doctoral Dissertation
CHE 7932	Doctoral Dissertation
CHE 7933	Doctoral Dissertation
CHE 7934	Doctoral Dissertation
CHE 7935	Doctoral Dissertation
CHE 7936	Doctoral Dissertation
CHE 7937	Doctoral Dissertation
CHE 7938	Doctoral Dissertation

D. Electives (minimum 9 semester credit hours required; chosen with consent of advisor): 9

CHE 5273	Separation Science
CHE 5833	Computational Chemistry
CHE 6263	Recent Advances in Bioanalytical Chemistry
CHE 6403	Bioinorganic Chemistry
CHE 6433	Organometallic Chemistry
CHE 6443	Green Chemistry and Catalysis
CHE 6623	Methods of Organic Synthesis
CHE 6633	Bioorganic Chemistry
CHE 6683	Topics in the Chemistry of Natural Products
CHE 6813	Molecular Thermodynamics
CHE 6823	Chemical Kinetics and Dynamics
CHE 6833	Quantum Chemistry
CHE 6853	Biophysical Chemistry
CHE 6883	Mass Spectrometry
CHE 7633	Advanced Catalysis in Organic Synthesis
CHE 7973	Special Problems

Total Credit Hours 86

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.

Chemistry (CHE) Courses

CHE 5263. Advanced Analytical Chemistry. (3-0) 3 Credit Hours.

Prerequisites: CHE 3214 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.

CHE 5273. Separation Science. (3-0) 3 Credit Hours.

Prerequisite CHE 5263 or equivalent. This course will cover theoretical and practical aspects of separations. Topics will include flow, transport, and equilibrium in separation processes. Gas and liquid chromatographies along with capillary electrophoresis will also be discussed, in addition to the relevant instrumentation.

CHE 5313. Advanced Biochemistry. (3-0) 3 Credit Hours.

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.

CHE 5453. Advanced Inorganic Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 4463 or equivalent. This course is intended to provide students with a firm foundation in modern inorganic chemistry and serve as a basis for advanced elective courses within the subdiscipline. Topics to be covered include symmetry and group theory, electronic structure and bonding in transition metal complexes, applications of group theory to vibrational and electronic spectroscopy, rudimentary topics in molecular magnetism, and inorganic reaction mechanisms.

CHE 5483. Inorganic Solid State Materials. (3-0) 3 Credit Hours.

Prerequisite: CHE 4463 or equivalent. This course is intended as an introductory course to inorganic materials and solid state chemistry for graduate students and advanced undergraduate students. The objective is to understand solid state materials from structural and chemistry perspectives and to introduce general solid state synthesis methodologies and characterization techniques.

CHE 5643. Advanced Organic Chemistry. (3-0) 3 Credit Hours.

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.

CHE 5833. Computational Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 3824 or equivalent. 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.)

CHE 5843. Advanced Physical Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 3824 or equivalent. An advanced study of valence and spectra as grounded in valence bond theory, molecular orbital theory and the extended Hückel method. Topics include group theory as applied to molecular structure and spectra, electronic, vibrational and rotational spectroscopies, and chemical reactivity including Woodward-Hoffmann theory.

CHE 5922. Research and Teaching Practice and Ethics. (0-0) 2 Credit Hours.

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.)

CHE 5981. Graduate Seminar in Chemistry. (0-3) 1 Credit Hour.

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).

CHE 6263. Recent Advances in Bioanalytical Chemistry. (3-0) 3 Credit Hours.

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. (Formerly CHE 7263. Credit cannot be earned for both CHE 6263 and CHE 7263.)

CHE 6403. Bioinorganic Chemistry. (3-0) 3 Credit Hours.

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. (Formerly CHE 7403. Credit cannot be earned for both CHE 6403 and CHE 7403.)

CHE 6433. Organometallic Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 4463 or equivalent. This course is intended to provide students with an introduction to the field of organometallic chemistry covering concepts in bonding, synthesis, and catalysis. Students will become familiar with common ligands and preparative methods in organometallic chemistry, theories of bonding and electronic structure, basic reaction mechanisms, and applications to catalysis in organic chemistry. (Formerly CHE 7433. Credit cannot be earned for both CHE 6433 and CHE 7433.)

CHE 6443. Green Chemistry and Catalysis. (3-0) 3 Credit Hours.

Prerequisite: CHE 3464 or consent of instructor. Introduction to the 12 principles of green chemistry as well as the tools of green chemistry including the use of alternative feed stocks or starting materials, reagents, solvents, target molecules, and catalysts; demonstrates how to evaluate a reaction or process and determine "greener" alternatives; focuses on the application of innovative technology the development of "greener" routes to improve industrial processes and to produce important products.

CHE 6623. Methods of Organic Synthesis. (3-0) 3 Credit Hours.

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 7623. Credit cannot be earned for both CHE 6623 and CHE 7623.)

CHE 6633. Bioorganic Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 5643 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 7603. Credit cannot be earned for both CHE 6633 and CHE 7603.)

CHE 6683. Topics in the Chemistry of Natural Products. (3-0) 3 Credit Hours.

Prerequisites: CHE 5643 and CHE 6623. 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 7683. Credit cannot be earned for both CHE 6683 and CHE 7683 on the same topic.)

CHE 6693. Pharmaceutical Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 3643 or equivalent or consent of instructor. This course aims to provide students with an understanding of the overall process of drug discovery and development with particular emphasis on the role of organic chemistry in these endeavors. It will cover the basic principles of how new drugs are discovered, how drugs interact with their biological targets, application of medicinal chemistry in lead optimization, and the role of process chemistry in large-scale drug synthesis and development. The second half of the course will provide actual case studies of both successful and unsuccessful drug candidates where students will learn about the entire drug discovery and development process from firsthand experience.

CHE 6813. Molecular Thermodynamics. (3-0) 3 Credit Hours.

Prerequisite: CHE 5843. A molecular approach to the study of the physicochemical properties of gases, liquids, and solids. (Formerly CHE 7813. Credit cannot be earned for both CHE 6813 and CHE 7813.)

CHE 6823. Chemical Kinetics and Dynamics. (3-0) 3 Credit Hours.

Prerequisite: CHE 5843. An advanced study of topics in chemical kinetics and dynamics. (Formerly CHE 7823. Credit cannot be earned for both CHE 6823 and CHE 7823.)

CHE 6833. Quantum Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 5843. The application of quantum mechanical methods to chemical systems. (Formerly CHE 7833. Credit cannot be earned for both CHE 6833 and CHE 7833.)

CHE 6843. Statistical Mechanics. (3-0) 3 Credit Hours.

Prerequisite: CHE 5843. The application of statistical mechanical methods to chemical systems.

CHE 6853. Biophysical Chemistry. (3-0) 3 Credit Hours.

Prerequisite: CHE 5843. The study of the structure/function relations of proteins, nucleic acids, membranes, and other macromolecular biomolecules using spectroscopic methods. (Formerly CHE 7853. Credit cannot be earned for both CHE 6853 and CHE 7853.)

CHE 6883. Mass Spectrometry. (3-0) 3 Credit Hours.

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.

CHE 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

CHE 6973. Special Problems. (3-0) 3 Credit Hours.

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.

CHE 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

CHE 6991. Directed Research. (0-0) 1 Credit Hour.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6992. Directed Research. (0-0) 2 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6993. Directed Research. (0-0) 3 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6994. Directed Research. (0-0) 4 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6995. Directed Research. (0-0) 5 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6996. Directed Research. (0-0) 6 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6997. Directed Research. (0-0) 7 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 6998. Directed Research. (0-0) 8 Credit Hours.

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 9 hours or 19 hours, regardless of discipline, will apply to the Master's degree or Doctoral degree, respectively.

CHE 7633. Advanced Catalysis in Organic Synthesis. (3-0) 3 Credit Hours.

Prerequisite CHE 5642 or equivalent. This course will cover advanced topics in modern catalytic transformations useful in the synthesis of complex molecular structures. Topics will include an introduction to catalysis, organometallics overview, kinetics of catalysis, non-linear effects, kinetic resolutions, asymmetric hydrogenations, C-H activation, olefin metathesis, Pd-catalyzed allylic substitutions, transition metal mediated cross-couplings, biocatalysis and organocatalysis.

CHE 7911. Chemistry Research Colloquium. (0-0) 1 Credit Hour.

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).

Department of Computer Science

The Department of Computer Science offers a Master of Science degree and a Doctor of Philosophy degree in Computer Science.

- Master of Science Degree in Computer Science (p. 269)
- Doctor of Philosophy Degree in Computer Science (p. 269)

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
CS 5363	Programming Languages and Compilers
CS 5513	Computer Architecture
CS 5523	Operating Systems
CS 5633	Analysis of Algorithms
B. Electives:	18
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
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.

Total Credit Hours

36

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	3
Select two of the following courses:		6
CS 5343	Developing Secure Systems and Software	
CS 6353	Unix and Network Security	
CS 6373	Applied Cryptography	
CS 6393	Advanced Topics in Computer Security	

Total Credit Hours

9

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	3
Select two of the following courses:		6
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	

Total Credit Hours

9

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. 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
CS 5363	Programming Languages and Compilers
CS 5513	Computer Architecture
CS 5523	Operating Systems
CS 5633	Analysis of Algorithms
B. Electives:	18
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):	42
CS 7123	Research Methods (6 semester credit hours required. 3 semester credit hours may be replaced by CS 6953 Independent Study with permission)
Select a minimum of 18 semester credit hours of the following:	
CS 7211	Doctoral Research
CS 7212	Doctoral Research
CS 7213	Doctoral Research
CS 7214	Doctoral Research
CS 7215	Doctoral Research
CS 7216	Doctoral Research
Select a minimum of 18 semester credit hours of the following:	
CS 7311	Doctoral Dissertation
CS 7312	Doctoral Dissertation
CS 7313	Doctoral Dissertation
CS 7314	Doctoral Dissertation
CS 7315	Doctoral Dissertation
CS 7316	Doctoral Dissertation
D. Flexible Electives:	18
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.	

