

# GRADUATE CATALOG

# 2021-2023

May 2021

**UTSA**<sup>®</sup>

The University of Texas at San Antonio<sup>™</sup>

# TABLE OF CONTENTS

Graduate Catalog .....	2	Department of Public Administration .....	232
Introduction .....	3	Department of Public Health .....	237
Certificate Program Regulations .....	4	Department of Social Work .....	241
Master's Degree Regulations .....	6	Department of Sociology .....	246
Degree Requirements .....	6	College of Liberal and Fine Arts .....	251
Transfer of Credit .....	8	Department of Anthropology .....	252
Doctoral Degree Regulations .....	11	Department of Art and Art History .....	260
Degree Requirements .....	11	Department of Communication .....	264
Transfer of Credit .....	12	Department of English .....	267
Graduate Program Committee Requirements .....	13	Department of History .....	273
Admission to Candidacy .....	13	Department of Modern Languages and Literatures .....	277
Completing the Degree .....	14	Department of Music .....	281
Carlos Alvarez College of Business .....	16	Department of Philosophy and Classics .....	287
Department of Accounting .....	24	Department of Political Science and Geography .....	290
Department of Economics .....	30	College of Sciences .....	305
Department of Finance .....	34	Department of Chemistry .....	305
Department of Information Systems and Cyber Security .....	40	Department of Computer Science .....	311
Department of Management .....	52	Department of Earth and Planetary Sciences .....	318
Department of Management Science and Statistics .....	56	Department of Integrative Biology .....	326
Department of Marketing .....	65	Department of Mathematics .....	339
College of Education and Human Development .....	70	Department of Molecular Microbiology and Immunology .....	344
Department of Bicultural-Bilingual Studies .....	71	Department of Neuroscience, Developmental and Regenerative Biology .....	349
Department of Counseling .....	82	Department of Physics and Astronomy .....	355
Department of Educational Leadership and Policy Studies .....	91	University College .....	362
Department of Educational Psychology .....	101	Graduate Faculty .....	368
Department of Interdisciplinary Learning and Teaching .....	116	Additional Course Fees .....	392
Department of Race, Ethnicity, Gender, and Sexuality Studies .....	134	Index .....	401
Klesse College of Engineering and Integrated Design .....	136		
Department of Biomedical Engineering and Chemical Engineering .....	136		
Department of Electrical and Computer Engineering .....	150		
Department of Mechanical Engineering .....	168		
School of Architecture and Planning .....	178		
School of Civil and Environmental Engineering, and Construction Management .....	191		
College for Health, Community and Policy .....	209		
Department of Criminology and Criminal Justice .....	214		
Department of Demography .....	217		
Department of Kinesiology .....	226		
Department of Psychology .....	226		

# GRADUATE CATALOG

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## 2021–2023

### The University of Texas at San Antonio

Published May 1, 2021

The online version of The University of Texas at San Antonio Graduate Catalog is the official version. This catalog was last updated on November 17, 2022 (p. 2).

#### 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 sanctions and/or penalties they may incur.**

Students should refer to *UTSA Student Policies* for additional policies, procedures, and information directly related to their enrollment at UTSA.

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Nov. 17, 2022: Added the Graduate Certificate in Engineering Education (p. 144) in the Department of Biomedical Engineering and Chemical Engineering.

Nov. 4, 2022: Added the M.S. in Artificial Intelligence (p. 362) in the University College

Nov. 4, 2022: Added the M.S. in Engineering Education (p. 136) in the Department of Biomedical Engineering and Chemical Engineering.

Oct. 27, 2022: Removed the Graduate Certificates in E-STEM Education and Special Education Advocacy from the Department of Interdisciplinary Learning and Teaching.

Sep. 20, 2022: Add the M.S. in Aerospace Engineering (p. 168) in the Department of Mechanical Engineering.

Aug. 12, 2022: Added the Ph.D. in Molecular Microbiology and Immunology (p. 344) in the Department of Molecular Microbiology and Immunology.

July 13, 2022: M.A. in Reading and Literacy changed to M.A. in Literacy Education (p. 116).

July 13, 2022: Added Graduate Certificate in Technology for Language Education (p. 76).

Dec. 2, 2021: Added the M.S. in Behavior Analysis (p. 101) in the Department of Educational Psychology.

Oct. 1, 2021: The College of Engineering and Integrated Design (p. 136) replaced the Colleges of Engineering, and Architecture, Construction and Planning.

Oct. 1, 2021: The Department of Integrative Biology, the Department of Molecular Microbiology and Immunology, and the Department of Neuroscience, Developmental and Regenerative Biology were added (replacing the Departments of Biology, and Environmental Sciences and Ecology).

Sept. 1, 2021: The M.S. in Geology were renamed to Geosciences (p. 318).

Sept. 1, 2021: The Department of Geological Sciences was renamed Earth and Planetary Sciences (p. 318).

## Introduction

### Welcome Roadrunners!

The UTSA Graduate Catalog provides detailed information students need to navigate their educational experience. This catalog is divided into two sections: Student Policies and the Graduate Catalog.

- Student Policies explains important University policies regarding Admissions (<http://catalog.utsa.edu/policies/admission/>), Tuition, Fees, Charges, Deposits, Refunds (<http://catalog.utsa.edu/policies/tuitionfees/>), General Academic Regulations (<http://catalog.utsa.edu/policies/generalacademicregulations/>), and Administrative Policies and Procedures (<http://catalog.utsa.edu/policies/administrativepoliciesandprocedures/>).
- The Graduate Catalog provides students with information regarding their programs of study and any requirements needed to complete their degree. Please refer to the Table of Contents in this catalog for further information.

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

## Institutional Accreditation

The University of Texas at San Antonio is accredited by the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) to award baccalaureate, master's, and doctoral degrees. Questions about the accreditation of The University of Texas at San Antonio may be directed in writing to the Southern Association of Colleges and Schools Commission on Colleges at 1866 Southern Lane, Decatur, GA 30033-4097, by calling (404) 679-4500, or by using information available on SACSCOC's website ([www.sacscoc.org](http://www.sacscoc.org) (<https://www.sacscoc.org/>)).

## 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.

# CERTIFICATE PROGRAM REGULATIONS

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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 indicate their intent to seek admission into a certificate program. Applicants will be required to meet University admission requirements for special graduate students.

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 a special graduate student 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. UTSA awards credit for college-level transfer coursework of no more than 3 semester credit hours, earned with a grade of "B" or higher, from regionally-accredited colleges and universities. Admitted students may submit a petition for credits to the related Graduate Program Committee and academic College to receive credit earned from foreign institutions and non-regionally accredited colleges or universities. Based on course level, rigor, quality, comparability, and degree program relevance, credits may be awarded on an individual basis at the discretion of the Graduate Program Committee, academic College and the Graduate School.

UTSA reserves the right to refuse recognition of credit from a college or university if it is determined the course does not meet the department's standards of level, rigor, quality, comparability, and degree program relevance. Applicability of such coursework toward the UTSA degree plan is at the discretion of the major academic department. 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 cannot be 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.

## Completion of Requirements for a 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 (<https://onestop.utsa.edu/graduation/applying-for-graduation/>) to the One Stop Enrollment 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

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- Degree Requirements (p. 6)
- Transfer of Credit (p. 8)

## 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 complete the minimum number of semester credit hours required for the degree. All master's degrees require a minimum of 30 semester credit hours.
3. The student must remove all conditions of admission, if any were assigned at the time of admission.
4. 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.
5. 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).
6. The student must satisfactorily complete the comprehensive examination, except as provided by the M.B.A. degree and Master of Accountancy, M.S. Business, M.S. Data Analytics, M.S. Information Technology and Master of Social Work.
7. 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.
8. 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.
9. To graduate, all graduate students must have an overall grade point average of at least a 3.0 (on a 4.0 scale).
10. 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 Student Policies.

## Comprehensive Examination

A candidate for a thesis or non-thesis master's degree must, in addition to other requirements, pass (according to department standards) the comprehensive examination, which may be oral, written, or both. Additionally, some programs may allow the successful completion of a thesis to fulfill the comprehensive examination requirement. Thesis

candidates should discuss comprehensive examination options with their supervising professor.

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. The comprehensive examination can only be taken twice. Students who have not successfully completed the comprehensive exam after the second attempt will be dismissed. Please see the Academic Standing (<http://catalog.utsa.edu/policies/generalacademicregulations/academicstanding/>) section in *UTSA Student Policies* for further details.

To satisfy the comprehensive examination requirement, candidates for the M.B.A. degree are required to complete MBA 5613 Strategic Management and Policy with a grade of "B" (3.0) or better, candidates for the M.S. Business degree are required to complete MGT 5903 Strategic Management and Policy with a grade of "B" (3.0) or better, candidates for the M.S. in Data Analytics are required to complete DA 6833 Data Analytics Practicum II with a grade of "B" (3.0) or better, candidates for the M.S. degree in Information Technology are required to complete IS 6813 Strategic Management of Information Technology with a grade of "B" (3.0) or better, students who earn an average of 3.0 or higher in the combination of ACC 5163 Ethics and Accountant's Professional Responsibility, ACC 6013 Financial Accounting Theory, and ACC 5863 Advanced Financial Accounting will satisfy the comprehensive examination requirement for the MACY degree, and candidates for the Master of Social Work degree are required to complete SWK 5433 Specialized 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 the Graduate Catalog, Table of Contents, 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. Upon recommendation of the Graduate Program Committee and the academic College, the Graduate School appoints the Thesis Committee. The Thesis Committee consists of the Thesis Chair and two additional members of the Graduate Faculty. The chair of the Thesis Committee must be a member of the Graduate Faculty for that graduate program. A majority of the thesis committee must consist of graduate faculty or adjunct faculty in the student's program. For interdisciplinary committees, the chair of the committee may be a graduate faculty member from another program and/or the committee may consist of half of graduate faculty members from outside the student's program, upon approval of the Associate Dean of the College and Dean of the Graduate School. Changes to the Thesis Committee require documentation to be signed by the Department Chair, the Associate Dean of the College, and the Dean of the Graduate School and must be received by the Graduate School. 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.

### Non-Thesis 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 the Graduate Catalog, Table of Contents, 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.

## 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. UTSA awards credit for college-level transfer coursework, earned with a grade of "B" or higher, from regionally-accredited colleges and universities. Admitted students may submit a petition for credits to the related Graduate Program Committee and academic College to receive credit earned from foreign institutions and non-regionally accredited colleges or universities. Based on course level, rigor, quality, comparability, and degree program relevance, credits may be awarded on an individual basis at the discretion of the Graduate Program Committee, academic College and the Graduate School.

UTSA reserves the right to refuse recognition of credit from a college or university if it is determined the course does not meet the department's standards of level, rigor, quality, comparability, and degree program relevance. Applicability of such coursework toward the UTSA degree plan is at the discretion of the major academic department. 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. Degrees awarded from a Professional School with selected grading systems such as pass/fail must have been completed with a grade of "Pass" or better.
5. Coursework cannot be 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

#### 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.

## Dual Degree 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.

### 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. A graduate committee of at least three faculty must review all applications and make admissions recommendations to the Graduate School dean. Final admission decisions are made by the Graduate School dean. All agreements require Graduate School dean's signature authority for approval.

### 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 Student Policies, 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.

### 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.

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

## Dual Degree Program with Other Institutions

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 for master's degree or 8 years for doctoral degree of the first semester of enrollment.

### 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. A graduate committee of at least three faculty must review all applications and make admissions recommendations to the Graduate School dean. Final admission decisions are made by the Graduate School dean. All agreements require Graduate School dean's signature authority for approval.

### 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.

### **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-counted courses must be taken within six years for master's degree or eight years for doctoral degree prior to graduation. Students must earn a minimum of one third of the semester credit hours required for the UTSA graduate degree at UTSA.

### **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 programs, the student will have the option of completing the other degree following the normal requirements of that individual graduate program. Additional requirement will include research capstone project in addition to thesis/dissertation research. This can be in the form of a research paper or actual research project.

# DOCTORAL DEGREE REGULATIONS

- Degree Requirements (p. 11)
- Transfer of Credit (p. 12)
- Graduate Program Committee Requirements (p. 13)
- Admission to Candidacy (p. 13)
- Completing the Degree (p. 14)

## 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.

## 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.

## Academic Review and Individual Development Plan Form

Doctoral students are required to complete the Academic Review and Individual Development Plan (IDP) form at the beginning of each academic year. The Academic Review and IDP is an assessment of scholarly activities, types of funding received and sources, and future goals for the upcoming academic year. Students will complete the form with their currently assigned graduate advisor and submit to the Graduate School for review.

## 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 may not return to the University without applying for readmission to the graduate program and must pay the Graduate School application fee.

## Transfer of Credit

Students are expected to complete all coursework at UTSA. UTSA awards credit for college-level transfer coursework, earned with a grade of "B" or higher, from regionally-accredited colleges and universities. Admitted students may submit a petition for credits to the related Graduate Program Committee and academic College to receive credit earned from

foreign institutions and non-regionally accredited colleges or universities. Based on course level, rigor, quality, comparability, and degree program relevance, credits may be awarded on an individual basis at the discretion of the Graduate Program Committee, academic College and the Graduate School.