Total Credit Hours **90**

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-CS 7216 Doctoral Research or CS 7311-CS 7316 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-CS 7316 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.

Computer Science (CS) Courses

CS 5103. Software Engineering. (3-0) 3 Credit Hours.

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.

CS 5113. Computer Graphics. (3-0) 3 Credit Hours.

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.

CS 5123. Software Testing and Quality Assurance. (3-0) 3 Credit Hours.

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.

CS 5153. User Interfaces and Usability. (3-0) 3 Credit Hours.

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.

CS 5233. Artificial Intelligence. (3-0) 3 Credit Hours.

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.

CS 5253. Expert Systems. (3-0) 3 Credit Hours.

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.

CS 5263. Bioinformatics. (3-0) 3 Credit Hours.

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. (Same as BME 6323. Credit cannot be earned for both BME 6323 and CS 5263.).

CS 5323. Principles of Computer and Information Security. (3-0) 3 Credit Hours.

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.

CS 5343. Developing Secure Systems and Software. (3-0) 3 Credit Hours.

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.

CS 5353. Formal Languages, Automata, and Theory of Computation. (3-0) 3 Credit Hours.

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.

CS 5363. Programming Languages and Compilers. (3-0) 3 Credit Hours.

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.

CS 5443. Database Management Systems. (3-0) 3 Credit Hours.

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.

CS 5463. Topics in Computer Science. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in Computer Science or consent of instructor. Topics in an area of computer science. May be repeated for credit when topics vary.

CS 5473. Data Mining. (3-0) 3 Credit Hours.

Prerequisites: CS 3343 or consent of instructor. Concepts, principles, algorithms, performance, and applications of data mining and knowledge discovery. Topics may include data preprocessing, classification and prediction, clustering analysis, association and pattern analysis, outlier detection, and data mining software.

CS 5513. Computer Architecture. (3-0) 3 Credit Hours.

Prerequisites: CS 3733 and CS 3853. Study of modern computer architecture, including parallel computers, multiprocessors, pipelines, and fault tolerance.

CS 5523. Operating Systems. (3-0) 3 Credit Hours.

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.

CS 5573. Cloud Computing. (3-0) 3 Credit Hours.

Prerequisites: CS 3733 and CS 3853. Introduction to Cloud Computing. A study of the system architecture, enabling technologies, software environment, and innovative applications of the Cloud Computing paradigm. Topics include data center virtualization, cloud platforms, cloud resource management, cloud programming and software environments, big data processing in the cloud, cloud performance and energy efficiency analysis.

CS 5623. Simulation Techniques. (3-0) 3 Credit Hours.

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.

CS 5633. Analysis of Algorithms. (3-0) 3 Credit Hours.

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.

CS 5933. Internship in Computer Science. (0-0) 3 Credit Hours.

Prerequisites: An overall 3.0 grade point average, and permission in writing from the instructor, the Department Chair, and the Dean of the College of Sciences. The opportunity for a semester-long work experience in a private business or public agency in a computer science-related position. Not more than 3 semester credit hours of CS 5933, and not more than a total of 6 semester credit hours of CS 5933 and CS 6953 may count toward the Master of Science degree or Ph.D. degree in Computer Science. The grade report for this course is either "CR" (satisfactory participation in the internship) or "NC" (unsatisfactory participation in the internship).

CS 5971. Directed Research. (0-0) 1 Credit Hour.

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.

CS 5972. Directed Research. (0-0) 2 Credit Hours.

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.

CS 5973. Directed Research. (0-0) 3 Credit Hours.

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.

CS 5974. Directed Research. (0-0) 4 Credit Hours.

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.

CS 5975. Directed Research. (0-0) 5 Credit Hours.

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.

CS 5976. Directed Research. (0-0) 6 Credit Hours.

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.

CS 6133. Software Specification and Verification. (3-0) 3 Credit Hours.

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.

CS 6243. Machine Learning. (3-0) 3 Credit Hours.

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.

CS 6293. Advanced Topics in Bioinformatics. (3-0) 3 Credit Hours.

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.

CS 6353. Unix and Network Security. (3-0) 3 Credit Hours.

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.

CS 6363. Advanced Compiler Construction. (3-0) 3 Credit Hours.

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.

CS 6373. Applied Cryptography. (3-0) 3 Credit Hours.

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.

CS 6393. Advanced Topics in Computer Security. (3-0) 3 Credit Hours.

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.

CS 6463. Advanced Topics in Computer Science. (3-0) 3 Credit Hours.

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.

CS 6513. Advanced Architecture. (3-0) 3 Credit Hours.

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.

CS 6523. Distributed Operating Systems. (3-0) 3 Credit Hours.

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.

CS 6543. Networks. (3-0) 3 Credit Hours.

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.

CS 6553. Performance Evaluation. (3-0) 3 Credit Hours.

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.

CS 6643. Parallel Processing. (3-0) 3 Credit Hours.

Prerequisite: CS 5513. Parallel models of computation, performance measurement, and modeling of parallel algorithms and application studies on parallel computers.

CS 6723. Image Processing. (3-0) 3 Credit Hours.

Prerequisites: CS 5633 and MAT 2233 or an equivalent. Topics include image acquisition, enhancement, transformations, filters, compression, segmentation and edge detection, morphology, and recognition.

CS 6953. Independent Study. (0-0) 3 Credit Hours.

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.

CS 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

CS 6973. Special Problems. (3-0) 3 Credit Hours.

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.

CS 6981. Master's Thesis. (0-0) 1 Credit Hour.

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.

CS 6982. Master's Thesis. (0-0) 2 Credit Hours.

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.

CS 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

CS 7123. Research Methods. (3-0) 3 Credit Hours.

Prerequisites: Doctoral Student standing. Examine and learn practical research skills and research writing techniques. Review, present, and critique recent research publications in the areas of Computer Science. May be repeated for credit. May not be counted towards the Master of Science degree in Computer Science.

CS 7211. Doctoral Research. (0-0) 1 Credit Hour.

Prerequisite: Successful completion of the Doctoral Qualifying Examination. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7212. Doctoral Research. (0-0) 2 Credit Hours.

Prerequisite: Successful completion of the Doctoral Qualifying Examination. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7213. Doctoral Research. (0-0) 3 Credit Hours.

Prerequisite: Successful completion of the Doctoral Qualifying Examination. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7214. Doctoral Research. (0-0) 4 Credit Hours.

Prerequisite: Successful completion of the Doctoral Qualifying Examination. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7215. Doctoral Research. (0-0) 5 Credit Hours.

Prerequisite: Successful completion of the Doctoral Qualifying Examination. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7216. Doctoral Research. (0-0) 6 Credit Hours.

Prerequisite: Successful completion of the Doctoral Qualifying Examination. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7314. Doctoral Dissertation. (0-0) 4 Credit Hours.

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 18 hours is required for the Doctoral degree.

CS 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.

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

The Department of Geological Sciences offers a Master of Science degree in Geology and a Certificate of Professional Development in Geographic Information Science. Department faculty also participate in the Ph.D. program in Environmental Science and Engineering administered by the Department of Civil and Environmental Engineering.

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. Students whose undergraduate preparation is deficient but who meet the minimum University standards for admission may be conditionally admitted and required to complete specific courses as conditions of admission. If such courses are listed as deficiencies, they will not count toward the graduate degree. 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 must be sent to the Graduate School. Incomplete applications will not be considered until all required items are in an applicant's file.

Applicants whose native language is not English must submit scores from the Test of English as Foreign language (TOEFL) or the International English Language Testing Systems (IELTS) and must meet the minimum University-wide requirements.

The graduate faculty and Graduate Advisor of Record (GAR) will be responsible for recommending acceptance into the program and will take the lead in advising students before an academic advisor is identified. A limited number of teaching assistantships are available and applications should be submitted to the Graduate Advisor of Record. Individual faculty members may have opportunities for research assistantships and should be contacted directly.

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 academic 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 in the first year if not done so in the first semester because that will determine the type of committee appointed. The Committee should be appointed once an academic advisor 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. For a thesis option student, the thesis defense is treated as the comprehensive examination. 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 (exclusive of coursework or other study required to remove academic or admission deficiencies).

Thesis Option Requirements

All candidates for the Master of Science in Geology with thesis option must complete a minimum of 33 semester credit hours of the following:

- | | |
|---|----|
| A. 5 semester credit hours of required courses: | 5 |
| GEO 5103 Current Topics in the Geosciences | |
| GEO 5991 Graduate Seminar in Geology (repeated for a total of 2 hours) | |
| B. A minimum of 22 semester credit hours of electives in consultation with Graduate Advisor of Record: | 22 |
| A minimum of 22 hours of graduate credit in organized classes with the approval of the Graduate Advisor of Record is required. This may include no more than 6 hours total of any combination of GEO 6953 Independent Study and GEO 5973 Directed Research. 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. | |
| C. Master's Thesis: | 6 |
| GEO 6983 Master's Thesis (repeated for a total of 6 hours) | |
| Candidates must submit a research proposal to the student's Academic Advisor and Committee no later than the beginning of the third semester of graduate work. | |
| D. Comprehensive Examination: | |

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.

Total Credit Hours 33

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 (exclusive of coursework or other study required to remove academic or admission deficiencies).

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 39 semester credit hours of the following:

A. 11 semester credit hours of required courses: 11

GEO 5103	Current Topics in the Geosciences
GEO 5973	Directed Research
GEO 5991	Graduate Seminar in Geology (Repeated for a total of 2 hours)
GEO 6953	Independent Study

B. A minimum of 28 semester credit hours of electives in consultation with the Graduate Advisor of Record 28

An additional 28 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

C. Comprehensive Examination:

GEO 6961	Comprehensive Examination
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Enrollment in GEO 6961, Comprehensive Examination, will be required in the semester the comprehensive examination is taken, if registered for no other courses that semester.

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.

Total Credit Hours 39

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 GIS programming. 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 fifth course may be any course with a strong component of GIS application, including independent study, in the student's area of specialty.

A. 9 hours of required courses: 9

GEO 5053	Remote Sensing
GEO 6513	Advanced GIS
GEO 6533	Programming for Geospatial Application (Programming for Geospatial Application)

B. 3 hours selected from one of the following: 3

ANT 6653	Spatial Techniques in Anthropology
CE 5293	Geographic Information Systems (GIS)
DEM 7093	GIS for Population Science
GEO 5033	Geographical Information Systems
GRG 5913	Design and Management of Geographic Information Systems

C. Capstone course chosen in consultation with and approved by the student's GIS Certificate Advisor 3

Total Credit Hours 15

Geology (GEO) Courses

GEO 5033. Geographical Information Systems. (2-2) 3 Credit Hours. 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. Same as CE 5293. Credit can be earned for only one of the following: CE 5293, EES 5033, or GEO 5033.)

GEO 5043. Global Change. (3-0) 3 Credit Hours.

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.)

GEO 5053. Remote Sensing. (2-2) 3 Credit Hours.

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. Credit cannot be earned for both EES 5053 and GEO 5053.)

GEO 5083. Remote Sensing Image Processing and Analysis. (2-2) 3 Credit Hours.

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.)

GEO 5093. Remote Sensing in Hydrology. (2-2) 3 Credit Hours.

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.)

GEO 5103. Current Topics in the Geosciences. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in geology or consent of instructor. Evaluation of current research trends and methodology in the geosciences.

GEO 5223. Advanced Environmental Geology. (3-0) 3 Credit Hours.

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. Credit cannot be earned for both EES 5223 and GEO 5223.)

GEO 5303. Petroleum Geology. (3-0) 3 Credit Hours.

Prerequisites: GEO 3103 and GEO 3123, 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.

GEO 5404. Dynamics of Geomorphic Landscapes. (3-3) 4 Credit Hours.

Prerequisite: GEO 4113 or GRG 3723, or consent of instructor. Mechanics of surficial processes. Application of geomorphic principles to select environmental issues. Field trips may be required. (Formerly EES 5404. Credit cannot be earned for both EES 5404 and GEO 5404.)

GEO 5413. River Science. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing in biology, environmental science, geology, or civil engineering, or consent of instructor. An in-depth examination of river sediment transport principles. Topics include water and sediment supply, sediment dynamics, river morphology, and channel instability. Field trips may be required. (Formerly EES 5414 and GEO 5414. Same as CE 5653. Credit can be earned for only one of the following: CE 5653, EES 5414, GEO 5414, or GEO 5413.)

GEO 5434. Fluvial Processes and Deposits. (3-3) 4 Credit Hours.

Prerequisite: GEO 4113 or GRG 3723, or consent of instructor. An in-depth examination of the interface between fluvial geomorphology and sedimentology. Key topics include sediment transport principles, bedform development, facies models, and architectural analysis. Field trips may be required.

GEO 5454. Advanced Paleontology. (3-3) 4 Credit Hours.

Prerequisite: BIO 3063 or GEO 3063, or consent of instructor. In-depth paleontological analyses. Current literature and scientific deliberations will be emphasized. Topic 1: Focused Paleontology. Detailed study of one to three taxonomic groups. Topic 2: Vertebrate Paleontology. The evolutionary history of the Vertebrata. Topic 3: Earth Systems Paleontology. Survey of past interactions between the biosphere, lithosphere, and atmosphere. May be repeated for credit when topics vary. Field trips may be required. (Formerly EES 5454. Credit cannot be earned for both EES 5454 and GEO 5454.)

GEO 5483. Environmental Hydrogeology. (3-0) 3 Credit Hours.

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 may be required. (Formerly EES 5483. Credit cannot be for both EES 5483 and GEO 5483.)

GEO 5504. Advanced Stratigraphy. (3-3) 4 Credit Hours.

Prerequisites: GEO 3123 and GEO 3131, or consent of instructor. Chronologic study of stratigraphic systems, physical properties and facies, depositional and paleogeographic implications, correlation, nomenclature, and biostratigraphy. Sequence stratigraphy and seismic and log analyses are studied. Field trips may be required. (Formerly EES 5504. Credit cannot be earned for both EES 5504 and GEO 5504.)

GEO 5603. Physical Hydrogeology. (3-0) 3 Credit Hours.

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 may be required. (Formerly EES 5603. Credit cannot be earned for both EES 5603 and GEO 5603.)

GEO 5713. Groundwater Modeling. (3-0) 3 Credit Hours.

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 5713. Credit cannot be earned for both EES 5713 and GEO 5713.)

GEO 5804. Igneous-Metamorphic Petrology. (3-3) 4 Credit Hours.

Prerequisites: GEO 3043, GEO 3051, 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 may be required. (Formerly EES 5804. Credit cannot be earned for both EES 5804 and GEO 5804.)

GEO 5863. Field Analysis of Complex Geologic Problems. (0-6) 3 Credit Hours.

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 5863. Credit cannot be earned for both EES 5863 and GEO 5863.)

GEO 5894. Advanced Structural Geology. (3-3) 4 Credit Hours.

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 may be required. (Formerly EES 5894. Credit cannot be earned for both EES 5894 and GEO 5894.)

GEO 5904. Carbonate Petrology. (3-3) 4 Credit Hours.

Prerequisites: GEO 3043, GEO 3051, 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.)

GEO 5954. Sandstone Petrology. (3-3) 4 Credit Hours.

Prerequisites: GEO 3043, GEO 3051, 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 may be required. (Formerly EES 5954. Credit cannot be earned for both EES 5954 and GEO 5954.)

GEO 5971. Directed Research. (0-0) 1 Credit Hour.

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.)

GEO 5972. Directed Research. (0-0) 2 Credit Hours.

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.)

GEO 5973. Directed Research. (0-0) 3 Credit Hours.

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.)

GEO 5991. Graduate Seminar in Geology. (1-0) 1 Credit Hour.

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.)

GEO 6011. Seminar in Geospatial Science and Applications. (1-0) 1 Credit Hour.

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.

GEO 6183. Basin Analysis and Sedimentary Geology. (3-0) 3 Credit Hours.

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 may be required. (Formerly EES 6183. Credit cannot be earned for both EES 6183 and GEO 6183.)

GEO 6203. Aqueous Geochemistry. (2-3) 3 Credit Hours.

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.)

GEO 6243. Paleocology. (3-0) 3 Credit Hours.

Prerequisite: BIO 3063 or GEO 3063, 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, and the temporal contribution fossil communities provide to research of environmental change. Topic 1: Methods of Paleocology. Survey of paleoecological theory and methods. Topic 2: Paleoclimatology. Review of the modern climate system and proxies for understanding major climate changes through geologic time. May be repeated for credit when topics vary. Field trips may be required. (Formerly EES 6243. Credit cannot be earned for both EES 6243 and GEO 6243.)

GEO 6304. Isotope Geochemistry. (3-2) 4 Credit Hours.

Prerequisite: GEO 3374. The course will cover an introduction to isotope theory, and its utility in geological science and related fields. Focus will be on methods, data acquisition, data corrections, and interpretation. Laboratory methods for isotope sample preparation and hands-on experience with isotope ratio-mass spectrometry (IRMS) and peripherals. (Formerly EES 6304. Credit cannot be earned for both EES 6304 and GEO 6304.)

GEO 6344. Micropaleontology. (3-3) 4 Credit Hours.

Prerequisite: BIO 3063 or GEO 3063, 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 may be required. (Formerly EES 6344. Credit cannot be earned for both EES 6344 and GEO 6344.)

GEO 6403. Advanced Geophysics. (3-0) 3 Credit Hours.

Prerequisite: GEO 3383 or consent of instructor. Application of fundamentals of geophysical properties of the earth, specifically the propagation of seismic energy and electromagnetic (EM) fields in earth materials, toward an advanced analysis of seismic, EM prospecting techniques, and well-logging methods. Techniques addressed will be specifically relevant to the petroleum and mineral extraction industries. (Formerly EES 6403. Credit cannot be earned for both EES 6403 and GEO 6403.).

GEO 6513. Advanced GIS. (2-2) 3 Credit Hours.

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. Credit cannot be earned for both EES 6513 and GEO 6513.).

GEO 6523. GIS for Water Resources. (3-0) 3 Credit Hours.

Prerequisites: GEO 4623 and GEO 6513, or consent of instructor. Current approaches for using GIS to acquire, process and analyze spatial data for surface water and groundwater systems. Course will introduce watershed delineation techniques, spatial interpolation methods for analysis of precipitation and groundwater data, and GIS-based modeling of hydrologic mass-balance in watersheds. (Formerly EES 6523. Credit cannot be earned for both EES 6523 and GEO 6523.).

GEO 6533. Programming for Geospatial Application. (2-2) 3 Credit Hours.

Prerequisite: CE 5293 or GEO 5033, or consent of instructor. This course teaches one or more programming languages with high-level toolkits suitable for GIS (Geographic Information System) application and development in a variety of open source environments. The course introduces key GIS concepts such as location, distance, units, projections, datum, and GIS data formats, examines a number of libraries of programming languages (e.g., Python or others), and explores how to combine these with geo-spatial data to accomplish a variety of tasks.

GEO 6803. Analytical Methods. (1-4) 3 Credit Hours.

Prerequisite: Graduate standing in geology, or consent of instructor. Geological and geochemical applications of laboratory-based analytical techniques; these may include X-ray diffraction, secondary and transmission electron microscopy, X-ray microanalysis, thermal ionization and plasma mass spectrometry, isotope ratio mass spectrometry, and image analysis. The theory and development of electron, X-ray and plasma-based methods 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.) (Formerly titled "Electron Microscopy and Microbeam Analysis.").

GEO 6813. Water Resources. (3-0) 3 Credit Hours.

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.).

GEO 6951. Independent Study. (0-0) 1 Credit Hour.

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.).

GEO 6952. Independent Study. (0-0) 2 Credit Hours.

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.).

GEO 6953. Independent Study. (0-0) 3 Credit Hours.

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.).

GEO 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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.).