UTSA reserves the right to refuse recognition of credit from a college or university if it is determined the course does not meet the department's standards of level, rigor, quality, comparability, and degree program relevance. Applicability of such coursework toward the UTSA degree plan is at the discretion of the major academic department. 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. Degrees awarded from a Professional School with selected grading systems such as pass/fail must have been completed with a grade of "Pass" or better.
3. Coursework cannot be 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.

## Award of Interim Master's Degree for College of Engineering Students

This policy applies to Ph.D. students who are admitted to a doctoral program administered by the College of Engineering and wish to be awarded the Master's degree as part of their doctoral program. The Interim Master's degree is not a terminal degree. Current Ph.D. students who want to be awarded the Master's degree without proceeding to complete their doctoral studies should withdraw from the Ph.D. program and re-apply to the appropriate Master's degree program.

Students with no financial support (stipend, tuition and fees, GTAs, GRAs, fellowships, scholarships, etc) from UTSA at any time during their doctoral program must meet all of the requirements below:

1. Complete the appropriate set of 36 semester credit hours of coursework, matching, to the satisfaction of the appropriate Graduate Program Committee, the 36 hours required for regular master's degrees at UTSA in the specified area.
2. Pass a doctoral qualifying examination related to the above 36-semester-credit-hour program, administered under the standard UTSA regulations.
3. Apply for award of the master's degree before the application deadline and in the manner prescribed for regular master's degrees at UTSA.
4. Submit the following documentations to the Office of the Engineering Dean:
  - An approved program of study for the Master's degree
  - A certification that the student has passed the Qualifying Examination
  - An official transcript (or certified copy from the Office of the Registrar) showing a cumulative grade point average of 3.0 or better and good standing status
  - A certification stating the removal of any academic conditions imposed by the program's admissions committee
  - A certification from the mentor and the department chair that the student is on track with his/her doctoral program of study and research, and the student will satisfactorily complete his/her dissertation work as required by the program

Students who have received financial support (stipend, tuition and fees, GTAs, GRAs, fellowships, scholarships, etc) from UTSA at any time during their doctoral program must meet all the requirements below:

1. Pass a doctoral qualifying examination related to the above 36-semester-credit-hour program, administered under the standard UTSA regulations.
2. Be on track with their dissertation and will continue on with their PhD program.

3. Apply for award of the master's degree one semester before the dissertation defense with approval of the mentor and department chair. Application for the master's degree must be by or before the application deadline and in the manner prescribed for regular master's degrees at UTSA.
4. Submit the following documentations to the Office of the Engineering Dean:
  - An approved program of study for the Master's degree
  - A certification that the student has passed the Qualifying Examination
  - An official transcript (or certified copy from the Office of the Registrar) showing a cumulative grade point average of 3.0 or better and good standing status
  - A certification stating the removal of any academic conditions imposed by the program's admissions committee
  - A draft copy of the written dissertation that is approved by the mentor and the department chair

## 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. For interdisciplinary committees, the chair of the committee may be a graduate faculty member from another department and/or the committee may consist of half of graduate faculty members from outside the student's program (including graduate faculty from master's only programs), upon approval of the Associate Dean of the College and Dean of the Graduate School.

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 Associate 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 must have been taken within the previous eight years (exclusive of a maximum of three years of military service). The Graduate Program Committee will review the progress 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
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 website. (<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.



# CARLOS ALVAREZ COLLEGE OF BUSINESS

## Mission Statement

The Carlos Alvarez 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 Carlos Alvarez College of Business graduate business programs are currently accredited by AACSB International - The Association to Advance Collegiate Schools of Business - and conform to recommended guidelines.

## College-wide Programs

- Master of Business Administration (p. 16)
- Master of Science in Business (p. 16)
- Master of Science in Data Analytics (p. 16)
- Executive Master of Business Administration (p. 16)
- Dual Master of Business Administration and Master of Public Health (p. 16)
- Graduate Certificate in Intelligence Studies (p. 19)
- Pre-Ph.D. Program (p. 16)

### Department of Accounting (p. 24)

- Five-Year (150-Hour) Professional Accounting Program (p. 24)
- Master of Accountancy (p. 24)
- Doctor of Philosophy in Accounting (p. 24)

### Department of Economics (p. 30)

- Master of Arts in Economics – General Economics Concentration (p. 30)
- Master of Arts in Economics – Financial Economics Concentration (p. 30)
- Master of Arts in Economics – Business Data Analysis and Forecasting Concentration (p. 30)

### Department of Finance (p. 34)

- Master of Science in Finance (p. 34)
- Master of Science in Finance – Real Estate Finance and Development Concentration (p. 34)
- Doctor of Philosophy in Finance (p. 34)
- Graduate Certificate in Real Estate Finance and Development (p. 37)

### Department of Information Systems and Cyber Security (p. 40)

- Master of Science in Information Technology (p. 40)
- Master of Science in Information Technology – Cyber Security Concentration (p. 40)
- Master of Science in Management of Technology (p. 40)
- Doctor of Philosophy in Information Technology (p. 40)
- Graduate Certificate in Cloud Computing (p. 44)
- Graduate Certificate in Cyber Security (p. 44)
- Graduate Certificate in Project Management (p. 44)
- Graduate Certificate in Technology Entrepreneurship and Management (p. 44)

### Department of Management (p. 52)

- Doctor of Philosophy in Management and Organization Studies (p. 52)

### Department of Management Science and Statistics (p. 56)

- Master of Science in Statistics and Data Science (p. 56)
- Doctor of Philosophy in Applied Statistics (p. 56)
- Graduate Certificate in Operations and Supply Chain Management (p. 58)

### Department of Marketing (p. 65)

- Doctor of Philosophy in Marketing (p. 65)

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- M.B.A. (p. 16)

- M.S. in Business (p. 17)

- M.S. in Data Analytics (p. 17)

- Executive M.B.A. (p. 18)

- Dual M.B.A and Master of Public Health (p. 19)

- Pre-Ph.D. Program (p. 19)

## 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 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) or Graduate Record Exam (GRE) scores, personal statement, résumé, and references.

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 (no more than five years old) (upon review of the M.B.A. Committee, GRE scores (no more than five years old) may be accepted in lieu of the GMAT scores)
- A personal statement
- A current résumé with employment or other experience
- At least two letters of reference

## Degree Requirements

The M.B.A. program requires 36 semester credit hours of work.

Code	Title	Credit Hours
A. 27 semester credit hours of required master's level business courses		27
MBA 5113	Business Foundations	
MBA 5133	Financial Accounting Concepts	
MBA 5213	Management and Behavior in Organizations	
MBA 5233	Accounting Analysis for Decision Making	
MBA 5313	Marketing Management	
MBA 5333	Financial Management	
MBA 5413	Management Science with Data Analytics	
MBA 5513	Managerial Economics	
MBA 5613	Strategic Management and Policy	
B. 9 semester credit hours of elective master's level business courses		9
<b>Total Credit Hours</b>		<b>36</b>

## 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 website (<http://business.utsa.edu/graduate/>).

## Degree Options

Students seeking the M.B.A. degree may select between two options to complete the required 36 semester credit hours.

### Option 1: General M.B.A. Non-Thesis Option

Under Option 1, students are required to complete the 27 semester credit hours listed above and 9 semester credit hours of electives. These electives may be taken either in the College of Business or in areas outside of the College of Business as approved by the Graduate Program Committee.

### Option 2: General M.B.A. Thesis Option

Under Option 2, students are required to complete the 27 semester credit hours listed above, 3 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 Master's Degree Regulations.

## 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 who do not have a business degree. 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 nonbusiness 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)

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.

Code	Title	Credit Hours
A. 30 semester credit hours of required master's level business courses		30
ACC 5003	Financial Accounting Concepts	
ECO 5003	Economic Theory and Policy	
FIN 5023	Financial Management	
MGT 5043	Management and Behavior in Organizations	
MGT 5093	Leadership	
MGT 5633	Effective Negotiating	
MGT 5903	Strategic Management and Policy	
MOT 5243	Essentials of Project and Program Management	
MKT 5023	Marketing Management	
MS 5003	Quantitative Methods for Business Analysis	
B. 3 semester credit hours of developmental courses		3
GBA 6302	Professional Development and Communication	
MGT 6971	Special Problems (Business Speaking)	
<b>Total Credit Hours</b>		<b>33</b>

## 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.

Code	Title	Credit Hours
A. 24 semester hours of required master’s level courses		24
DA 6213	Data-Driven Decision Making and Design	
DA 6223	Data Analytics Tools and Techniques	
DA 6233	Data Analytics Visualization and Communication	
DA 6813	Data Analytics Applications	
IS 6713	Data Foundations	
IS 6733	Deep Learning on Cloud Platforms	
STA 6443	Statistical Modeling	
STA 6543	Predictive Modeling	
B. 6 semester credit hours of required practicum courses		6

DA 6823	Data Analytics Practicum I
DA 6833	Data Analytics Practicum II
<b>Total Credit Hours</b>	<b>30</b>

## Executive Master of Business Administration

The Executive Master of Business Administration (E.M.B.A.) is a 43-credit hour 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 43-credit hour, five-semester plan of study features lockstep cohort classes, weekend class scheduling, professional development and coaching, 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.

To be considered for admission to the E.M.B.A. program, applicants must:

- Submit a current resume documenting approximately 8 years of work experience with increasing managerial responsibility. Less experienced applicants will be considered if they can demonstrate exceptional accomplishment.
- Submit a personal statement discussing their interest in the E.M.B.A. program
- Submit two (2) letters of professional reference
- Submit official transcripts from all prior universities attended
- Participate in a personal interview with the E.M.B.A. Programs Committee

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

The GMAT or GRE is not required for admission into the E.M.B.A. program. The TOEFL is not required for admission into the E.M.B.A. program. 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 without reapplying. Admission to future E.M.B.A. classes is dependent upon successful reapplication. Acceptance in a future program is not guaranteed.

The Executive Master of Business Administration (E.M.B.A.) program offers a choice of two curriculum tracks. Students are eligible to choose a track after the first semester in the program. The **General Management** track weaves quantitative, analytical and managerial learning threads throughout the program and covers general business courses. The **Health Professionals** track is for health professionals interested in further developing their business and leadership skills with healthcare specific courses.

Code	Title	Credit Hours
<b>A. Common courses required for both tracks:</b>		<b>31</b>
ACC 5003	Financial Accounting Concepts	
FIN 5023	Financial Management	
GBA 6973	Special Topics in General Business Administration	
MGT 5043	Management and Behavior in Organizations	
MGT 5093	Leadership	
MGT 5633	Effective Negotiating	
MGT 5903	Strategic Management and Policy	
MGT 6971	Special Problems	
MKT 5023	Marketing Management	
MS 5003	Quantitative Methods for Business Analysis	
MS 5023	Decision Analysis and Production Management	
<b>B. EMBA Tracks. Students must choose one of the two tracks below: 12</b>		
<b>General Management Track</b>		
ACC 5023	Accounting Analysis for Decision Making	
ECO 5023	Managerial Economics	
FIN 5823	Corporate Restructuring	
MGT 5253	Ethics and Globalization	
<b>Health Professionals Track</b>		
ACC 6783	Accounting for Healthcare Organizations (replaces ACC 5023)	
BLW 6553	Legal, Ethical, and Social Issues of Healthcare Management (replaces MGT 5253)	
ECO 6543	Healthcare Economics and Policy (replaces ECO 5023)	
MGT 6133	Organizational and Managerial Issues in Healthcare Delivery (replaces FIN 5823)	
<b>Total Credit Hours</b>		<b>43</b>

## 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 (<https://sph.uth.edu/campuses/san-antonio/>) for M.P.H. program admission and degree requirements.

## Pre-Ph.D. Program

The Pre-Ph.D. program will provide students with experience and training in business research necessary to make them competitive candidates for top-rated Ph.D. programs in business. It will cultivate students' interest in pursuing a doctoral education and will position them to become thought leaders in their respective areas. The program responds to labor market demands suggesting an expanding need for business professors, particularly those from under-represented minority (URM) groups. Since the University of Texas at San Antonio (UTSA) is a Hispanic Serving Institution (HSI), the primary URM group will be Hispanics, but the program is open to all graduate students. The primary audience is master's students, but doctoral students who join UTSA's Ph.D. program with undergraduate degrees only can benefit from this program as they complete the requirements to earn the doctoral degree.

## Admission Requirements

The Pre-Ph.D. program is open to all UTSA graduate students, including non-degree seeking students, regardless of their college or major. Applicants who are currently enrolled in a graduate degree program at UTSA have already met the University requirements for admission. Current students should contact the Dr. Hamid Beladi at [hamid.beladi@utsa.edu](mailto:hamid.beladi@utsa.edu) or telephone at (210) 458-7038.

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 go through the Pre-Ph.D. course sequence. Students who meet general UTSA admission requirements are eligible for admission to the Pre-Ph.D. program.

## Pre-Ph.D. Program Requirements

Below is the three-course suggested sequence for graduate students seeking to become competitive applicants in top business Ph.D. programs.

GBA 6013	Graduate Academic Research and Programming	3
GBA 6023	Research Conceptualization, Development, and Practice	3
GBA 6033	Research Conceptualization, Development, and Practice	3

## Graduate Certificate in Intelligence Studies

The Graduate Certificate in Intelligence Studies is a 12-semester-credit-hour program designed to prepare individuals from a broad range of

academic disciplines for a career in the Intelligence Community (<https://www.intelligence.gov/>). Individuals with business, foreign language, social science, computer science, criminal science, engineering or statistics backgrounds will benefit from this professional certificate. Individuals completing this certificate will gain a practical and hands-on knowledge of methods in intelligence collection, intelligence analysis, and reporting and briefing for the intelligence community. See the College of Business Critical Technology Studies Program (<http://www.business.utsa.edu/ctsp/>) website for more information.