GEO 6973. Special Problems. (3-0) 3 Credit Hours.

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.).

GEO 6983. Master's Thesis. (0-0) 3 Credit Hours.

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

The Department of Mathematics offers Master of Science degrees in Applied Mathematics-Industrial Mathematics, Mathematics, and Mathematics Education.

- Master of Science Degree in Applied Mathematics-Industrial Mathematics (p. 279)
- Master of Science Degree in Mathematics (p. 279)
- Master of Science Degree in Mathematics Education (p. 280)

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, 24 semester credit hours of graduate mathematics courses and 3 semester credit hours of a course 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 a résumé, scores from the Graduate Record Examination (GRE), and 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 and meet University-wide degree requirements. 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:	6
AIM 5113	Introduction to Industrial Mathematics
MAT 5283	Linear Algebra and Matrix Theory
B. Select 18 semester credit hours of the following:	18
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 5323	Mathematical Modeling
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 5983	Topics in Applied Mathematics
MAT 6603	Optimization Techniques in Operations Research

C. 3 semester credit hours of electives: Upon completion of 18 semester credit hours in mathematics, a student is eligible to enroll in advanced courses selected from disciplines in the Colleges of Sciences or Engineering.	3
D. 3 semester credit hours of Internship and Research Project: *	3
AIM 6943	Internship and Research Project
E. 6 semester credit hours selected from coursework in communications, leadership skills, and business principles such as:	6
MGT 5003	Conceptual Foundations of Management
MGT 5043	Management and Behavior in Organizations
MGT 5093	Leadership
Total Credit Hours	36

* Internship and Research Project

Upon completion of 18 semester credit hours in mathematics, a student is eligible to enroll in AIM 6943 Internship and Research Project. 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:

1. Submit either an employment letter from a company or a pre-internship proposal outlining the proposed work for approval by the student's Supervising Professor.
2. Complete the proposed work after the internship has been completed.
3. Defend the project before the deadlines set forth by the University.

Students currently employed in industry may negotiate an alternative internship experience.

Master of Science Degree in Mathematics Program Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, a Bachelor of Arts or Bachelor of Science in Mathematics is highly recommended as preparation. However, exceptional applicants with a Bachelor's degree in a closely related field may also be considered for admission. Students who do not qualify for unconditional admission should anticipate that additional undergraduate and/or graduate coursework may be required to complete the degree. Applicants should provide scores from the Graduate Record Examination (GRE). 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 in one of two concentrations, (1) Mathematics or (2) Applied Mathematics.

A. Students must complete the following 9 hours of required coursework:	9
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
B. Students must complete 9 hours of required coursework for the selected concentration:	9
Mathematics Concentration	
MAT 5173	Algebra I

MAT 5283	Linear Algebra and Matrix Theory	
MAT 5403	Functional Analysis I	
Applied Mathematics Concentration		
MAT 5293	Numerical Linear Algebra	
MAT 5603	Numerical Analysis	
MAT 5653	Differential Equations I	
C. Students must normally take an additional 18 semester credit hours of coursework chosen from eligible graduate courses in the Department of Mathematics. Students may apply a maximum of 6 semester credit hours of graduate coursework from other disciplines as approved by the Graduate Advisor of Record. Undergraduate coursework taken for graduate credit must be approved by the Graduate Review Committee and may not exceed 6 hours of credit.		18
D. Students are required to pass an advanced comprehensive examination or successfully defend their thesis research results.		
Total Credit Hours		36

Master of Science Degree in 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 complete the following courses:		15
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.		6
C. Students must normally take an additional 15 semester credit hours of coursework chosen from eligible graduate courses in the Department of Mathematics. Students 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.		15
D. Students are required to pass an advanced comprehensive examination or successfully defend their thesis research results.		
Total Credit Hours		36

Applied-Industrial Mathematics (AIM) Courses

AIM 5113. Introduction to Industrial Mathematics. (3-0) 3 Credit Hours.

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.

AIM 6943. Internship and Research Project. (0-0) 3 Credit Hours.

Prerequisites: Completion of at least 18 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.

Mathematics (MAT) Courses

MAT 5003. Modern Mathematics for Teachers. (3-0) 3 Credit Hours.

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.

MAT 5013. Computers for Mathematics Teachers. (3-0) 3 Credit Hours.

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. (Credit cannot be earned for more than one of the following: MAT 5013, CS 5023 or CS 5063.)

MAT 5023. Problem-Solving Seminar. (3-0) 3 Credit Hours.

Students will have the opportunity to engage in extensive experience and practice in solving mathematical problems.

MAT 5033. Foundations and Fundamental Concepts of Mathematics. (3-0) 3 Credit Hours.

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 without approval of the Graduate Advisor of Record and the Graduate Review Committee.

MAT 5043. Euclidean and Non-Euclidean Geometry. (3-0) 3 Credit Hours.

Topics will be selected from advanced Euclidean and non-Euclidean geometry, solid analytic geometry, and differential geometry.

MAT 5103. Introduction to Mathematical Analysis. (3-0) 3 Credit Hours.

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. (Credit cannot be earned for both MAT 5103 and MAT 5203.)

MAT 5123. Introduction to Cryptography. (3-0) 3 Credit Hours.

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.

MAT 5173. Algebra I. (3-0) 3 Credit Hours.

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.

MAT 5203. Theory of Functions of a Real Variable I. (3-0) 3 Credit Hours.

Prerequisite: MAT 4213 or consent of instructor. Measure and integration theory. (Credit cannot be earned for both MAT 5203 and MAT 5103.).

MAT 5213. Theory of Functions of a Real Variable II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5203. Further development of measure and integration theory, metric space topology, and elementary Banach space theory.

MAT 5223. Theory of Functions of a Complex Variable I. (3-0) 3 Credit Hours.

Prerequisite: MAT 3213 or MAT 4213. Complex integration, Cauchy's theorem, calculus of residues, and power series.

MAT 5233. Theory of Functions of a Complex Variable II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5223. Infinite products, entire functions, Picard's theorem, Riemann mapping theorem, and functions of several complex variables.

MAT 5243. General Topology I. (3-0) 3 Credit Hours.

Prerequisite: MAT 4273 or consent of instructor. Topological spaces, metric spaces, continua, and plane topology.

MAT 5253. General Topology II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5243. Topics may include: Metrizable topological spaces, function spaces, covering spaces, homotopy theory and fundamental groups, classification of surfaces, and others.

MAT 5263. Algebraic Topology. (3-0) 3 Credit Hours.

Prerequisite: MAT 4273 or MAT 5243. Fundamental ideas of algebraic topology, homotopy and simplicial complexes, fundamental group, covering spaces, and duality theorems.

MAT 5283. Linear Algebra and Matrix Theory. (3-0) 3 Credit Hours.

Prerequisite: MAT 2233 or an equivalent. A study of linear algebraic structures and algebraic properties of matrices.

MAT 5293. Numerical Linear Algebra. (3-0) 3 Credit Hours.

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.).

MAT 5313. Algebra II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5173. Areas of study include: groups, rings, fields, Galois theory, ideal theory and representations of groups, module theory, and homological algebra.

MAT 5323. Mathematical Modeling. (3-0) 3 Credit Hours.

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.

MAT 5333. Wavelet Analysis. (3-0) 3 Credit Hours.

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.

MAT 5343. Differential Geometry. (3-0) 3 Credit Hours.

Prerequisite: MAT 5283 or equivalent. Multilinear algebra, differentiable manifolds, exterior differential forms, affine connections, Riemannian geometry, and curvature equations.

MAT 5353. Mathematics of Image Processing. (3-0) 3 Credit Hours.

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.

MAT 5403. Functional Analysis I. (3-0) 3 Credit Hours.

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.

MAT 5413. Functional Analysis II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5403. Riesz representation theorem, spectral theory, Banach algebras, and C^* -algebras.

MAT 5553. Harmonic Analysis. (3-0) 3 Credit Hours.

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.

MAT 5603. Numerical Analysis. (3-0) 3 Credit Hours.

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.).

MAT 5613. Numerical Solutions of Differential Equations. (3-0) 3 Credit Hours.

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.

MAT 5653. Differential Equations I. (3-0) 3 Credit Hours.

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.

MAT 5663. Differential Equations II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5653. Dynamic systems, the fundamental existence and uniqueness theorem, stability, the Poincare-Bendixson theorem, introduction to perturbation, and bifurcation theory.

MAT 5673. Partial Differential Equations I. (3-0) 3 Credit Hours.

Prerequisite: MAT 3623, MAT 5663, or consent of instructor. Classical theory of initial value and boundary value problems for partial differential equations.

MAT 5683. Partial Differential Equations II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5673. Modern topics in partial differential equations.

MAT 5833. Perturbation Theory in Applied Mathematics. (3-0) 3 Credit Hours.

Prerequisite: MAT 3613, MAT 5653, or consent of instructor. Perturbation theory, asymptotic analysis, and boundary layer expansions.

MAT 5973. Directed Research. (0-0) 3 Credit Hours.

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.

MAT 5983. Topics in Applied Mathematics. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. In-depth study of current topics in applied mathematics. May be repeated for credit when topics vary.

MAT 6603. Optimization Techniques in Operations Research. (3-0) 3 Credit Hours.

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.

MAT 6953. Independent Study. (0-0) 3 Credit Hours.

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.

MAT 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

MAT 6963. Topics in Mathematics Education. (3-0) 3 Credit Hours.

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.

MAT 6973. Special Problems. (3-0) 3 Credit Hours.

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.

MAT 6983. Master's Thesis. (0-0) 3 Credit Hours.

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 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 institutions, or educational institutions.