### Admission Requirements

The certificate is open to all UTSA graduate students, including non-degree seeking students, regardless of their college or major. Applicants who are currently enrolled in a graduate degree program at UTSA have already met University requirements for admission. Current students should contact the Critical Technology Studies Program (<http://www.business.utsa.edu/ctsp/>) and complete a form requesting permission to pursue the Intelligence Studies certificate via email at [ctsp@utsa.edu](mailto:ctsp@utsa.edu) or telephone at (210) 458-7328.

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. Students who meet general UTSA admission requirements are eligible for admission to this certificate program.

### Certificate Requirements

To earn the Graduate Certificate in Intelligence Studies, students must complete 12 semester credit hours as follows:

Code	Title	Credit Hours
Required Courses (12 semester credit hours):		12
NS 6003	The Role of U.S. Intelligence in National Security	
NS 6223	Analytical Writing, Reporting and Briefing for the Intelligence Community	
NS 6503	Intelligence Reasoning Analysis	
NS 6523	Methods in Intelligence Collection	
<b>Total Credit Hours</b>		<b>12</b>

### 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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

### Data Analytics (DA) Courses

**DA 6213. Data-Driven Decision Making and Design. (3-0) 3 Credit Hours.**  
This course introduces students to the process of making organizational decisions using data-driven techniques. Specifically, this course emphasizes question formulation, hypothesis development, data analysis, model building, and model testing using business case studies. The first component of this course focusses on data-driven decision making using linear and logistic regression analysis. The second component of this course focusses on time series analysis using regression, Exponential Smoothing, ARIMA, ARIMAX, and Unobserved Component modeling-based approaches. The third component of this course focusses on survival analysis using non-parametric, semi-parametric, and parametric methods. Appropriate statistical software will be used throughout this course to demonstrate various methods. Differential tuition: \$387.

**DA 6223. Data Analytics Tools and Techniques. (3-0) 3 Credit Hours.**

Students will be provided the opportunity to gain education and experience with SAS Enterprise Guide and SAS Enterprise Miner, a leading commercial tool for analytical industry. Students will become familiar with data preparation process, including data imports, data merge, data cleaning, data transformation, conditional processing, data summary, and data visualization techniques using SAS software. Statistical modeling and machine learning are also introduced in SAS Enterprise Guide and Enterprise Miner. Students will not become scientific programmers from this course, nor will they learn the formalisms of programming per se; rather, they will be provided the opportunity to learn and experience a complete process of data analytics.. Differential Tuition: \$387.

**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 be provided the opportunity to learn common methods for data visualization for a wide variety of data types and data analytics applications. Differential Tuition: \$387.

**DA 6813. Data Analytics Applications. (3-0) 3 Credit Hours.**

Students will be presented 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, which may include some of the topics from 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 environment, manufacturing and operations, and logistics and supply chain. Differential tuition: \$387.

**DA 6821. Data Analytics Practicum I. (1-0) 1 Credit Hour.**

This course presents 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. In the first 1 credit semester of this course students will learn how to identify the proper statistical technique to apply to a problem, complete a set of modules that review basic statistical fundamentals and have the opportunity to gain a first experience at data analysis using small time series data sets. During the second 2 credit semester of the practicum, students will engage in a project that incorporates 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 as well as develop some fundamental coding skills using a large, real world data set. In addition, they will acquire training in analytical and statistical techniques including introduction to social network analysis as well as an introduction to a number of other statistical methods designed to encourage the student to explore and learn more advanced techniques. may be repeated for credit. Differential Tuition: \$129.

**DA 6822. Data Analytics Practicum I. (2-0) 2 Credit Hours.**

This course presents 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. In the first 1 credit semester of this course students will learn how to identify the proper statistical technique to apply to a problem, complete a set of modules that review basic statistical fundamentals and have the opportunity to gain a first experience at data analysis using small time series data sets. During the second 2 credit semester of the practicum, students will engage in a project that incorporates 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 as well as develop some fundamental coding skills using a large, real world data set. In addition, they will acquire training in analytical and statistical techniques including introduction to social network analysis as well as an introduction to a number of other statistical methods designed to encourage the student to explore and learn more advanced techniques. Differential Tuition: \$258.

**DA 6823. Data Analytics Practicum I. (3-0) 3 Credit Hours.**

Prerequisites: DA 6213, DA 6813, and STA 6443. This course presents 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. In the first 1 credit semester of this course students will learn how to identify the proper statistical technique to apply to a problem, complete a set of modules that review basic statistical fundamentals and have the opportunity to gain a first experience at data analysis using small time series data sets. During the second 2 credit semester of the practicum, students will engage in a project that incorporates 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 as well as develop some fundamental coding skills using a large, real world data set. In addition, they will acquire training in analytical and statistical techniques including introduction to social network analysis as well as an introduction to a number of other statistical methods designed to encourage the student to explore and learn more advanced techniques. Differential Tuition: \$387.

**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 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. 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. Differential Tuition: \$387.

## General Business Administration (GBA) Courses

### **GBA 6013. Graduate Academic Research and Programming. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. The course provides an introduction to research in business administration for graduate students who are interested in entering the doctoral programs but do not have prior academic experience in this area. It also explores the nature of doctoral programs and careers in academe. The curriculum examines the nature and scope of research conducted in a variety of business disciplines and involves a broad systematic review of business research literature. Finally, this course presents the foundational work and an array of methods and approaches that students can take to prepare for research projects of interest. Curricula also include development of meaningful research topics. Differential Tuition: \$387.

### **GBA 6023. Research Conceptualization, Development, and Practice. (3-0) 3 Credit Hours.**

Prerequisites: GBA 6013 and (MS 3043 or MBA 5413 or equivalent), and consent of instructor. This course is the first in a two-part sequence and provides an overview of common research methodologies and their applications in context to the student's degree program. Foundational concepts include examination and application of theoretical frameworks, critical analysis of scholarly literature and collection / processing of data through a theoretical lens. Students also explore quantitative, qualitative and mixed research methods and the analytical elements of an effective research scheme. Differential Tuition \$387.

### **GBA 6033. Research Conceptualization, Development, and Practice. (3-0) 3 Credit Hours.**

Prerequisite: GBA 6023 and consent of instructor. This course is the second in a two-part sequence and intends to give students hands-on research experience in a pragmatic and professional manner. This course continues with the array of quantitative research skills introduced in GBA 6023 and trains students to apply an appropriate research paradigm and conduct scientific business analysis. The analysis of data, data visualization and communication of outcomes are emphasized. Topics related to strategic fit and selection of research outlets are incorporated. Differential Tuition \$387.

### **GBA 6302. Professional Development and Communication. (2-0) 2 Credit Hours.**

Prerequisite: Consent of instructor. This course is designed to enhance the student's ability in and experience with building networking skills, verbal and written communication skills, business etiquette, and learning how to increase their professional human capital. Students will learn how to build a personal career portfolio (an approved resume, a LinkedIn profile, etc.), how to market themselves, how to prepare for internship and job placement interviews, how to utilize professional networking, and how to work effectively and professionally in collaborative settings. The goal is to make students more marketable and valuable professionals to the global economy. Written assignments and attendance at course-related seminars are required. Differential Tuition: \$258.

### **GBA 6883. Global Business Immersion. (0-0) 3 Credit Hours.**

Prerequisite: 6 College of Business semester credit hours and official admission into the Business Immersion Program. An advanced field-trip course designed to provide intensive exposure to the business practices of the locations visited. The pre-departure activities enhance prior knowledge of the local business climate and culture. The in-country activities include visits to local companies and workshops hosted by local professors. The post-immersion components engage students in reflection opportunities and applied project experiences. This course relies heavily on experiential components. Attendance to all official course events is required. This course may be repeated for credit. Differential Tuition: \$387.

### **GBA 6941. Graduate Internship. (1-0) 1 Credit Hour.**

Prerequisites: Graduate standing, 15 semester credit hours of graduate work, and consent of instructor. Internship must be approved in advance by the Internship Coordinator and the student's Graduate Advisor of Record. Supervised full- or part-time, off-campus work experience and training in business operations and/or management. Individual conferences and written reports required. Differential Tuition: \$129.

### **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. Differential Tuition: \$258.

### **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. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

## Master of Business Administration (MBA) Courses

### **MBA 5113. Business Foundations. (3-0) 3 Credit Hours.**

A first semester MBA degree course designed to provide students with a conceptual foundation for business analysis and decision-making. Topics will include overview of business organizations, industry analysis, and time value of money. Differential Tuition: \$387.

**MBA 5133. 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. (Same as ACC 5003. Credit cannot be earned for both ACC 5003 and MBA 5133.) Differential Tuition: \$387.

**MBA 5213. Management and Behavior in Organizations. (3-0) 3 Credit Hours.**

Prerequisites: Completion of or concurrent enrollment in MBA 5113 and MBA 5133. 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. (Same as MGT 5043. Credit cannot be earned for both MBA 5213 and MGT 5043.) Differential Tuition: \$387.

**MBA 5233. Accounting Analysis for Decision Making. (3-0) 3 Credit Hours.**

Prerequisites: MBA 5113 and MBA 5133. The study of accounting and its uses by management in the decision-making process. (Same as ACC 5023. Credit cannot be earned for both ACC 5023 and MBA 5233.) Differential Tuition: \$387.

**MBA 5313. Marketing Management. (3-0) 3 Credit Hours.**

Prerequisites: Completion of or concurrent enrollment in MBA 5113 and MBA 5133. 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. (Same as MKT 5023. Credit cannot be earned for both MBA 5313 and MKT 5023.) Differential Tuition: \$387.

**MBA 5333. Financial Management. (3-0) 3 Credit Hours.**

Prerequisites: MBA 5113 and MBA 5133. 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. (Same as FIN 5023. Credit cannot be earned for both FIN 5023 and MBA 5333.) Differential Tuition: \$387.

**MBA 5413. Management Science with Data Analytics. (3-0) 3 Credit Hours.**

Prerequisites: MBA 5113 and MBA 5133. This course provides students with knowledge and applications of quantitative methods and data analytic tools commonly used in the fields of management science and operations management. The focus is to demonstrate how to solve managerial and technical problems encountered in various functional areas in business. Topics include, but not limited to, descriptive analytics, probability distributions, sampling distributions, confidence interval estimation, hypothesis testing, chi-squared test, analysis of variance, linear regression, forecasting, linear programming and optimization, project scheduling, and simulation. Computer software and spreadsheet models are adopted in the instructions. (Same as MS 5023. Credit cannot be earned for both MBA 5413 and MS 5023.) Differential Tuition: \$387.

**MBA 5513. Managerial Economics. (3-0) 3 Credit Hours.**

Prerequisites: MBA 5113 and MBA 5133. Application of price theory to economic decisions of the firm. An applications-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. (Same as ECO 5023. Credit cannot be earned for both ECO 5023 and MBA 5513.) Differential Tuition: \$387.

**MBA 5613. Strategic Management and Policy. (3-0) 3 Credit Hours.**

Prerequisite: Completion of all other MBA Core courses or approval of instructor, Department Chair, and Associate Dean of the Office of Graduate Studies. 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. (Same as MGT 5903. Credit cannot be earned for both MBA 5613 and MGT 5903.) Differential Tuition: \$387.



# 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. 24)
- Master of Accountancy (MACY) (p. 24)
- Ph.D. in Accounting (p. 25)

## 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. 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 Five-Year Professional program. Students admitted to the Five-Year Professional program will be reclassified from undergraduate to graduate student status when they have completed 120 semester credit hours of coursework toward their degree. Students may receive the B.B.A. in Accounting and the Master of Accountancy degrees as each of the degree's requirements are completed.

### Program Admission Requirements

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 upper-division accounting courses taken and an acceptable score on the Graduate Management Admission Test (GMAT).
3. Have completed a minimum of 9 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 Director of Masters' 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 Director of Masters' 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 of accounting, taxation, or data analytics and information security 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
- Personal statement
- 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 or probationary 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:

Code	Title	Credit Hours
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 3123	Cost Analysis	3
ACC 4013	Principles of Auditing	3
BLW 3013	Business Law	3
ECO 2013	Introductory Macroeconomics	3
ECO 2023	Introductory Microeconomics	3
FIN 3013	Principles of Business Finance	3
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:

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>18</b>
ACC 6013	Financial Accounting Theory *	
ACC 5163	Ethics and Accountant's Professional Responsibility *	
ACC 5823	Governmental and Not-for-Profit Accounting	
ACC 5863	Advanced Financial Accounting *	
ACC 5993	Data Analytics for Accountants	
ACC 6073	Advanced Corporate Taxation	
*Students who earn an average of 3.0 or higher in the combination of ACC 5163, ACC 6013, and ACC 5863 will satisfy the comprehensive examination requirement for the MACY degree.		
<b>B. Electives</b>		<b>12</b>
12 semester credit hours of graduate track electives approved by the Graduate Advisor of Record and the Chair of the Department of Accounting. Students may choose to focus their graduate study in one of four tracks through their choice of these 12 hours. Tracks include financial accounting/auditing, taxation, data analytics/information security, and general studies.		
<b>Total Credit Hours</b>		<b>30</b>

## Doctor of Philosophy Degree in Accounting

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Accounting. The Ph.D. in Accounting 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

### Program Admission Requirements

Applicants must have a bachelor's degree from an accredited university. The Ph.D. Program Committee in the major areas will evaluate applicants to the PhD 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 60 (paper version) or 79 (internet version) 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 Ph.D. Program 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 may include an appointment to a teaching assistantship, research assistantship, or research fellowship. The Ph.D. Program Committee, comprised of members selected from the graduate faculty, is responsible for advising students.

### Degree Requirements for Students who have Obtained a Bachelor's Degree

The degree requires a minimum of 84 semester credit hours beyond the bachelor's degree.

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

Code	Title	Credit Hours
<b>A. M.B.A. Core Courses</b>		<b>9</b>
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:		
MBA 5213	Management and Behavior in Organizations	
MBA 5233	Accounting Analysis for Decision Making	
MBA 5313	Marketing Management	
MBA 5333	Financial Management	
MBA 5413	Management Science with Data Analytics	
MBA 5513	Managerial Economics	
MBA 5613	Strategic Management and Policy	
The Ph.D. Program Committee may consider the approval of transferring some or all of the credit hours of this requirement based on prior graduate coursework.		
<b>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).</b>		<b>9</b>
The Ph.D. Program Committee may consider the approval of transferring up to 9 credit hours of this requirement based on prior graduate coursework.		
<b>C. Required Course</b>		<b>3</b>
GBA 7103	Doctoral Teaching Seminar	
<b>D. Statistics and Research Methodology</b>		<b>18</b>

18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Ph.D. Program Committee. Courses include but are not limited to:	
ECO 6013	Microeconomic Theory
ECO 6103	Econometrics I
ECO 6113	Mathematical Economics
GBA 7013	Research Methods I
GBA 7023	Research Methods II
MS 7033	Applications in Causal Structural Modeling
STA 6923	Introduction to Statistical Learning
STA 7023	Applied Linear Statistical Models
STA 7033	Multivariate Statistical Analysis
<b>E. Major Area Coursework</b>	<b>21</b>
1. PhD Level Courses (12 semester credit hours)	
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
ACC 7983	Special Topics in Accounting
2. Directed Electives (9 semester credit hours)	
ACC 7043	Archival-Based Research Methods in Accounting
6 semester credit hours of graduate-level coursework as approved by the Ph.D. Program Committee.	
<b>F. Free elective</b>	<b>3</b>
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.	
<b>G. Doctoral Research</b>	<b>9</b>
<b>H. Doctoral Dissertation</b>	<b>12</b>
The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.	
<b>Total Credit Hours</b>	<b>84</b>

## Degree Requirements for Students that have Obtained a Master's Degree

The degree requires a minimum of 66 semester credit hours beyond the master's degree.

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

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
GBA 7103	Doctoral Teaching Seminar	
<b>B. Statistics and Research Methodology</b>		<b>18</b>
18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Ph.D. Program Committee. Courses include but are not limited to:		
ECO 6013	Microeconomic Theory	
ECO 6103	Econometrics I	

ECO 6113	Mathematical Economics	
GBA 7013	Research Methods I	
GBA 7023	Research Methods II	
MS 7033	Applications in Causal Structural Modeling	
STA 6923	Introduction to Statistical Learning	
STA 7023	Applied Linear Statistical Models	
STA 7033	Multivariate Statistical Analysis	
<b>C. Major Area Coursework</b>		<b>21</b>
1. PhD Level Courses (12 semester credit hours)		
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	
ACC 7983	Special Topics in Accounting	
2. Directed Electives (9 semester credit hours)		
ACC 7043	Archival-Based Research Methods in Accounting	
6 semester credit hours of graduate-level coursework as approved by the Ph.D. Program Committee		
<b>D. Free elective</b>		<b>3</b>
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.		
<b>E. Doctoral Research</b>		<b>9</b>
<b>F. Doctoral Dissertation</b>		<b>12</b>
The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.		
<b>Total Credit Hours</b>		<b>66</b>

## 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 Ph.D. Program Committee. No more than two attempts to pass qualifying examinations are allowed. Results of the written and oral examinations must be reported to the Ph.D. Program 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.

## 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. (Same as MBA 5133. Credit cannot be earned for both ACC 5003 and MBA 5133.) Differential Tuition: \$387.

### **ACC 5013. Introduction to Accounting. (3-0) 3 Credit Hours.**

Accounting 5013 is an overview course for financial and managerial accounting. Students will learn basic financial transaction analysis, along with financial statement construction and analysis. An introduction to budgeting and performance evaluation, along with other managerial accounting topics, are covered. Restricted to students in the Master of Business program. Differential Tuition: \$387.

### **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. (Same as MBA 5233. Credit cannot be earned for both ACC 5023 and MBA 5233.) Differential Tuition: \$387.

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

Prerequisite: 15 hours of graduate accounting coursework completed. 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. Differential Tuition: \$387.

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

Prerequisite: Graduate standing. This course examines the principal 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.) Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

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

Prerequisite: ACC 3033 or an equivalent. A study of accounting principles and practices of state and local governments and not-for-profit organizations. Differential Tuition: \$387.

### **ACC 5833. Internal Auditing. (3-0) 3 Credit Hours.**

Prerequisite: ACC 4013 or an equivalent. The course will cover internal audit from a broad perspective that includes information technology, business processes, and accounting systems. Differential Tuition: \$387.

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

Prerequisite: ACC 3033 or an equivalent. A study of corporate consolidations and other specialized areas of financial accounting. Topics may vary depending upon current professional controversies. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

### **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.) Differential Tuition: \$387.

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

Prerequisite: ACC 3033 or ACC 3053 or an equivalent. The use and interpretation of the economic information in financial statements to assess historical performance of the firm, project future performance, and value the firm. The course provides students the opportunity to build on existing technical and analytical skills to include a user perspective. (Same as FIN 5943. Credit cannot be earned for both ACC 5943 and FIN 5943.) Differential Tuition: \$387.

### **ACC 5993. Data Analytics for Accountants. (3-0) 3 Credit Hours.**

Prerequisite: ACC 4013 or consent of instructor and graduate standing. This is an application-oriented course that provides students the opportunity to acquire knowledge of the data analytics model, an understanding of data analytic thinking and terminology, and hands-on experience with data analytics tools and techniques. Differential Tuition: \$387.

### **ACC 6003. Management Control Systems. (3-0) 3 Credit Hours.**

Prerequisite: ACC 3123 or an equivalent. Advanced study of the role of accounting in the application of management control systems. Topics include managerial decisions that derive from data-driven cost and management accounting-related topics. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

### **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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisite: ACC 3043 or an equivalent. The course will focus on current topics and developments in taxation planning and preparation. Coverage includes IRS enforcement tools and corresponding taxpayer rights, audits and appeals, civil and criminal penalties, and statutory relief provisions. The course will emphasize professional standards and ethical considerations in tax practice. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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. Differential Tuition \$387.

**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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**ACC 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. Differential Tuition: \$516.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**ACC 7314. Doctoral Dissertation. (0-0) 4 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. Differential Tuition: \$516.

**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. Differential Tuition: \$774.

**ACC 7983. Special Topics in Accounting. (3-0) 3 Credit Hours.**

Prerequisites: Consent of instructor and admission to the Ph.D. Program. A seminar offering the opportunity for specialized study not normally or not often available as part of the regular course offerings in the accounting doctoral program. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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. Differential Tuition: \$387.

# 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 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 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 graduating semester.

## 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
ECO 6033	Macroeconomic Theory
ECO 6103	Econometrics I
ECO 6113	Mathematical Economics

**B. 21 semester credit hours of elective graduate work, 9 of which may be non-economics courses, contingent upon approval by the Economics Graduate Advisor. 21**

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 non-economics 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:

ECO 6203	Industrial Organization and Public Policy Analysis
ECO 6303	Econometrics II
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 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.

Code	Title	Credit Hours
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**A. 12 semester credit hours of required core courses: 12**

ECO 6013	Microeconomic Theory
ECO 6033	Macroeconomic Theory
ECO 6103	Econometrics I
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. 6**

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	Industrial Organization and Public Policy Analysis
ECO 6303	Econometrics II
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 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.



Code	Title	Credit Hours
<b>A. 12 semester credit hours of required core courses:</b>		<b>12</b>
ECO 6013	Microeconomic Theory	
ECO 6033	Macroeconomic Theory	
ECO 6103	Econometrics I	
ECO 6113	Mathematical Economics	
<b>B. 15 semester credit hours of required courses:</b>		<b>15</b>
ECO 6303	Econometrics II	
ECO 6583	Special Topics in Econometrics/Forecasting	
MKT 5063	Marketing Research Design and Application	
STA 6033	SAS Programming and Data Management	
STA 6923	Introduction to Statistical Learning	
<b>C. 6 semester credit hours of electives from the list below or as approved by the Graduate Advisor.</b>		<b>6</b>
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	Industrial Organization and Public Policy Analysis	
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 6973	Special Topics	
<b>D. Comprehensive Examination</b>		
Students must pass a comprehensive examination administered by the Graduate Program Committee in Economics.		
<b>Total Credit Hours</b>		<b>33</b>

## 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. Differential Tuition: \$387.

### 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. (Same as MBA 5513. Credit cannot be earned for both ECO 5023 and MBA 5513.) Differential Tuition: \$387.

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

Prerequisite: 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. Differential Tuition: \$387.

### ECO 6033. Macroeconomic Theory. (3-0) 3 Credit Hours.

Prerequisite: 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.) Differential Tuition: \$387.

### ECO 6103. Econometrics I. (3-0) 3 Credit Hours.

Prerequisites: ECO 6113, 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. Differential Tuition: \$387.

### 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. Differential Tuition: \$387.

### ECO 6203. Industrial Organization and Public Policy Analysis. (3-0) 3 Credit Hours.

Prerequisite: Consent of instructor. Utilization of price theory and market structure to empirically examine the conduct and performance of American business organizations, including the role of antitrust legislation. Particular emphasis is placed on the use of case studies of actual firms, markets and industries. (Formerly titled "Government and Business.") Differential Tuition: \$387.

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

Prerequisite: 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.) Differential Tuition: \$387.

### ECO 6303. Econometrics II. (3-0) 3 Credit Hours.

Prerequisites: ECO 6103, 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.) Differential Tuition: \$387.

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

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.) Differential Tuition: \$387.

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

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. Differential Tuition: \$387.

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

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.) Differential Tuition: \$387.

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

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.) Differential Tuition: \$387.

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

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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$129.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

## 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.

- M.S. in Finance – General Option (p. 34)
- M.S. in Finance – Real Estate Finance and Development Concentration (p. 34)
- Ph.D. in Finance (p. 35)

## 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) or Graduate Record Examinations (GRE) 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 GMAT or GRE scores
- A personal statement
- A current résumé with employment or other experience (optional)
- Letters of reference (optional)
- Interview (optional)

Students with nonfinance undergraduate degrees or other deficiencies may be required to take additional undergraduate and graduate remedial courses, 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.

Code	Title	Credit Hours
<b>A. 6 semester credit hours of foundations of knowledge courses:</b>		<b>6</b>
MBA 5113	Business Foundations	
MBA 5133	Financial Accounting Concepts	
<b>B. 9 semester credit hours of required courses:</b>		<b>9</b>
FIN 5023	Financial Management	
FIN 5633	Investment Theory and Problems	
FIN 6313	Modeling of Financial Decision Making	
<b>C. 18 semester credit hours of electives, at least 15 of which must be from the set of courses shown below.</b>		<b>18</b>
No more than 6 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	Advanced Topics 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	Derivatives Markets and Instruments	
FIN 6223	Corporate Risk Management	
FIN 6323	Financial Data Analytics	
FIN 6943	Finance Internship	
FIN 6953	Independent Study	
<b>D. Comprehensive Examination</b>		
All candidates must pass a comprehensive examination administered by the Graduate Program Committee in Finance.		
<b>Total Credit Hours</b>		<b>33</b>

### 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 and development. 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.

Code	Title	Credit Hours
<b>A. 6 semester credit hours of foundations of knowledge courses:</b>		<b>6</b>
MBA 5113	Business Foundations	
MBA 5133	Financial Accounting Concepts	
<b>B. 21 semester credit hours of required courses:</b>		<b>21</b>
FIN 5023	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 5633	Investment Theory and Problems	
FIN 6313	Modeling of Financial Decision Making	
<b>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:</b>		<b>6</b>
FIN 5033	Advanced Topics 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	Derivatives Markets and Instruments	
FIN 6223	Corporate Risk Management	
FIN 6323	Financial Data Analytics	
FIN 6943	Finance Internship	
FIN 6953	Independent Study	
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.)	
<b>D. Comprehensive Examination</b>		
All candidates must pass a comprehensive examination administered by the Graduate Program Committee in Finance.		
<b>Total Credit Hours</b>		<b>33</b>

## Doctor of Philosophy Degree in Finance

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Finance. The Ph.D. in Finance 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

## Admission Requirements

Applicants must have a bachelor's degree from an accredited university. The Ph.D. Program 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 60 (paper version) or 79 (internet version) 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 Ph.D. Program 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 may include an appointment to a teaching assistantship, research assistantship, or research fellowship. The Ph.D. Program Committee, comprised of members selected from the graduate faculty, is responsible for advising students.