Graduate students will be able to choose from several areas of specialization in experimental and theoretical physics, including condensed matter, advanced materials, nanomaterials, biophysics, laser spectroscopy, astrophysics, theoretical particle physics, cosmology, mathematical physics, and computational physics. The graduate program includes a partnership with the Space Science and Engineering Division of the Southwest Research Institute (SwRI) which, through the appointment of selected Adjoint Faculty, provides research opportunities in 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 (p. 282)
- Doctor of Philosophy Degree in Physics (p. 283)

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 members offer the opportunity for personalized interaction and thesis development through coursework and research. Additional cooperative projects and programs are available within UTSA or with other 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) or the International English Language Testing System (IELTS). 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) or an IELTS score below 7. 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 (a minimum of 24 semester credit hours): 24

PHY 5103	Classical Mechanics I
PHY 5203	Electrodynamics I
PHY 5303	Statistical Mechanics
PHY 5403	Quantum Mechanics I
PHY 6983	Master's Thesis (repeated for a total of 6 semester credit hours)

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.

PHY 7003	Directed Research (repeated for a total of 6 semester credit hours)
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. 6 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 6

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.

Total Credit Hours 30

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 (21 semester credit hours): 21

PHY 5103	Classical Mechanics I
PHY 5203	Electrodynamics I
PHY 5303	Statistical Mechanics
PHY 5403	Quantum Mechanics I
PHY 7003	Directed Research (repeated for a total of 6 semester credit hours)
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. 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 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. 9

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 and includes a written report of the research activity carried out in the 6 hours of Directed Research as well as a seminar where the results of such research activity is presented.

Total Credit Hours 30

Doctor of Philosophy Degree in Physics

The Department of Physics and Astronomy, in partnership with the Southwest Research Institute, offers opportunities for advanced studies 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. Inclusion of the Physics GRE score is not required but is recommended.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS). 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) or an IELTS score below 7. 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 (21 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 (33 semester credit hours) and Doctoral Dissertation (12 semester credit hours), totaling at least 48 semester credit hours, complete the Program of Study.

Transfer of Credit

Transfer of credit from other institutions is possible under the following regulations:

1. Transfer of credit for core classes is granted only if the syllabi of the classes adhere to the standard of the syllabi used for the core classes in the current program and typically is allowed only from institutions that grant Ph.D. degrees in Physics.
2. A maximum of 30 semester credit hours is allowed to be transferred, excluding research and thesis hours, and must adhere to the Transfer of Credit policy in chapter 5, Doctoral Degree regulations, in the UTSA Graduate Catalog.
3. No research hours can be transferred to the program.

Program of Study

A. Core Curriculum:	12
PHY 5103	Classical Mechanics I
PHY 5203	Electrodynamics I
PHY 5303	Statistical Mechanics
PHY 5403	Quantum Mechanics I
B. Advanced Physics Electives (21 semester credit hours selected from the following or from graduate courses offered by other departments, e.g., Mathematics, Electrical and Computer Engineering, Chemistry, etc.):	21
PHY 6103	Classical Mechanics II
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 (48 semester credit hours): 48

PHY 7013 Research Seminar

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.

Select a minimum of 6 hours of the following; prior to passing qualifying examination

PHY 7001 Directed Research

PHY 7002 Directed Research

PHY 7003 Directed Research

Select a minimum of 27 hours of the following; after advancement to candidacy

PHY 7101 Doctoral Research

PHY 7102 Doctoral Research

PHY 7103 Doctoral Research

Select 12 hours of the following:

PHY 7111 Doctoral Dissertation ¹

PHY 7112 Doctoral Dissertation ¹

PHY 7113 Doctoral Dissertation ¹

Total Credit Hours 81

¹ Students must enroll in PHY 7111 Doctoral Dissertation-PHY 7113 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.

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 successfully completing 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 Qualifying

Examination 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.

Composition of the Qualifying Examination and Dissertation Committees

It is highly recommended that both committees are composed of the same faculty members (internal and external). For students completing their Dissertation with SwRI adjoint faculty as their advisors, the committee must include at least one core faculty member from the Department of Physics and Astronomy at UTSA. It is also required that at least one member of the committee is external to the program.

Physics (PHY) Courses

PHY 5103. Classical Mechanics I. (3-0) 3 Credit Hours.

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.

PHY 5203. Electrodynamics I. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Electrostatics and magnetostatics; boundary value problems, Maxwell's equations; plane waves; wave guides diffraction; multipole radiation.

PHY 5303. Statistical Mechanics. (3-0) 3 Credit Hours.

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.

PHY 5403. Quantum Mechanics I. (3-0) 3 Credit Hours.

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.)

PHY 6103. Classical Mechanics II. (3-0) 3 Credit Hours.

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.

PHY 6123. Plasma Physics and Magnetohydrodynamics (MHD). (3-0) 3 Credit Hours.

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.

PHY 6133. Introduction to Scientific Writing. (3-0) 3 Credit Hours.

Methods to overcome resistance to writing and approach to become productive scientific writers. Writing methods and techniques for manuscript, dissertation, thesis preparation. Fundamentals of funding proposal writing. Critical reading and reviewing.

PHY 6203. Electrodynamics II. (3-0) 3 Credit Hours.

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.

PHY 6303. Quantum Mechanics II. (3-0) 3 Credit Hours.

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.

PHY 6313. Solid State Physics. (3-0) 3 Credit Hours.

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.

PHY 6323. Nonlinear Optics and Lasers. (3-0) 3 Credit Hours.

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.

PHY 6403. Fundamentals of Space Physics. (3-0) 3 Credit Hours.

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.

PHY 6413. Fundamentals of Astronomy. (3-0) 3 Credit Hours.

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.

PHY 6503. Mathematical Physics I. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing or consent of instructor. Linear algebra, ordinary and partial differential equations, special functions, eigenvalue problems, complex analysis, group theory.

PHY 6513. Mathematical Physics II. (3-0) 3 Credit Hours.

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.

PHY 6523. Computational Physics. (3-0) 3 Credit Hours.

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.

PHY 6613. Methods of Experimental Physics. (3-0) 3 Credit Hours.

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.

PHY 6623. Space Physics Laboratory. (1-4) 3 Credit Hours.

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.

PHY 6953. Independent Study. (0-0) 3 Credit Hours.

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.

PHY 6961. Comprehensive Examination. (0-0) 1 Credit Hour.

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).

PHY 6983. Master's Thesis. (0-0) 3 Credit Hours.

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.

PHY 7001. Directed Research. (0-0) 1 Credit Hour.

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.

PHY 7002. Directed Research. (0-0) 2 Credit Hours.

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.

PHY 7003. Directed Research. (0-0) 3 Credit Hours.

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.

PHY 7013. Research Seminar. (3-0) 3 Credit Hours.

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.

PHY 7101. Doctoral Research. (0-0) 1 Credit Hour.

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.

PHY 7102. Doctoral Research. (0-0) 2 Credit Hours.

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.

PHY 7103. Doctoral Research. (0-0) 3 Credit Hours.

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.

PHY 7111. Doctoral Dissertation. (0-0) 1 Credit Hour.

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.

PHY 7112. Doctoral Dissertation. (0-0) 2 Credit Hours.

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.

PHY 7113. Doctoral Dissertation. (0-0) 3 Credit Hours.

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.

PHY 7403. Topics in Biophysics and Biomedical Physics. (3-0) 3 Credit Hours.

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.

PHY 7503. Topics in Experimental Physics. (3-0) 3 Credit Hours.

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.

PHY 7603. Topics in Condensed Matter Physics. (3-0) 3 Credit Hours.

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.

PHY 7703. Topics in Space Physics. (3-0) 3 Credit Hours.

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.

PHY 7803. Topics in Theoretical Physics. (3-0) 3 Credit Hours.

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.

PHY 7903. Topics in Astrophysics. (3-0) 3 Credit Hours.

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.

PHY 7973. Special Topics in Physics. (3-0) 3 Credit Hours.

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.

PHY 7983. Current Topics in Physics. (3-0) 3 Credit Hours.

Research and critical analysis of the relevant current research literature in relevant Physics topics. Analysis and discussion of ongoing research projects. May be repeated for credit as topics vary.

Ph.D. in Translational Science

The Doctor of Philosophy (Ph.D.) degree in Translational Science (TS) 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) and The University of Texas at Austin (UT Austin). The TS Ph.D. will prepare scientists to lead multidisciplinary biomedical research teams in Type 1 (T1) Track (bench-to-bedside) or Type 2 (T2) Track (bedside-to-community) translational research, toward the goal of translating basic biomedical scientific discoveries into strategies that will improve human and global health. Areas of research emphasis/excellence include, but are not limited to, Hispanic health, military medicine, comprehensive cancer research, aging and longevity, obesity and diabetes/metabolic syndrome, infectious diseases, addiction, and targeted drug delivery. The Ph.D. degree in Translational Science 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 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

The TS Ph.D. is an advanced scientific research doctoral program. In addition to satisfying the University-wide graduate admission requirements (refer to Chapter 1, Admission), the following admission requirements will be applied to all applicants:

1. Completion of, or enrollment in, an advanced Professional Degree (e.g., M.D., D.O., D.D.S., MSN, Pharm.D.), completion of a Master's or Doctoral degree, preferably in a health-related, science, public health or social science discipline, or enrollment as a M.D./Ph.D. student with successful completion of the two-year pre-clinical curriculum. Enrollment/graduation must be from an accredited college or university in the United States, or proof of equivalent training at a foreign institution, with a minimum grade point average of 3.0 in the professional and/or graduate work
2. Official Graduate Record Examination (GRE) scores. Applicants may request a waiver for the GRE requirement if they provide evidence that they have earned a doctoral degree (i.e., M.D., D.O., J.D., D.V.M., Pharm.D., D.D.S., Ph.D., etc.) from an accredited U.S. institution, are currently certified by the Educational Commission for Foreign Medical Graduates (ECFMG), have passed all three steps of the United States Medical Licensing Examination (USMLE), or were previously enrolled in the Graduate School of one of the joint degree institutions
3. Official Test of English as a Foreign Language (TOEFL) score, with a score of at least 600 (paper test) or online equivalent, or a score of 7.0 on the Academic Examination of the International English Language Testing System (IELTS), for applicants whose native language is not English. Applicants whose scores fall below the minimum requirement will be further assessed for English comprehension skills. TOEFL may be waived for applicants whose post-secondary education was conducted with English as the language of instruction. ECFMG certified physicians will also be granted a TOEFL waiver. NOTE: Consistent with Texas Education Code, Section 51.842(b), an applicant's standardized test scores,

when used to make admission or scholarship decisions, will be compared with scores of other applicants from similar socioeconomic backgrounds, to the extent such information is available. The applicant's performance on a standardized test (i.e., GRE) will be considered in addition to other admission criteria, and will not be used as the sole criterion for consideration of an applicant

4. A personal statement (1–3 pages) that describes the applicant's past training and experience, future career goals and objectives, scientific research interest, and how the TS Ph.D. program will prepare them to achieve their stated research interest and career goals. The Personal Statement should include but is not limited to:
 - A statement of the applicant's background and purpose for applying to the TS Ph.D. program
 - Applicant's interest in and commitment to a translational science career
 - Applicant's potential to develop into a successful scientist, as evidenced by research training/experience, prior publications, etc.
 - Research interest and its applicability to the TS Ph.D. program
 - Identification of a potential Supervising Professor, if applicable
 - Career goals and how the TS Ph.D. program will contribute to their attainment
5. Recommendation Forms and letters of recommendation from three (3) faculty or other individuals who are familiar with and can provide information about the applicant's academic, research, and/or professional abilities and performance, in addition to the applicant's potential to succeed in a doctoral program and develop into an independent research investigator
6. A current Curriculum Vitae
7. A copy of the applicant's U.S. medical or other health professional license or certificate, if applicable.