## Degree Requirements for Students that have Obtained a Bachelor's Degree

The degree requires a minimum of 84 semester credit hours beyond the bachelor's degree.

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

Code	Title	Credit Hours
<b>A. M.B.A. Core Courses</b>		<b>9</b>
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:		
MBA 5213	Management and Behavior in Organizations	
MBA 5233	Accounting Analysis for Decision Making	
MBA 5313	Marketing Management	

MBA 5333	Financial Management	
MBA 5413	Management Science with Data Analytics	
MBA 5513	Managerial Economics	
MBA 5613	Strategic Management and Policy	
The Ph.D. Program Committee may consider the approval of transferring some or all of the credit hours of this requirement based on prior graduate coursework.		
<b>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).</b>		<b>9</b>
The Ph.D. Program Committee may consider the approval of transferring up to 9 credit hours of this requirement based on prior graduate coursework.		
<b>C. Required Course</b>		<b>3</b>
GBA 7103	Doctoral Teaching Seminar	
<b>D. Statistics and Research Methodology</b>		<b>18</b>
18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Ph.D. Program Committee. Courses include but are not limited to:		
ECO 6013	Microeconomic Theory	
ECO 6103	Econometrics I	
ECO 6113	Mathematical Economics	
GBA 7013	Research Methods I	
GBA 7023	Research Methods II	
MS 7033	Applications in Causal Structural Modeling	
STA 6923	Introduction to Statistical Learning	
STA 7023	Applied Linear Statistical Models	
STA 7033	Multivariate Statistical Analysis	
<b>E. Major Area Coursework</b>		<b>21</b>
1. PhD Level Courses (12 semester credit hours)		
FIN 7023	Corporate Finance	
FIN 7033	Valuation	
FIN 7043	Empirical Finance	
FIN 7113	International Financial Markets	
2. Directed Electives (9 semester credit hours)		
FIN 7053	Topics in Financial Research	
6 semester credit hours of graduate-level FIN courses as approved by the Ph.D. Program Committee.		
<b>F. Free elective</b>		<b>3</b>
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.		
<b>G. Doctoral Research</b>		<b>9</b>
<b>H. Doctoral Dissertation</b>		<b>12</b>
The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.		
<b>Total Credit Hours</b>		<b>84</b>

## Degree Requirements for Students that have Obtained a Master's Degree

The degree requires a minimum of 66 semester credit hours beyond the master's degree.

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

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
GBA 7103	Doctoral Teaching Seminar	
<b>B. Statistics and Research Methodology</b>		<b>18</b>
18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Ph.D. Program Committee. Courses include but are not limited to:		
ECO 6013	Microeconomic Theory	
ECO 6103	Econometrics I	
ECO 6113	Mathematical Economics	
GBA 7013	Research Methods I	
GBA 7023	Research Methods II	
MS 7033	Applications in Causal Structural Modeling	
STA 6923	Introduction to Statistical Learning	
STA 7023	Applied Linear Statistical Models	
STA 7033	Multivariate Statistical Analysis	
<b>C. Major Area Coursework</b>		<b>21</b>
1. PhD Level Courses (12 semester credit hours)		
FIN 7023	Corporate Finance	
FIN 7033	Valuation	
FIN 7043	Empirical Finance	
FIN 7113	International Financial Markets	
2. Directed Electives (9 semester credit hours)		
FIN 7053	Topics in Financial Research	
6 semester credit hours of graduate-level FIN courses as approved by the Ph.D. Program Committee.		
<b>D. Free elective</b>		<b>3</b>
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.		
<b>E. Doctoral Research</b>		<b>9</b>
This requirement is met by doctoral research coursework.		
<b>F. Doctoral Dissertation</b>		<b>12</b>
The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.		
<b>Total Credit Hours</b>		<b>66</b>

## 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 Ph.D. Program Committee. No more than two attempts to pass qualifying examinations are allowed. Results of the written and oral examinations must be reported to the Ph.D. Program 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 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 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:

Code	Title	Credit Hours
Required Courses (12 semester credit hours):		12
FIN 5403	Real Estate Principles <sup>1</sup>	
FIN 5423	Real Estate Finance and Investment	
FIN 5443	Real Estate Construction	
FIN 5453	Real Estate Development	
<b>Total Credit Hours</b>		<b>12</b>

Refer to the course descriptions for course prerequisites.

<sup>1</sup> If you are enrolled in the Graduate Certificate in Real Estate Finance and Development, the prerequisite for FIN 5403 is as follows: 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. With the exception of graduate students in Architecture, Urban Planning or Public Administration, all other applicants must have a minimum of one year of continuous work experience in the field of real estate or related discipline as approved in writing by the program advisor. 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 5023. Financial Management. (3-0) 3 Credit Hours.

Prerequisites: MBA 5113 and MBA 5133, or their equivalents. 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. (Same as MBA 5333. Credit cannot be earned for both FIN 5023 and MBA 5333.) Differential Tuition: \$387.

### FIN 5033. Advanced Topics in Financial Management. (3-0) 3 Credit Hours.

Prerequisite: FIN 5023 or an equivalent. Focus on applications of financial management principles to business situations. Primary areas of focus include planning, current asset management, capital budgeting, mergers and acquisitions, risk management, corporate financial policies, and financing alternatives. (Formerly titled "Cases in Financial Management.") Differential Tuition: \$387.

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

Prerequisite: FIN 5023 or written consent of instructor. 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 5023 with score of "B" or higher or consent of program advisor. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisites: FIN 5423 and FIN 5443. 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisite: FIN 5023 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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.") Differential Tuition: \$387.

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

Prerequisite: FIN 5633 or an equivalent; and ACC 3033 or ACC 3053 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.) Differential Tuition: \$387.

**FIN 6213. Derivatives Markets and Instruments. (3-0) 3 Credit Hours.**

Prerequisite: FIN 5023 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. (Formerly titled "Speculative Markets and Securities.") Differential Tuition: \$387.

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

Prerequisite: FIN 5023 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**FIN 6323. Financial Data Analytics. (3-0) 3 Credit Hours.**

Prerequisites: FIN 5023 and FIN 5633. This course explores how data analytics can be used to understand and solve some of the important financial decisions encountered by businesses. Large-scale financial and administrative data sets, and proprietary private sector data can greatly improve the way we measure, track, and describe financial activity. They can also enable novel ways to make financial decisions. The course gives students an introduction to financial applications using data analytics. Topics include: gauging investor sentiment, profit forecasting, corporate finance decision making, project management, default prediction, and personal finance. In the context of these topics, the course provides an introduction to basic statistical methods and data analysis techniques. The course has two principal learning objectives: 1) to introduce students to financial decision making, and how to understand and analyze quantitative data, and 2) to show students how practitioners use "big data" to tackle financial problems. The course also outlines some of the challenges in accessing and making use of these data. It is recommended that this course be taken towards the end of the degree program. Differential Tuition: \$387.

**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. Differential Tuition: \$258.

**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. Differential Tuition: \$387.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.



**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**FIN 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. Differential Tuition: \$516.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**FIN 7314. Doctoral Dissertation. (0-0) 4 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. Differential Tuition: \$516.

**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. Differential Tuition: \$774.

# 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.

- M.S. in Information Technology (p. 40)
- M.S. in Information Technology – Cyber Security Concentration (p. 41)
- M.S. in Management of Technology (p. 42)
- Ph.D. in Information Technology (p. 42)

## 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) or Graduate Record Examination (GRE) 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:

Code	Title	Credit Hours
<b>A. 9 semester credit hours of required courses:</b>		<b>9</b>
IS 5143	Information Technology	
IS 5203	Telecommunication Systems	
IS 6813	Strategic Management of Information Technology	1

**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
IS 6083	Agile Project 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	Digital 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 6933	Internship in Information Technology
2. 6 semester credit hours selected from the following:	6
MBA 5213	Management and Behavior in Organizations
MGT 5093	Leadership
MOT 5053	Technology Commercialization
MOT 5163	Management of Technology
MOT 5223	Management of Professional Personnel
MOT 5243	Essentials of Project and Program Management
MOT 5253	Starting the High-Tech Firm
MOT 5313	Emerging Technologies

**Total Credit Hours** **33**

<sup>1</sup> Students who earn a grade of "B" (3.0) or better in IS 6813 Strategic Management of Information Technology 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.

## 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) or Graduate Record Examination (GRE) 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:

Code	Title	Credit Hours
<b>A. 15 semester credit hours of required courses:</b>		<b>15</b>
IS 5143	Information Technology	
IS 5203	Telecommunication Systems	
IS 6303	Introduction to Voice and Data Security	
IS 6323	Security Risk Analysis	
IS 6813	Strategic Management of Information Technology <sup>1</sup>	

**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	Digital 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
IS 6943	Internship in Cyber Security
IS 6953	Independent Study
IS 6973	Special Problems
NS 6233	Analytic Methods, Interpretation, Writing and Briefing of Intelligence
NS 6503	Intelligence Reasoning Analysis
2. 6 semester credit hours selected from the following:	6
MBA 5213	Management and Behavior in Organizations
MGT 5093	Leadership
MOT 5053	Technology Commercialization
MOT 5163	Management of Technology
MOT 5223	Management of Professional Personnel
MOT 5243	Essentials of Project and Program Management

MOT 5253	Starting the High-Tech Firm
MOT 5313	Emerging Technologies

**Total Credit Hours** **33**

<sup>1</sup> Students who earn a grade of “B” (3.0) or better in IS 6813 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.

## 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.

Code	Title	Credit Hours
<b>A. All candidates are required to successfully complete the following 21 semester credit hours:</b>		
MOT 5053	Technology Commercialization	
MOT 5163	Management of Technology	
MOT 5223	Management of Professional Personnel	
MOT 5243	Essentials of Project and Program Management	
MOT 5313	Emerging Technologies	
MOT 5343	Financial Aspects of Management of Technology	
MOT 6203	Strategic Management of Technology <sup>1</sup>	
<b>B. All candidates must complete 12 semester credit hours of electives as approved by the M.S. MOT Graduate Advisor of Record</b>		<b>12</b>
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> Students who earn a grade of “B” (3.0) or better in MOT 6203 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

## Doctor of Philosophy Degree in Information Technology

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Information Technology. The Ph.D. in Information Technology 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 (e.g. Information Systems, Cyber Security and Analytics/AI).

The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

### Admission Requirements

Applicants must have a bachelor’s degree from an accredited university. The Ph.D. Program 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 60 (paper version) or 79 (internet version) 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 related discipline (e.g. Information Systems, Computer Science, Cyber Security and Analytics/AI), with sufficient quantitative rigor are required to complete a program consisting of a minimum of 84 semester credit hours. The Ph.D. Program 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 may include an appointment to a teaching assistantship, research assistantship, or research fellowship. The Ph.D. Program Committee, comprised of members selected from the graduate faculty, is responsible for advising students.

## Optional Concentrations

- Cyber Security Concentration
- Artificial Intelligence and Machine Learning Concentration

Students may graduate without a concentration, in which case their course of study is considered traditional information systems. Where students wish to focus the Ph.D. in IT on **Cyber Security** or **Artificial Intelligence and Machine Learning**, they should elect a concentration.

## Degree Requirements for Students that have Obtained a Bachelor's Degree

The degree requires a minimum of 84 semester credit hours beyond the bachelor's degree.

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

Code	Title	Credit Hours
<b>A. Master's Degree Core Courses</b> 9		
This requirement may be met by a master's degree in a related discipline, (e.g. Business Administration, Information Systems, Computer Science, Cyber Security and Analytics/AI). 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 those offered in Information Systems and Cyber Security or other departments, with the approval of the Ph.D Program Committee:		
The Ph.D. Program Committee may consider the approval of transferring some or all of the credit hours of this requirement based on prior graduate coursework.		
<b>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).</b> 9		
The Ph.D. Program Committee may consider the approval of transferring up to 9 credit hours of this requirement based on prior graduate coursework.		
<b>C. Required Course</b> 3		
GBA 7103	Doctoral Teaching Seminar	
<b>D. Statistics and Research Methodology</b> 12		
12 semester credit hours of 6000- or 7000-level courses in Statistics, Analytics/AI, Research Methods, Management Science, or related courses as approved by the Ph.D. Program Committee.		
<b>E. Major Area Coursework</b> 27		
1. Ph.D. Level Courses: A total of 12 credit hours of Ph.D. level courses on different topics, as required and approved by the Ph.D. Program Committee, but not limited to the following:		
Cyber Security concentration and non-concentration students are required to take IS 7013 and IS 7023. IS 7013 should be taken in the first semester.		
IS 7013	Foundations of Information Systems Research	
IS 7023	Behavioral and Organizational Information Systems and Cyber Security Research	
IS 7033	Topics in Information Systems and Information Technology Research	
IS 7043	Seminar in Software Development	

IS 7053	Topics in AI/ML Research
IS 7063	Topics in Cybersecurity Research
Artificial Intelligence and Machine Learning concentration students must take either IS 7013 or IS 7023. Students should take this course in their second year.	
IS 7013 or IS 7023	Foundations of Information Systems Research Behavioral and Organizational Information Systems and Cyber Security Research
IS 7033	Topics in Information Systems and Information Technology Research
IS 7043	Seminar in Software Development
IS 7053	Topics in AI/ML Research
IS 7063	Topics in Cybersecurity Research

2. Directed Electives (15 semester credit hours) Must be approved in the student's Program of Study before taking them.

<b>F. Free elective</b>	3
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.	
<b>G. Doctoral Research (9 semester credit hours)</b>	9
This requirement is met by doctoral research coursework.	
<b>H. Doctoral Dissertation (minimum of 12 semester credit hours)</b>	12
Programs of study must be approved annually by the COB Ph.D. coordinator or delegate, Information Systems & Cyber Security Ph.D. program coordinator, and the student's subject matter advisor (concentration coordinator if the student has not identified a dissertation chair; else, the dissertation chair).	
<b>Total Credit Hours</b>	<b>84</b>

## Degree Requirements for Students that have Obtained a Master's Degree

The degree requires a minimum of 66 semester credit hours beyond the master's degree.

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

Code	Title	Credit Hours
<b>A. Required Course</b> 3		
GBA 7103	Doctoral Teaching Seminar	
<b>B. Statistics and Research Methodology</b> 12		
12 semester credit hours of 6000- or 7000-level courses in Statistics, Analytics/AI, Research Methods, Management Science, or related courses as approved by the Ph.D. Program Committee.		
<b>C. Major Area Coursework</b> 27		
1. Ph.D. Level Courses: A total of 12 credit hours of Ph.D. level courses on different topics, as required and approved by the Ph.D. Program Committee, but not limited to the following:		
Cyber Security concentration and non-concentration students are required to take IS 7013 and IS 7023. IS 7013 should be taken in the first semester.		
IS 7013	Foundations of Information Systems Research	
IS 7023	Behavioral and Organizational Information Systems and Cyber Security Research	

IS 7033	Topics in Information Systems and Information Technology Research (e.g. Blockchain in Cyber Security)
IS 7033	Topics in Information Systems and Information Technology Research (Machine Learning)
IS 7043	Seminar in Software Development
IS 7053	Topics in AI/ML Research
IS 7063	Topics in Cybersecurity Research

Artificial Intelligence and Machine Learning concentration students must take either IS 7013 or IS 7023. Students should take this course in their second year.

IS 7013 or IS 7023	Foundations of Information Systems Research Behavioral and Organizational Information Systems and Cyber Security Research
IS 7033	Topics in Information Systems and Information Technology Research
IS 7043	Seminar in Software Development
IS 7053	Topics in AI/ML Research
IS 7063	Topics in Cybersecurity Research

2. Directed Electives (15 semester credit hours) must be approved in the student's Program of Study before taking them.

**D. Free elective** **3**

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

**E. Doctoral Research (9 semester credit hours)** **9**

This requirement is met by doctoral research coursework.

**F. Doctoral Dissertation (minimum of 12 semester credit hours)** **12**

Programs of study must be approved annually by the COB Ph.D. coordinator or delegate, Information Systems & Cyber Security Ph.D. program coordinator, and the student's subject matter advisor (concentration coordinator if the student has not identified a dissertation chair; else, the dissertation chair).

**Total Credit Hours** **66**

### 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 Ph.D. Program Committee. No more than two attempts to pass qualifying examinations are allowed. Results of the written and oral examinations must be reported to the Ph.D. Program 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 Cyber Security (p. 44)
- Graduate Certificate in Cloud Computing (p. 44)
- Graduate Certificate in Project Management (p. 45)
- Graduate Certificate in Technology Entrepreneurship and Management (p. 45)

## Graduate Certificate in Cyber Security

The graduate certificate in Cyber Security is a 12-semester-credit-hour program designed for students *not* studying cyber security as their major field of study. It is designed to give non-cyber professionals the knowledge and technical skills needed to deal with cyber security issues that impact a wide variety of fields. This certificate is designed to give a common framework of understanding cyber security, as well as allow for specialization in specific areas, such as law, policy, analysis, response, etc.

The certificate is administered by the College of Business. The courses are offered by the Department of Information Systems and Cyber Security. The certificate program is open to any major field of study except the UTSA M.S.I.T. in Cyber Security and UTSA B.B.A. in Cyber Security graduates. The certificate program is also open to non-degree seeking students. The certificate is valuable to current UTSA students, alumni, and business professionals.

### Certificate Requirements

To satisfy the requirements for the Graduate Certificate in Cyber Security, students must complete 12 semester credit hours as follows:

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
IS 6113	Telecommunications Essentials	
<b>B. Electives</b>		<b>9</b>
Select three courses from the following list:		
IS 6213	Information Assurance and Security Essentials	
IS 6223	Intrusion Detection and Incident Response Essentials	
IS 6463	Web Application Security Essentials	
IS 6473	Information Assurance Policy Essentials	
IS 6483	Digital Forensic Analysis Essentials	
IS 6513	Industrial Control System Security Essentials	
IS 6763	Cyber Law Essentials	
<b>Total Credit Hours</b>		<b>12</b>

## Graduate Certificate in Cloud Computing

The graduate certificate in Cloud Computing is a 12-semester-credit-hour program designed to equip technical professionals with the knowledge and technical skills necessary for a career in an organization that leverages cloud computing. The wide-range of use of cloud computing in today's business, government and academic environments requires a broad range of competencies and understanding of how cloud computing influences a particular area. This certificate is designed to give a

common framework of understanding cloud computing, as well as allow for specialization in specific areas, such as, cyber-security, cloud-infrastructure, and applications in cloud.

The certificate is administered by the College of Engineering in conjunction with the College of Business and the College of Sciences. The course requirements for each program focus may be found under the College of Engineering (<http://catalog.utsa.edu/graduate/engineering/#certificatestext>), the Department of Computer Science (p. 313), and the Department of Information Systems and Cyber Security.

## Certificate Requirements

To satisfy the requirements for the Graduate Certificate in Cloud Computing, students must complete 12 semester credit hours as follows:

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
Select one entry course:		
IS 6973	Special Problems (Topic: Cloud Computing for Business)	
Or a cross-listed course in CS and EE. The entry course is taught through team teaching in which instructor from each college contributes to the subjects outlined in the course syllabus.		
<b>B. Track Electives</b>		<b>6</b>
Select two courses from one of the following tracks:		
<b>Applications Track</b>		
CS 5233	Artificial Intelligence	
CS 5493	Large-Scale Data Management	
CS 5573	Cloud Computing	
CS 6243	Machine Learning	
EE 5243	Special Topics in Control (Topic: Data Analytics with Cloud Computing)	
EE 5243	Special Topics in Control (Topic: Programming Techniques for the Cloud)	
IS 6703	Introduction to Data Mining	
<b>Security Track</b>		
IS 5513	Fundamentals of Information Assurance	
IS 6363	Digital Forensics	
<b>Infrastructure Track</b>		
CS 5103	Software Engineering	
CS 5123	Software Testing and Quality Assurance	
CS 6543	Networks	
CS 6553	Performance Evaluation	
<b>C. Capstone Project</b>		<b>3</b>
IS 6953	Independent Study (topic should be in the field of Cloud Computing)	
<b>Total Credit Hours</b>		<b>12</b>

## Graduate Certificate in Project Management

The Graduate Certificate in Project Management is a 12-semester-credit-hour program designed to help individuals prepare to manage the myriad projects underpinning today's burgeoning economy. This certificate focuses on the tools and techniques that define core processes in project management. It also offers an opportunity for individuals to gain

both fundamental and advanced knowledge about theory and practice, with a special focus on technology-intensive areas such as software engineering. This certificate offers a pathway for those interested in the opportunity to practice the skills needed to prepare for the following certification exams: Project Management Professional (PMP); Certified Associate in Project Management (CAPM); and PMI-Agile Certified Practitioner (PMI-ACP).

## Program Admission Requirements

Students who are currently enrolled in a graduate degree program at UTSA are eligible for admission to this certificate program. Current graduate students should contact a Graduate Advisor in The College of Business, Office of Graduate Studies to obtain the required form to pursue the Graduate Certificate in Project Management.

Applicants not currently enrolled in a graduate degree program at UTSA are required to apply for admission to UTSA as a special (non-degree-seeking) graduate student; individuals must declare their intent to seek admission into a certificate program. Applicants who meet general UTSA admission requirements are eligible for admission to this certificate program.

Students who wish to earn the Graduate Certificate in Project Management must complete 12 semester credit hours as follows:

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
MOT 5243	Essentials of Project and Program Management	
<b>B. Electives</b>		<b>9</b>
Select three courses from the following:		
IS 6083	Agile Project Management	
MOT 5163	Management of Technology	
MOT 5223	Management of Professional Personnel	
MOT 5233	Advanced Topics in Project Management	
MOT 5263	Project Management Certification	
MOT 5313	Emerging Technologies	
<b>Total Credit Hours</b>		<b>12</b>

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

## 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:

Required Courses (12 semester credit hours):		12
MOT 5053	Technology Commercialization	
MOT 5243	Essentials of Project and Program Management	
MOT 5253	Starting the High-Tech Firm	
MOT 5343	Financial Aspects of Management of Technology	
<b>Total Credit Hours</b>		<b>12</b>

## 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. Differential Tuition: \$387.

### 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. Differential Tuition: \$387. Course Fee: ISCS \$75.

### 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. Differential Tuition: \$387. Course Fee: ISCS \$75.

### 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.) Differential Tuition: \$387.

### IS 6083. Agile Project Management. (3-0) 3 Credit Hours.

This introductory course presents concepts and techniques for leading agile teams in many types of projects including software development, engineering, construction, product development, as well as science and technology focused efforts. The course will give students the opportunity to develop an agile mindset and a range of adaptive skills including agile methods, practices, and values that are associated with achieving higher levels of performance and customer satisfaction. The course will also prepare students to sit for the Project Management Institute's PMI-ACP certification exam. (Credit cannot be earned for both IS 4083 and IS 6083.) Differential Tuition: \$387.

### 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.") Differential Tuition: \$387.

### IS 6113. Telecommunications Essentials. (3-0) 3 Credit Hours.

Includes an in-depth look at basic telecommunications terminology and concepts. Introduction to voice and data networks, signaling and multiplexing. Network topologies and protocol fundamentals and architectures are presented and compared. Ethernet, IEEE 802.11x, TCP/IP, dedicated circuit, and VPN technologies are introduced. Network security fundamentals are explored. Differential Tuition: \$387.

### IS 6213. Information Assurance and Security Essentials. (3-0) 3 Credit Hours.

Prerequisite: IS 6113. This course will provide the student the opportunity to learn about the basic elements that comprise Information Assurance Security. An in-depth presentation of information assurance topics such as fraud, eavesdropping, traffic analysis, intrusion detection and prevention, hacking, viruses, cryptography, risk management, and secure architectures will be discussed. Differential Tuition: \$387.

### IS 6223. Intrusion Detection and Incident Response Essentials. (3-0) 3 Credit Hours.

Prerequisite: IS 6213. This course will provide the student with the opportunity to learn about the elements that comprise intrusion detection and incident response. It provides an in-depth look at intrusion detection methodologies, tools, and approaches to handling intrusions when they occur. It examines the laws that address cyber crime and intellectual property issues and 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. Differential Tuition: \$387.

### 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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**IS 6363. Digital 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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**IS 6463. Web Application Security Essentials. (3-0) 3 Credit Hours.**

Prerequisite: IS 6213. The security issues related to web applications will be discussed in this course. Topics include web application authentication, authorization, as well as browser and web database security principles. Various web application security attack types such as code injection, cross-site scripting, and cross-site request forgery will be studied. The course will also include discussions about business aspects that contribute to a secure web-based transaction environment. Research into appropriate topics will be incorporated into the course. Differential Tuition: \$387. Course Fee: ISCS \$75.

**IS 6473. Information Assurance Policy Essentials. (3-0) 3 Credit Hours.**

Prerequisite: IS 6113. There are many policy issues within the firm and at various levels of government that affect information assurance. This course will examine how these policies affect electronic security. Subjects will include privacy of information, intellectual property protection, globalization of information systems, and other policy matters. The protection and control of secured information will also be discussed. Research into appropriate topics will be incorporated into the course. Differential Tuition: \$387.

**IS 6483. Digital Forensic Analysis Essentials. (3-0) 3 Credit Hours.**

An introductory course in collecting, examining, and preserving evidence of computer crimes. This course examines the issues, tools, and control techniques needed to successfully investigate illegal activities facilitated through the use of information technology. The tools of collecting, examining, and evaluating data in an effort to establish intent, culpability, motive, means, methods, and loss resulting from e-crimes will be examined. Research into appropriate topics will be incorporated into the course. Differential Tuition: \$387. Course Fee: ISCS \$75.

**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. Differential Tuition: \$387.



**IS 6513. Industrial Control System Security Essentials. (3-0) 3 Credit Hours.**

Prerequisite: IS 6213. Many of the critical infrastructure systems contain a system control and data acquisition (SCADA) component. Frequently, the control systems are remotely accessed and therefore becomes the focal point for attack. This course examines the control system components from the standpoint of vulnerability and protection. Research into appropriate topics will be incorporated into the course. Differential Tuition: \$387. Course Fee: ISCS \$75.

**IS 6533. Federal Research Projects. (3-0) 3 Credit Hours.**

Prerequisite: Consent of the Instructor. This course is a research based course that makes real-world research problems that exist in the government domain available for students to work on. The research problems cover a wide variety of issues. The solutions may be a literature review, developing code, proposing an answer, or testing a solution. Weekly coordination with a Technical Director from a Federal Lab is part of the process. Differential Tuition: \$387.