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.

Applications must be submitted online at <https://apply.embarc.com/grad/UTHSCSA/>. A complete application includes the application form, official transcripts, GRE scores or waiver request, letters of recommendation, Curriculum Vitae, a copy of the health professions license/certificate (if applicable), and a personal statement. TOEFL or IELTS scores, or waiver request, are required for applicants whose native language is not English. Incomplete applications will not be considered. The TS Committee on Graduate Studies (TS COGS), with members from each of the participating institutions, is responsible for reviewing applications for admission and selecting the most qualified applicants.

Degree Requirements

The degree requires a minimum of 72 semester credit hours beyond the master's or professional degree. Students will elect either T1 Track (bench-to-bedside) or T2 Track (bedside-to-community). The curriculum consists of core courses (24 semester credit hours), track elective courses (12 semester credit hours) and free elective courses (6 semester credit hours), plus 30 semester credit hours of research and completion of a dissertation. Students will work with a graduate advisor or the supervising professor to complete an individualized degree plan that will meet the student's research interest and goals. Using the individualized degree plan as a guide, courses may be taken at any participating institution with the written approval of the graduate advisor or supervising professor.

Any grade lower than a "B" in a graduate course will not count toward the minimum number of required semester credit 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 TS Committee on Graduate Studies.

Advancement to Candidacy

TS Ph.D. students will advance to candidacy after completing their written and oral qualifying examinations. The Qualifying Examination will be administered before the start of dissertation research, and admission to candidacy will be contingent on its successful completion. Methods for administration of the qualifying exam will be written and oral. The exam will be comprehensive and will include questions covering:

- Information gained through the translational science coursework; and
- The basic knowledge required for the chosen area of research.

The format of the exam and composition of the Qualifying Examination Committee (QEC) will be determined by the TS COGS. Additional criteria may be set by the home institution, such as approval by an institution-specific committee, such as a Graduate Studies Committee (GSC), in addition to the TS COGS. At a minimum, each QEC will have representatives from two UT institutions and at least one graduate faculty member from a discipline outside the student's main area of study. The QEC will administer the qualifying exam at a set date and time, will utilize the results as the basis for evaluating the student's performance, and will report its judgment of performance to the TS COGS and the home institution's committee, if applicable.

The qualifying exam is composed of two parts:

1. **Written Exam:** The written exam is a series of assignments designed to test the student's background in translational science and their ability to apply this knowledge to research. Students will have up to three months to complete the written portion of the qualifying exam. Requirements for the written exam will include:
 - a. Preparation of a 12-page research grant proposal related to their field but not their specific dissertation project
 - b. Preparation of a scholarly systematic review related to the student's specific research topic
 - c. At least one other assignment, such as data analysis, abstract writing, or patent application, as appropriate to the student's proposed research
2. **Oral Exam:** The oral exam will consist of presentation of the 12-page research grant proposal (see above) including the background, significance, innovation, impact, methods/approach, proposed analyses, and anticipated problems. The QEC, through questioning, will engage the candidate in a discussion of the proposed research to delineate the strengths and weaknesses of the approach.

Students who do not pass the qualifying exam will have their performance reviewed by the QEC. If the qualifying exam is not passed, the QEC may recommend:

1. specific remediation in areas that require further study, including taking further coursework;
2. the student be allowed to retake the qualifying exam or section(s) of the exam, as appropriate; and/or
3. the student be dismissed from the graduate program.

Students who retake the qualifying exam and who do not pass it on the second attempt will be dismissed from the TS Ph.D. program. Any student wishing to transfer to a Master's program will be responsible for identifying an appropriate program and applying.

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 the supervising professor and the Dissertation Committee. A student must choose a Dissertation Committee by the end of the second semester of study or within 90 days following the student's admission to candidacy. The Dissertation Committee will include at least four members, but may have additional members if required by the Graduate School of the student's home institution. Minimum Dissertation Committee requirements are:

1. The Supervising Professor, who will act as the Chair;
2. Graduate faculty from the TS Ph.D. program from the student's home institution;
3. Graduate faculty from the TS Ph.D. program from a second institution participating in the joint degree program;
4. A member from an outside institution who is not part of the TS Ph.D. program and is an expert in the student's dissertation field.

Approval of the Dissertation Committee and the completed dissertation will follow the guidelines established by the Graduate School of the student's home institution.

Final Oral Examination (Defense of Dissertation)

Completion of the dissertation will require a satisfactory final oral examination, as evaluated and approved by the Dissertation Committee. The final oral examination will cover aspects of the dissertation, information derived from the general field of the dissertation research, and other parts of the student's individualized curriculum as determined by the Dissertation Committee. Satisfactory completion of the final oral examination will be evaluated based on whether the student has:

1. completed all work assigned by the Dissertation Committee;
2. passed all examinations, including the final oral examination;
3. completed the minimum requirements as outlined in the student's individualized curriculum plan;
4. completed a dissertation that meets the criteria outlined above for independent investigation and contribution to the scientific discipline; and
5. submitted an approved abstract for publication in *Dissertation Abstracts International*.

Following a thorough review of the completion of these requirements, the Dissertation Committee will sign the approval sheets and provide an official recommendation to the TS COGS regarding the award of the doctoral degree.

If the dissertation is considered meritorious by a majority vote of the TS COGS, the TS COGS will accept the Dissertation Committee's approval and then inform the Graduate School of the student's home institution. Final acceptance of the doctoral dissertation is accomplished by majority vote of the Graduate council or committee of the student's

home institution. The TS COGS will also inform the Graduate Schools of the other UT components.

Program of Study

The TS Ph.D. curriculum is designed to meet requirements and display expertise in eight educational domains:

1. Understanding translational science
2. Responsible research conduct
3. Research design and analysis
4. Lead, motivate, and manage collaborative team science
5. Utilization of multi-level cultural proficiency
6. Effective scientific communication
7. Competence in the business of translational science
8. Evidence-based policy and implementation

A. Core Courses

A minimum of 24 semester credit hours must be taken in courses with content specific to the eight educational domains for the TS Ph.D. program. For some domains, only one course is available. For others, equivalent courses are offered on multiple campuses—UTSA, UTHSCSA, UTCOP (UT Austin College of Pharmacy), and UTSPH (UT School of Public Health San Antonio Regional Campus). The TS COGS will evaluate each university's curriculum annually and may approve courses not included on this list. The courses selected to meet the core course requirements must be approved by the academic advisor/supervising professor prior to enrollment. Core courses may be selected from:

Domain 1: Understanding of Translational Science

UTHSCSA	MEDI 6001 Introduction to Translational Science
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Domain 2: Responsible Research Conduct

UT Austin	PGS 182W Ethics in Science and Clinical Practice
UT Austin	PGS 185D Responsible Conduct of Science
UTHSCSA	MEDI 5070 Responsible Conduct of Patient-Oriented Clinical Research
UTSA	BIO 7413 Research Ethics and Responsible Conduct in Research

Domain 3: Research Design and Analysis

UT Austin	EDP 382K Correlation and Regression Analysis
UT Austin	EDP 482K Quantitative Methods: Experimental Design & Statistical Inference
UT Austin	EDP 381W Molecular Biology in Translational Research
UT Austin	PGS 383Q Statistics in Translational Science
UT Austin	PGS 390K Experimental Design and Research Methodology in Pharmacy Admin

UTHSCSA	BIOC 6035 Drug Design and Discovery
UTHSCSA	CSBL 5095 Experimental Design and Data Analysis
UTHSCSA	MEDI 5071 Patient-Oriented Clinical Research Methods-1
UTHSCSA	MEDI 5072 Patient-Oriented Clinical Research Biostatistics-1
UTHSCSA	MEDI 6060 Patient-Oriented Clinical Research Methods-2
UTHSCSA	MEDI 6061 Patient-Oriented Clinical Research Biostatistics-2
UTSA	PSY 5413 Inferential Statistics
UTSA	PSY 6213 Correlation and Regression Analyses
UTSA	PSY 7013 Advanced Research Design
UTSA	SOC 5083 Advanced Quantitative Research Methods
UTSA	STA 5103 Applied Statistics
UTSA	STA 6833 Design and Analysis of Experiments
UTSPH	PH 1610 Introduction to Biostatistics
UTSPH	PH 1690 Foundations of Biostatistics
UTSPH	PH 1700 Intermediate Biostatistics
UTSPH	PH 1820 Applied Statistical Analysis I
UTSPH	PH 2710 Epidemiology III

Domain 4: Leadership and Team Science

UTSA	MGT 5093 Leadership
UTSPH	PH 3998 Special Topics in Management & Policy Science: Strategic Leadership
UTSPH	PH 5200 Foundations in Leadership in Public Health

Domain 5: Cultural Proficiency

UT Austin	HED 395 Advanced Topical Studies: Social Determinants of Health
UTSA	MGT 5043 Management of Behavior in Organizations
UTSA	SOC 5133 Sociology of Health and Health Care
UTSPH	PH 1110 Social and Behavioral Aspects of Community Health
UTSPH	PH 3998L Working with Diverse Communities

Domain 6: Scientific Communication

UT Austin	PGS 290R Medical Writing and Communication
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UT Austin	PGS 381V Communication Skills in Translational Science
UT Austin	PHR 487Q Communication Skills for Scientists
UTHSCSA	MEDI 5075 Scientific Communication

Domain 7: Business of Translational Science

UTSA	MOT 5173 Technology Transfer: The Theory and Practice of Knowledge Utilization
UTSA	MOT 5323 Biotechnology Industry

Domain 8: Evidence-based Policy and Implementation

UT Austin	PGS 393Q Health-Related Quality of Life Measurements
UTHSCSA	MEDI 6065 Health Services Research
UTSPH	PH 3630 Health Program Planning, Implementation, & Evaluation
UTSPH	PH 3920 Health Services Delivery and Performance

B. Topics in Translational Science Seminar

Enrollment is required for a minimum of 2 semester credit hours and these count toward the Elective credits listed below.