**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.") Differential Tuition: \$387.

**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. Students will learn how to wrangle and preprocess structured and unstructured data, to include multidimensional data, textual data that requires natural language processing (NLP) and web-based data. Students will also learn web scraping, web crawling, and how to collect data via web-based application programming interfaces (APIs). Students will learn all of these topics using common Python data analytics and data science packages. 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. Differential Tuition: \$387. Course Fee: ISCS \$75.

**IS 6733. Deep Learning on Cloud Platforms. (3-0) 3 Credit Hours.**

This course presents students with basic understanding of modern neural networks and their applications in computer vision and natural language processing (NLP). The course starts with a recap of linear models and discussion of stochastic optimization methods that are crucial for training deep neural networks. Students will examine all of the popular neural network building blocks including fully connected layers, convolution, and recurrent layers. In this course, students will gain a thorough introduction to cutting-edge topics such as attention and transformer in Deep Learning for NLP using public cloud platforms. Students will also gain practical hands-on experience in the optimization, deployment, and scaling ML models of various types. The prerequisites for this course are: 1) Basic knowledge of Python. 2) Basic linear algebra and probability. Differential Tuition: \$387. Course Fee: ISCS \$75.

**IS 6763. Cyber Law Essentials. (3-0) 3 Credit Hours.**

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. Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**IS 6933. Internship in Information Technology. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing, 15 semester credit hours of graduate work (including IS 5143), and consent of instructor. Supervised full- or part-time off-campus work experience and training in the areas of information technology. May not be done at student's current or past employer unless in a new role/function. May not be repeated for credit. (Credit cannot be earned for both IS 6933 and IS 6943.) Differential Tuition: \$387.

**IS 6943. Internship in Cyber Security. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing, 15 semester credit hours of graduate work (including IS 6303), and consent of instructor. Supervised full- or part-time off-campus work experience and training in the areas of cyber security. May not be done at student's current or past employer unless in a new role/function. May not be repeated for credit. (Credit cannot be earned for both IS 6943 and IS 6933.) Differential Tuition: \$387.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

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

Prerequisites: Permission from 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**IS 7023. Behavioral and Organizational Information Systems and Cyber Security 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. Differential Tuition: \$387.

**IS 7033. Topics in Information Systems and Information Technology. (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 information communication technology systems, management of information systems, systems analysis and design, and data management. May be repeated for credit when topics vary. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**IS 7053. Topics in AI/ML Research. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This research seminar focuses on the challenges in the design of safe and robust AI-based systems. It explores some of the major problems in this area from the viewpoint of industry and academia, as well as issues such as safety, fairness, robustness, adversarial examples, explainable AI, and real-world implications of AI. May be repeated for credit when topics vary. Tuition Differential: \$387.

**IS 7063. Topics in Cybersecurity Research. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This research seminar focuses on cybersecurity, as well as infrastructure assurance / critical technology from a security perspective. Topics may include blockchain, economics of security, cloud and big data security, threat hunting and detection, and cybersecurity metrics and analytics. May be repeated for credit when topics vary. Tuition Differential: \$387.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$258.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$516.

**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. Differential Tuition: \$645.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$258.

**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. Differential Tuition: \$387.

**IS 7314. Doctoral Dissertation. (0-0) 4 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. Differential Tuition: \$516.

**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. Differential Tuition: \$645.

**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. Differential Tuition: \$774.

## **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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MOT 5263. Project Management Certification. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This course is designed to give students the opportunity to prepare for the Project Management Professional (PMP) and Certified Associate in Project Management (CAPM) certification exams. The course is structured around the Project Management Institute Knowledge Areas including: integration, scope, time, cost, quality, risk, procurement, human resources, communication, and stakeholders. The course focuses on the inputs, tools, techniques and outputs associated with the core project management processes. Students will also complete diagnostics exam instruments and practice exams. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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 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. Differential Tuition: \$387.

**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). Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisite: Approval of the 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). Differential Tuition: \$129.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**National Security (NS) Courses****NS 6003. The Role of U.S. Intelligence in National Security. (3-0) 3 Credit Hours.**

This course provides a broad overview of the role of intelligence work - and in particular U.S. intelligence efforts - in maintaining and enhancing the country's national security posture. The history of the intelligence community from the Second World War onward is examined in terms of how that community has evolved over the years. Emphasis is placed upon the interplay and challenges that the intelligence community face with policy makers. Included is an examination of case studies that illustrate intelligence successes and failures that have had a significant impact on national security. Also covered is the evolving unique nature that the cyber domain plays in cyber/national security issues. Differential Tuition: \$387.

**NS 6223. Analytical Writing, Reporting and Briefing for the Intelligence Community. (3-0) 3 Credit Hours.**

Prerequisite: NS 6003. Fundamentals of writing and reporting for intelligence community audiences. Illustrated concepts and principles include bottom line up front, topic sentences, presentation of key judgments, the descriptive use of confidence intervals, estimative language, presentation of alternative outcomes, scenario description, appropriate reading level for reports, key challenges in one time briefings, speaking truth to power, the benefits of brevity and clarity, the issue of source disclosure, the value of context, characteristics of assessments, and avoiding policy statements. Differential Tuition: \$387.

**NS 6233. Analytic Methods, Interpretation, Writing and Briefing of Intelligence. (3-0) 3 Credit Hours.**

Prerequisite: IS 6733. The nature of data generated in the cyber domain is often quite technical and complex. The plethora of data generating devices, protocols, data architectures, and the emergence of new data contributing elements from the IoT world make analyzing data from the cyber domain a significant challenge. This course will examine the nature of the data coming from these multiple sources and origins and give the student experience in applying both cyber-specific and non-cyber specific analytics tools to example data sets. The challenges in linking cyber domain data to human actions and activities will be covered. Differential Tuition: \$387.

**NS 6503. Intelligence Reasoning Analysis. (3-0) 3 Credit Hours.**

Analysis and analytical reasoning in the intelligence field requires adherence to analytical standards and principles that promote integrity as well as logic. The course includes, but is not limited to, topics such as critical thinking, structured analytical techniques, the application of alternative competing hypotheses, key assumption check, perceptual, cognitive and cultural biases, methods for describing the assessed validity of information or conclusions, A/B team approaches, high impact low probability events, alternative futures analysis and other components of the process, and psychology of intelligence analysis. Differential Tuition: \$387.

**NS 6523. Methods in Intelligence Collection. (3-0) 3 Credit Hours.**

Prerequisite: NS 6003. This course covers the fundamentals of the primary methods for intelligence collection: human intelligence (HUMINT), geospatial intelligence (GEOINT), open source intelligence (OSINT), signals intelligence (SIGINT), and measurement and signal intelligence (MASINT). Topics explored include methods used, nature of the data collected, sources of error within the data collected for each method, limitations of the data, and challenges encountered when integrating and fusing data from multiple sources and methods. Use of unclassified case studies will provide additional examples of some of the concepts and principles covered. Differential Tuition: \$387.

**NS 6723. National Security and Human-Digital Technology Relationships. (3-0) 3 Credit Hours.**

One of the recent key emerging areas of research is the role of psychological, social, and cultural processes in cyber conflict. Following the kill chain upstream you will find at the end a human with motivations and objectives, This course examines a number of critical elements involved in the relationship between humans and digital technology as it relates to cyber and national security, including the role that motivations for malicious online acts and how social dynamics affect the emergence of relationships between non-nation state actors and nation states, the evolving nature of social movements and communities online and the emergence of cyberterrorism as a new entrant into the cyber threat matrix. Differential Tuition: \$387.

## Department of Management

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

## Doctor of Philosophy Degree in Management and Organization Studies

The Department of Management at UTSA offers aspiring scholars the opportunity to complete a Ph.D. degree in management and organization studies. The Department of Management's doctoral program places special emphasis on the development of research competence. This rigorous program is not intended for professionals targeting industry careers or consulting, but rather a scholarly career in higher education, with specific interests in organizational behavior, human resources, strategic management, organization theory and related areas. The program's mission is the development of students into scholars who will undertake faculty positions at leading research universities.

### Admission Requirements

Applicants are eligible to apply to the program if they have earned a bachelor's or master's degree from a regionally accredited institution. All applicants must submit:

- 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 60 (paper version) or 79 (internet version) on the Test of English as a Foreign Language (TOEFL). TOEFL scores may not be more than two years old.

Students work closely with faculty members through a research assistantship. Application materials are reviewed to ensure a good fit between students' goals and research interests and those of faculty members in the department.

### Degree Requirements for Students that have Obtained a Bachelor's Degree

The Ph.D. in Management and Organization Studies requires 84 graduate credit hours beyond the bachelor's degree, a comprehensive examination, and the completion of a dissertation. Specific course requirements are determined by the Department of Management's Ph.D. Program 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. It is expected that the student will begin to develop and conduct research while undertaking coursework.

**Program of Study**

Code	Title	Credit Hours
A.	Foundational Courses (18 semester credit hours)	18
	This requirement may be met by a master's degree in business or business-related discipline. A minimum of 9 semester credit hours outside of the student's major discipline are required and 9 hours of 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 are required.	
	The Ph.D. Program Committee may consider the approval of transferring up to 18 credit hours of this requirement based on prior graduate coursework.	
B.	Additional Course Requirements (45 semester credit hours)	45
	An additional 45 credits of coursework from 5000-7000 graduate level Management, Statistics, Research Methodology and related fields is required as directed and approved by the PhD Program Committee.	
C.	Doctoral Research and Dissertation (21 semester credit hours)	21
	A minimum of 9 hours of Doctoral Research and a minimum of 12 hours of Doctoral Dissertation are required. The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.	
<b>Total Credit Hours</b>		<b>84</b>

**Degree Requirements for Students that have Obtained a Master's Degree**

The Ph.D. in Management and Organization Studies requires 66 graduate credit hours beyond the bachelor's degree, a comprehensive examination, and the completion of a dissertation. Specific course requirements are determined by the Department of Management's Ph.D. Program 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. It is expected that the student will begin to develop and conduct research while undertaking coursework.

**Program of Study**

Code	Title	Credit Hours
A.	Course Requirements (45 semester credit hours)	45
	45 credits of coursework from 5000-7000 graduate level Management, Statistics, Research Methodology and related fields is required as directed and approved by the PhD Program Committee.	
B.	Doctoral Research and Dissertation (21 semester credit hours)	21
	A minimum of 9 hours of Doctoral Research and a minimum of 12 hours of Doctoral Dissertation are required. The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.	
<b>Total Credit Hours</b>		<b>66</b>

**Advancement to Candidacy**

Advancement to candidacy requires a student to complete all University and program requirements and to pass a comprehensive examination following completion of course requirements in the candidate's major field of study. The examination is administered by the Ph.D. Program

Committee. No more than two attempts to pass qualifying examinations are allowed. Results of the examinations must be reported to the Ph.D. Program Committee, the Dean of the College, and the Dean of the Graduate School. Admission into the doctoral program does not guarantee advancement to candidacy. Doctoral students advance to candidacy upon completing their comprehensive examination and successfully defending the dissertation proposal.

**Dissertation Requirements**

Students are required to present a dissertation to satisfy the research requirement for the doctorate. Dissertation requirements and guidelines are set by the Ph.D. Program Committee. The dissertation is defended in an oral examination.

**Maximum Time Limit**

As noted in the Doctoral Degree Regulations in this catalog, doctoral students at UTSA 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 Ph.D. 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.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$387.

## **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. Differential Tuition: \$387.

**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. (Same as MBA 5213. Credit cannot be earned for both MBA 5213 and MGT 5043.) Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MGT 5243. International Business Strategy. (3-0) 3 Credit Hours.**

Prerequisite: MGT 5043, an equivalent, or consent of instructor. Emphasis on how firms create global bases of sustainable competitive advantage. Examines strategic problems unique to global business competition, including dimensions of perceived environment uncertainty, international entry-mode choices, global sourcing, and creating entry barriers to defendable product markets. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

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

Prerequisite: Completion of the degree program's core courses or consent of instructor. A course intended to integrate material taken in the degree 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. (Same as MBA 5613. Credit cannot be earned for both MBA 5613 and MGT 5903.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MGT 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 degree. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$258.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$516.



**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. Differential Tuition: \$774.

## 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. The Department also offers a Master of Science degree in Statistics and Data Science and a Doctor of Philosophy degree in Applied Statistics.

- M.S. in Statistics and Data Science (p. 56)
- Ph.D. in Applied Statistics (p. 57)

### Master of Science Degree in Statistics and Data Science

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 data analytics to address marketing and sales, 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 banking, insurance, investment, health, finance, manufacturing and service. The Master of Science degree in Statistics and Data Science 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 are only admitted in the Fall semester of each academic year.