UTHSCSA	MEDI 6101 Topics in Translational Science
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C. Electives

A minimum of 18 semester credit hours is required (12 hours in the selected track and 6 hours of free electives). These can be selected from many graduate-level courses offered at any of the four participating institutions. The courses selected should contribute to the student's research and career needs and must be approved as part of the student's individualized degree plan by the academic advisor/supervising professor prior to enrollment.

Graduate Faculty

College of Architecture, Construction and Planning

Name	Title	Education
Architecture		
Alexander, John	Associate Professor	B.Arch., University of Detroit; M.Arch. History, Ph.D. University of Virginia
Azari, Rahman	Assistant Professor	B.Arch., M.Arch., Sahand University of Technology; Ph.D., University of Washington
Baron, Robert	Professor	B.Arch., University of Oregon, M.Arch., University of Washington; M.S.Arch., University of Pennsylvania
Beeson-Toker, Saadet	Assistant Professor	B.Arch., M.S., Ph.D., Middle East Technical University, Ankara, Turkey
Blizard, Mark	Associate Professor	B.Arch., M.Arch., Virginia Polytechnic Institution and State University
Burian, Edward R.	Associate Professor	B.Arch., University of Southern California, Los Angeles; M.Arch., Yale University
Caine, Ian	Assistant Professor	B.A., M.Arch., Washington University; M.S., Massachusetts Institute of Technology
Canizaro, Vincent B.	Associate Professor	B.E.D., Texas A&M University; M.Arch., University of California, Berkeley; Ph.D., Texas A&M University
Doganer, Sedef	Associate Professor	B.Arch., M.S., Ph.D., Istanbul Technical University
Dupont, William	Professor	San Antonio Conservation Society, Endowed Professorship; A.B., Brown University; M.Arch., University of Pennsylvania
Gribou, Julius M.	Professor	B. Design, University of Florida, Gainesville; M.Arch., University of Illinois at Urbana-Champaign
Lombardi, Angela	Assistant Professor	B.A., M.Arch., Ph.D., University of Rome
Murphy, Jr., John D.	Professor	B.S., M.S., Ph.D., Texas A&M University
Nishimoto, Taeg	Professor	B.Arch., Waseda University, Tokyo, Japan; M.Arch., Cornell University
Petrov, Antonio	Assistant Professor	M.Arch. and Urban Design, University of Applied Sciences Koblenz, Germany; M.Arch., Illinois Institute of Technology; D.Des., Harvard University Graduate School of Design
Rashed-Ali, Hazem	Associate Professor	B.S., Ain Shams University, Cairo; M.S., Oxford School of Architecture; Ph.D., Texas A&M University

Roff, Shelley	Associate Professor	B.E.D., Texas A&M University; M.Arch., University of California, Berkeley; Ph.D., Brown University
Suk, Jae-Yong	Assistant Professor	B. Engineering, Ajou University; M. Building Science, Ph.D., University of Southern California
Tangum, Richard R.	Professor	B.Arch., Texas Tech University; M. Arch., Virginia Polytechnic Institute; D.E.D., Texas A&M University
Temple, Stephen A.	Associate Professor	B.Arch., Carnegie Mellon University; M.S.Arch. Studies, The University of Texas at Austin
Valentine, Maggie	Professor	B.A., California State University, Northridge; Ph.D., University of California, Los Angeles
Walter, Rebecca J.	Assistant Professor	M.U.R.P., Ph.D., Florida Atlantic University

Construction Science

Gunhan, Suat	Associate Professor	B.Arch., M.S., Dokuz Eylul University; Ph.D., Illinois Institute of Technology
Hatipkarasulu, Yilmaz	Associate Professor	B.S., Cukurova University; M.S., Ph.D., Louisiana State University
Liu, Rui	Assistant Professor	B.S., B.Man., M.Man., Tianjin University; M.S., Ph.D., University of Florida
Palomera-Arias, Rogelio	Assistant Professor	B.S., University of Puerto Rico; M.S., Ph.D., Massachusetts Institute of Technology

College of Business

Name	Title	Education
Lengel, Robert H.	Associate Professor Emeritus	B.S., Pennsylvania State University; M.B.A., M.S., Rensselaer Polytechnic Institute; Ph.D., Texas A&M University
Lengnick-Hall, Cynthia	Professor Emeritus	B.A., M.B.A., University of California, Los Angeles; Ph.D., The University of Texas at Austin
Saegert, Joel G.	Professor Emeritus	B.A., Ph.D., University of Texas at Austin
Sandoval, Rodolpho	Associate Professor Emeritus	B.B.A., Texas A&I University; J.D., Texas Southern School of Law; M.A., Notre Dame University; LL.M., Harvard Law School
Accounting		
Asthana, Sharad C.	Professor	B.S., M.S., Lucknow University; Ph.D., The University of Texas at Austin
Boone, Jeff	Professor	B.B.A., M.S., Texas A&M University; Ph.D., University of North Texas
Cole, Cathy J.	Assistant Professor	B.A., North Carolina State University; M.Acc., University of Illinois; Ph.D., George Washington University

Fasci, Martha A.	Associate Professor	B.S., Our Lady of the Lake University; M.B.A., University of North Texas; Ph.D., The University of Texas at Austin
Forgione, Dana A.	Professor	B.B.A., M.B.A., M.S.A., Ph.D., University of Massachusetts Amherst
Groff, James E.	Professor	B.A., University of Iowa; M.B.A., Stetson University; Ph.D., University of Iowa
Linthicum, Cheryl L.	Professor	B.S., Colorado State University; M.B.A., Pittsburgh State University; Ph.D., Oklahoma State University
Liu, Hu (Harrison)	Assistant Professor	Ph.D., Texas A&M University; Ph.D., University of Houston
Lopez-Acevedo, Dennis M.	Associate Professor	B.B.A., University of Puerto Rico; M.B.A., George Washington University; Ph.D., University of Arkansas
Mao, Juan	Assistant Professor	Ph.D., University of Kansas
Nwaeze, Emeka T.	Associate Professor	B.S., M.P.A., Southern University; Ph.D., University of Connecticut
Pitman, Marshall K.	Professor	B.S., M.B.A., Eastern Illinois University; Ph.D., University of Mississippi
Raman, Krishnamurthy	Professor	BA., University of Calcutta; M.B.A., India Institute of Management, Calcutta; Ph.D., Indiana University
Sanders, Elaine	Associate Professor	B.B.A., Eastern New Mexico University; M.Acc., Ph.D., The University of Oklahoma
Smith, Pamela C.	Professor	B.S., University of Virginia; M.S., Ph.D., Virginia Polytechnic Institute and State University
Welch, Sandra T.	Professor	B.S., Texas Woman's University; M.P.A., The University of Texas at San Antonio; Ph.D., Texas A&M University
Ye, Zhongxia (Shelly)	Assistant Professor	Ph.D., Temple University
Yin, Jennifer	Associate Professor	B.S., M.S. Tax., University of New Orleans; Ph.D., University of Houston
Economics		
Alva, Samson J.	Assistant Professor	B.A. Mercer University; M.A., Ph.D., Boston College
Beladi, Hamid	Professor	B.A., Rasht College of Business, Iran; M.S., Ph.D., Utah State University
de la Vifia, Lynda	Professor	B.A., The University of Texas-Pan American; M.A., Ph.D., Rice University
Firoozi, Fathali	Professor	M.B.A., Oklahoma City University; M.A., The University of Texas at Austin; M.S., Ph.D., The University of Oklahoma

Ghossoub, Edgar A.	Associate Professor	B.B.A., Notre Dame University, Lebanon; M.S., University of North Carolina, Charlotte; M.S., Ph.D., University of Kentucky
Hollas, Daniel R.	Professor	B.B.A., University of Houston; M.A., Ph.D., University of Illinois at Urbana-Champaign
Lien, Donald	Professor	B.S., National Tsing Hua University; M.S., National Chiao Tung University; M.S., Ph.D., California Institute of Technology
Liu, Long	Associate Professor	B.A., M.A., Renmin University, Beijing, China; Ph.D., Syracuse University
Lo, Melody	Associate Professor	B.A., National Tsing Hua University; M.A., Ph.D., Purdue University
Mahdavi, Saeid	Associate Professor	B.A., National University of Iran; M.A., Ph.D., University of California, Santa Barbara
Merrifield, John D.	Professor	B.S., California Polytechnic State University; M.A., University of Illinois at Urbana-Champaign; Ph.D., University of Wyoming
Truett, Dale B.	Professor	B.A., Purdue University; M.A., Ph.D., The University of Texas at Austin
Truett, Lila J.	Professor	B.A., Kansas State University; M.A., Ph.D., University of Iowa
Weiber, Kenneth E.	Associate Professor	B.A., College of William and Mary; M.A., Ph.D., Indiana University
Finance		
Bayar, Onur	Associate Professor	B.S., Bogazici University; M.S., University of Pittsburgh; M.S., Carnegie Mellon University; Ph.D., Boston College
Beyhaghi, Mehdi	Assistant Professor	B.S., M.B.A., Sharif University of Technology; M.A., University of Waterloo; Ph.D., York University
Bhanot, Karan	Professor	B.S.E.E., Punjab Engineering College, India; M.B.A., Indian Institute of Management; Ph.D., University of Iowa
Burns, Natasha	Associate Professor	M.B.A., Michigan State University; B.S., Ph.D., The Ohio State University
Ciochetti, Brian (Tony)	Professor	B.S., University of Oregon; M.S., Ph.D., University of Wisconsin-Madison
Fairchild, Keith Wm.	Associate Professor	B.A., Ph.D., The University of Texas at Austin
Kadapakkam, Palani-Rajan	Professor	B.S., Loyola College, India; Postgraduate Diploma in Management, Indian Institute of Management; Ph.D., University of Michigan

Misra, Lalatendu	Professor	Chartered Mechanical Engineer, IRIMEE, Jamalpur, India; M.B.A., Ph.D., The University of Texas at Austin
Thomson, Thomas A.	Professor	B.S.F., University of British Columbia; M.S., Virginia Polytechnic Institute and State University; Ph.D., University of California, Berkeley; Ph.D., University of Michigan
Wald, John K.	Professor	B.A., Yale University; Ph.D., University of California, Berkeley
Wang, Zijun	Associate Professor	B.A., M.A., Ren Min University of China; Ph.D., Texas A&M University

Information Systems and Cyber Security

Au, Yoris A.	Associate Professor	B.S., Parahyangan Catholic University, Indonesia; M.B.A., University of Pittsburgh; Ph.D., University of Minnesota
Beebe, Nicole	Associate Professor	B.S., Michigan Technological University; M.S., Georgia State University; Ph.D., The University of Texas at San Antonio
Carpenter, Darrell R.	Assistant Professor	B.S., Wayland Baptist University; M.S., Ph.D., The University of Texas at San Antonio
Dietrich, Glenn B.	Professor	B.S., University of Missouri; M.B.A., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin
Grant, Kevin P.	Associate Professor	B.S., U.S. Air Force Academy; M.S., Air Force Institute of Technology; Ph.D., Texas A&M University
Hallam, Cory R. A.	Associate Professor	B.E., Carleton University, Ottawa, Canada; M.S., M.E., Ph.D., Massachusetts Institute of Technology
Ko, Myung S.	Associate Professor	B.A., University of Washington; M.A., Ph.D., Virginia Commonwealth University
Liu, Zhechao	Associate Professor	B.A., Xiamen University, China; M.A., Tulane University; Ph.D., University of Pittsburgh
Rao, V. Srinivasan	Professor	B.Tech., Indian Institute of Technology, Madras; M.S., Colorado School of Mines; Ph.D., The University of Texas at Austin
Spivey, Woodie A.	Associate Professor	B.A.E., Georgia Institute of Technology; M.M.S., Texas Christian University; Ph.D., University of Houston
Walz, Diane B.	Professor	B.A., St. Louis University; M.B.A., Washington University; Ph.D., The University of Texas at Austin
Warren, John	Associate Professor	B.A., Knox University; M.B.A., Governors State University; Ph.D., University of Illinois at Chicago

Management

Cardy, Robert L.	Professor	B.S., M.A., Central Michigan University; Ph.D., Virginia Polytechnic Institute and State University
Chang, Pepe	Associate Professor	B.S., Ph.D., University of Utah
Clark, Jonathan	Assistant Professor	B.A., Boston College; M.S., Ph.D., Harvard University
Heller, Victor L.	Associate Professor	B.A., M.P.A., Ph.D., Arizona State University
Khanna, Poonam	Assistant Professor	B.Com., University of Delhi, India; M.B.A., Institute of Management Technology, India; Ph.D., The University of Texas at Austin
Krasikova, Dina	Assistant Professor	Diploma, Voronezh State University, Russia; M.S., Ph.D., Purdue University
Le, Huy	Associate Professor	B.S., Vietnam National University; Ph.D., University of Iowa
Lengnick-Hall, Mark	Professor	B.B.A., M.B.A., The University of Texas at Austin; Ph.D., Purdue University
McCarter, Matthew	Professor	B.S., Brigham Young University; Ph.D., University of Illinois at Urbana-Champaign
McDonald, Michael L.	Associate Professor	B.A., Emory University; Ph.D., The University of Texas at Austin
Miller, Stewart R.	Professor	B.A., M.B.A., Northwestern University; Ph.D., Indiana University, Bloomington
Rudy, Bruce C.	Assistant Professor	M.S., University of Michigan; B.B.A., M.S., Ph.D., The University of Texas at Austin
Thornton, Meghan	Assistant Professor	B.A., University of Notre Dame; M.S., Ph.D., Purdue University
Xu, Kai	Assistant Professor	Bachelor's, Master's, Ph.D., Xi'an Jiaotong University; Ph.D., Texas A&M University
Management Science and Statistics		
DeOliveira, Victor	Associate Professor	B.S., M.S., Universidad Simon Bolivar; Ph.D., University of Maryland
Du, Pang	Associate Professor	B.S., M.S., University of Science and Technology; M.A., M.S.E., Johns Hopkins University; Ph.D., Purdue University
Gonzalez, Juan J.	Associate Professor	B.S., Universidad Nacional Autónoma de México; M.I.B.S., Ph.D., University of South Carolina
Han, Donghoon	Associate Professor	B.Sc., M.Sc., Ph.D., McMaster University
Keating, Jerome P.	Professor	B.S., M.A., Ph.D., The University of Texas at Arlington.
Ko, Daijin	Professor	B.S., M.S., Yonsei University, Korea; M.S., Ph.D., University of Washington

Leung, Mark T.	Associate Professor	B.A., M.B.A., University of California; M.B.A., Ph.D., Indiana University
Roy, Anuradha	Associate Professor	B.S., Calcutta University, India; M.Stat., Indian Statistical Institute, Calcutta, India; Ph.D., Oakland University
Sass, Daniel A.	Associate Professor	B.S., Ph.D., University of Wisconsin-Milwaukee
Sun, Minghe	Professor	B.S., Northeast University of Technology; M.B.A., Chinese University of Hong Kong; Ph.D., The University of Georgia
Tripathi, Ram C.	Professor	B.A., M.A., Banaras Hindu University, India; M.S., Ph.D., University of Wisconsin-Madison
Tullous, Raydel	Associate Professor	B.A., M.M.S., Texas Christian University; Ph.D., University of Santa Clara
Xu, Kefeng	Associate Professor	B.E., Shanghai Jiao-Tong University; M.S.B.A., University of British Columbia; Ph.D., University of Maryland
Ye, Keying	Professor	B.S., Fudan University, Shanghai, China; M.S., Institute of Applied Mathematics, Academia Sinica, Beijing, China; Ph.D., Purdue University
Marketing		
Basuroy, Suman	Professor	B.A., Brandeis University; M.S., Carnegie-Mellon University; Ph.D., University of Pittsburgh
Bhargave, Rajesh P.	Assistant Professor	B.B.A., The University of Texas at Austin; Ph.D., University of Pennsylvania
Bojanic, David C.	Professor	B.S., Pennsylvania State University, M.B.A., James Madison University; D.B.A., University of Kentucky
Chandrasekaran, Deepa	Assistant Professor	B.A., M.A., University of Madras, India; M.B.A., Indian Institute of Management; Ph.D., University of Southern California
Gretz, Richard	Associate Professor	B.A., Westfield State College; M.A., Ph.D., Claremont Graduate University
Lee, Saerom	Assistant Professor	B.B.A., Seoul National University; M.S., University of Illinois at Urbana-Champaign; Ph.D., Pennsylvania State University
Silvera, David H.	Professor	B.S., M.B.A., University of California, Irvine; Ph.D., The University of Texas at Austin
Utecht, Richard L.	Associate Professor	B.B.A., M.B.A., Texas A&I University; Ph.D., University of North Texas

Yan, Dengfeng	Assistant Professor	L.L.B., Nanjing University, China; M.Phil., Hong Kong Baptist University; Ph.D., Hong Kong University of Science and Technology
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Zhang, Yinlong (Allen)	Professor	Bachelor of History, Renmin University of China; M.Phil., Hong Kong University of Science and Technology; Ph.D., University of Pittsburgh
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College of Education and Human Development

Name	Title	Education
Borman, Christopher A.	Professor Emeritus	B.S., Ed.D., Indiana University; M.A., Northwestern University
Clark, Ellen R.	Professor Emeritus	B.A., Trinity University; M.A., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin
Colfer, George R.	Professor Emeritus	B.S., Lock Haven State College; M.S., Ithaca College; Ph.D., Texas A&M University
Cook, Gillian E.	Professor Emeritus	B.A., Sir George Williams University; Ed.M., Ed.D., Harvard University
Davis, Dewey D.	Professor Emeritus	B.S., Edinboro State College; M.Ed., Ph.D., The University of Texas at Austin
Kessler, Carolyn L.	Professor Emeritus	B.A., St. Mary-of-the-Woods College; M.S., Ph.D., Georgetown University
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Interdisciplinary Learning and Teaching

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Mechanical Engineering

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College of Liberal and Fine Arts

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Anthropology

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Art and Art History

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Communication			Ardoin, Paul	Assistant Professor	B.A., M.A., Florida Atlantic University; Ph.D., Florida State University
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Modern Languages and Literatures

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Oleszkiewicz, Malgorzata	Associate Professor	B.A., M.A., Queens College; Ph.D., New York University
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Music

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Philosophy and Classics

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Psychology			Zawacki, Tina	Associate Professor	B.S., Grand Valley State University; Ph.D., Wayne State University
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