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, the Admissions Committee requires applicants to complete Calculus I, II, and III, and a course in Matrix Theory/Linear Algebra prior to applying for the program. However, if necessary, the Linear Algebra/Matrix Theory course may be taken during the first semester of the program (in addition to degree requirements). 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:

Code	Title	Credit Hours
<b>A. 15 semester credit hours of required coursework:</b>		<b>15</b>
STA 5093	Introduction to Statistical Inference	
STA 5103	Applied Statistics	
STA 5503	Mathematical Statistics I	
STA 5513	Mathematical Statistics II	
STA 6033	SAS Programming and Data Management	
<b>B. 12 semester credit hours of 5000/6000 level coursework, including STA 6233 if the candidate never took an R programming course, chosen from one or a combination of the following focus areas:</b>		<b>12</b>
Biostatistics:		
STA 6133	Simulation and Statistical Computing	
STA 6233	R Programming for Data Science	
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 6923	Introduction to Statistical Learning	
Industrial Statistics:		
STA 6013	Regression Analysis	
STA 6113	Applied Bayesian Statistics	
STA 6133	Simulation and Statistical Computing	
STA 6233	R Programming for Data Science	
STA 6833	Design and Analysis of Experiments	
STA 6843	Computer Aided Optimal Design	
Management Science:		
MS 5453	Management and Control of Quality	
MBA 5413	Management Science with Data Analytics	
MS 5463	Lean Operations and Six Sigma	
STA 6013	Regression Analysis	
STA 6133	Simulation and Statistical Computing	
STA 6233	R Programming for Data Science	
Financial Modeling:		
ECO 6103	Econometrics I	

FIN 6313	Modeling of Financial Decision Making
STA 6013	Regression Analysis
STA 6113	Applied Bayesian Statistics
STA 6133	Simulation and Statistical Computing
STA 6233	R Programming for Data Science
STA 6253	Time Series Analysis and Applications
Big Data and Analytics	
MS 5333	Introduction to Business Analytics
MS 5323	Statistical Methods for Business Analytics
STA 6013	Regression Analysis
STA 6233	R Programming for Data Science
STA 6253	Time Series Analysis and Applications
STA 6813	Multivariate Analysis
STA 6923	Introduction to Statistical Learning
STA 6933	Advanced Topics in Statistical Learning

### General Applied Statistics

Any 12 hours of 5000/6000-level courses in Statistics or other relevant disciplines as approved by the Graduate Advisor of Record.

### C. 6 semester credit hours of graduate-level courses in relevant disciplines as approved by the Graduate Advisor of Record. 6

### D. Comprehensive Examination

Each candidate for the degree is required to pass a comprehensive examination consisting of two parts. Part I: STA 5093 and STA 5103, and part II: STA 5503 and STA 5513. Parts I and II of the comprehensive examination must be taken in the same time period and cannot be split over two different times. Each candidate has at most two attempts to pass the comprehensive exams. The comprehensive examination will be offered only once a year during each summer.

**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 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. 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 60 (paper version) or 79 (internet version) on the Test of English as a Foreign Language (TOEFL). TOEFL scores may not be more than two years old.
- Submit evaluated copies of transcripts from foreign countries
- Applicants may be asked to appear before the admissions committee for a personal interview.

## Degree Requirements

Candidates with MS in Statistics or a related field are required to successfully complete a minimum of 57 credit hours of course work at levels of 6000/7000 starting from item C below. However, those who do not have the foundation courses listed in item A, are required to complete these courses in addition to the 57 credit hours required for the degree. The candidates with bachelor degree are required to successfully complete a minimum of 87 semester credit hours of graduate coursework as specified below:

Code	Title	Credit Hours
A. Foundation Courses		18
All candidates entering the program with only a bachelor's degree or with a non-quantitative master's degree must complete the following 18 semester credit hours of coursework:		
STA 5093	Introduction to Statistical Inference	
STA 5103	Applied Statistics	
STA 5503	Mathematical Statistics I	
STA 5513	Mathematical Statistics II	
STA 6033	SAS Programming and Data Management	
STA 6233	R Programming for Data Science	
B. All candidates entering the program with a bachelor's degree must complete 12 semester credit hours of 6000/7000-level Statistics courses approved by the Graduate Advisor.		12
C. All candidates must complete the following 12 semester credit hours of advanced coursework:		12
STA 6133	Simulation and Statistical Computing	
STA 6713	Linear Models	
STA 7503	Advanced Inference I	
STA 7513	Advanced Inference II	
D. 9 semester credit hours of graduate courses 6000 level or higher within the Department of Management Science and Statistics; as approved by the Graduate Advisor of Record.		9

E. A minimum of 6 semester credit hours of graduate elective courses approved by the Graduate Advisor of Record	6
F. A minimum of 15 semester credit hours of Doctoral Research.	15
G. A minimum of 15 semester credit hours of Doctoral Dissertation.	15
<b>Total Credit Hours</b>	<b>87</b>

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 Ph.D. Program Committee before the end of the second semester of enrollment.

## Advancement to Candidacy

Advancement to candidacy requires a student to complete University and Applied Statistics program requirements. After completing the required coursework, 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. However, those who do not pass the qualifying examination at the Ph.D. level may qualify for the M.S. degree. The written examinations are administered by the graduate faculty in the specialization area and are scheduled once a year. The oral proposal defense is administered at the discretion of the student's Dissertation Committee. It 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, and inventory management. 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:

Code	Title	Credit Hours
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 5363	Pricing and Revenue Management	
MS 5383	Supply Chain Analytics	
MS 5393	Advanced Production and 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	
<b>Total Credit Hours</b>		<b>12</b>

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 as a special graduate (non-degree seeking) 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. Differential Tuition: \$387.

### 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. (Same as MBA 5413. Credit cannot be earned for both MBA 5413 and MS 5023.) Differential Tuition: \$387.

### 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. Differential Tuition: \$387.

### 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MS 5363. Pricing and Revenue Management. (3-0) 3 Credit Hours.**

Revenue Management is about "providing the right product to the right customers at the right time at the right price." The main goal of this course is to apply revenue management practices to appropriate industries successfully. Specifically, the course will provide tools to forecast customer demand successfully, identify pricing and revenue opportunities, understand the impact of constrained capacity, opportunity costs, customer response, demand uncertainty and market segmentation on pricing decisions, and accordingly formulate and solve pricing optimization problems for revenue maximization. The material covered in the course assumes a basic understanding of probability and probability distributions, some knowledge of spreadsheet modeling, and using Excel Solver or similar optimization tools to get a solution. Differential Tuition: \$387.

**MS 5383. Supply Chain Analytics. (3-0) 3 Credit Hours.**

The main goal of this course is to integrate data analytics with supply chain management. The course will introduce data-driven models, skills, and tools for learners to manage supply chains efficiently and effectively. Specifically, the course will provide an overview of supply chain intelligence and analytics applied in the global marketplace through real-world examples and case studies, and help develop critical thinking skills in support of competition and collaboration strategies in supply chain management. Students learn to define the right data set, ask the right set of questions to drive supply chain efficiency and business value, and use the appropriate models and tools to develop data-driven decisions. Differential Tuition: \$387.

**MS 5393. Advanced Production and Operations Management. (3-0) 3 Credit Hours.**

Operations management as a basic function that must be performed in all business firms involves managing the activities and resources necessary to make products and/or provide services. It can be an effective competitive weapon to penetrate into markets worldwide. The course is designed to address the key operations issues in manufacturing and service organizations that have strategic as well as tactical implications. We review the methods required for design, operation, and improvements of the systems that create products or services. Topics covered include Product/Service Design, Process Strategy and Analysis, Quality and Performance, Capacity Planning & Constraint Management, Inventory Management, Forecasting, Operations Planning & Scheduling, and Resource Planning, etc. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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.). Differential Tuition: \$387.

**Statistics (STA) Courses****STA 5093. Introduction to Statistical Inference. (3-0) 3 Credit Hours.**

Prerequisite: Admission to the Master'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. Differential Tuition: \$387.

**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 R for data analysis. (Same as CE 5043. Credit cannot be earned for both STA 5103 and CE 5043.) Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**STA 5973. Directed Research. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree. Differential Tuition: \$387.

**STA 6003. Statistical Methods in Research and Practice. (3-0) 3 Credit Hours.**

Prerequisite: One semester of calculus and one statistics course, or consent of instructor. The course includes concepts and knowledge in basic probability, common distributions, point and interval statistical estimation, test of hypothesis, simple and multiple linear regression, and analysis of variance. Course emphasis will be placed on understanding the underlying assumptions and limitations of the different techniques. Statistical software will be used for data analysis. Differential Tuition: \$387.

**STA 6013. Regression Analysis. (3-0) 3 Credit Hours.**

Prerequisite: STA 5103 or equivalent, or consent of instructor. Multiple regression analysis, including model adequacy checks, transformations, weighted regression, diagnostics, outlier detection, polynomial regression, indicator variables, multicollinearity, remedial measures, variable selection, model validation, autocorrelation; and specialized regressions including robust regression, nonlinear regression, logistic regression, generalized linear models, and penalized regressions. Differential Tuition: \$387.

**STA 6033. SAS Programming and Data Management. (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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**STA 6233. R Programming for Data Science. (3-0) 3 Credit Hours.**

This course is designed to introduce students to the statistical program R for data analysis and manipulation. Topics include preprocessing/manipulating/combining datasets, summarizing and visualizing data techniques, writing functions, object oriented programming, data simulation and resampling methods, and interfacing R with other programming languages such as SQL, Python, C++, and Hadoop. Techniques for efficient programming will be stressed. The concept of high-performance computing (multi-core/parallel-processing) is also demonstrated. Differential Tuition: \$387.

**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 time 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.) Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**STA 6443. Statistical Modeling. (3-0) 3 Credit Hours.**

Prerequisite: Basic statistics or equivalent. Introduction of basic statistical methods, with specific emphasis on inferential statistics and predictive modeling algorithms. Topics include (i) exploratory data analysis; data visualization, graphical methods, extracting important variables and detecting outliers, (ii) linear models; analysis of variance (ANOVA), linear regression models, and logistic regression models. 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. Differential Tuition: \$387.

**STA 6543. Predictive Modeling. (3-0) 3 Credit Hours.**

This course presents students with basic understanding of predictive modeling techniques and predictive analytics tools, with specific emphasis on problem-solving with real data using R programming. Topics include data preprocessing, over-fitting and model tuning, supervised learning methods, including linear regression and classification, nonlinear regression and classification models, resampling methods, model regularization, tree and rule-based methods, and support vector machines. Unsupervised learning methods include principal component analysis, clustering methods, and outlier detection. Students will learn how to select various predictive modeling algorithms for a wide variety of applications and how to code the programs in R, as well as assumptions and requirements of predictive modelling, optimal tuning parameter setting, and how to interpret and report the results. Differential Tuition: \$387.

**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.) Differential Tuition: \$387.

**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-squared statistic; principal components, factor analysis, MANOVA, multivariate regression; cluster analysis, discriminant analysis; Wishart distribution; and tests concerning covariance matrices. Use of statistical software such as SAS or R for data analysis. Differential Tuition: \$387.

**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 applied data analysis as used in business, technological, and scientific settings. Topics include one-factor and two-factor experiments, randomized block designs, two-level and three-level factorial and fractional factorial designs, nested and split-plot designs, and optimal designs. Use is made of statistical software such as SAS and JMP for data analysis. Differential Tuition: \$387.

**STA 6843. Computer Aided Optimal Design. (3-0) 3 Credit Hours.**

Prerequisite: STA 6833 or equivalent, or consent of instructor. Introduction to obtaining experimental designs and statistical methods for fitting response surfaces, and how to computer-generate the designs and use them in applied settings. Topics discussed include generating designs for obtaining process improvements with steepest ascents and for fitting response surfaces of different shapes, and use of the resultant model diagnostics to find optimum operating conditions. Use is made of JMP and SAS for design generation. Differential Tuition: \$387.

**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 or R for data analysis. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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 or R. (Formerly STA 5903. Credit cannot be earned for both STA 6903 and STA 5903.) Differential Tuition: \$387.

**STA 6923. Introduction to Statistical Learning. (3-0) 3 Credit Hours.**

Prerequisite: One year of calculus and STA 4713, or STA 5103, or consent of instructor. This course provides an introduction to statistical learning and data mining tools in analyzing the vast amounts of data found in business, informatics, cyber security and other industries. The course mostly covers supervised and unsupervised learnings. The topics include concepts in statistical and machine learnings, variance-bias tradeoff, linear regressions with model assessment and regularization, model averaging, resampling tools, tree regressions and classification, discriminant analysis, nearest-neighbor classification, principal components and cluster analysis. Software such as R or Python may be used for data analysis. Differential Tuition: \$387.

**STA 6933. Advanced Topics in Statistical Learning. (3-0) 3 Credit Hours.**

Prerequisite: STA 6013 and STA 6923, or consent of instructor. This course provides deeper understanding in selected statistical learning concepts and tools with mathematical justifications. The topics include linear and nonlinear methods in regression and classification with regularization, additive models with bagging and boosting, random forest, support vector machines, and neural networks. Software such as R or Python may be used for data analysis. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**STA 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$387.

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

Prerequisites: Permission from 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**STA 7003. Advanced Statistical Methods. (3-0) 3 Credit Hours.**

Prerequisite: One semester of calculus and one statistics course, or consent of instructor. The course provides basic statistical methods to non-Statistics major business doctoral students. The course includes concepts and knowledge in basic probability, common distributions, point and interval statistical estimation, test of hypothesis, simple and multiple linear regression, and analysis of variance. Course emphasis will be placed on understanding the underlying assumptions and limitations of the different techniques. Statistical software will be used for data analysis. Differential Tuition: \$387.

**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. Differential Tuition: \$387.



**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. Differential Tuition: \$387.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$258.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$516.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$516.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

## 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.

### Doctor of Philosophy Degree in Marketing

The College of Business offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Marketing. The Ph.D. in Marketing 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

#### Admission Requirements

Applicants must have a bachelor's degree from an accredited university. The Ph.D. Program 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 60 (paper version) or 79 (internet version) 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 Ph.D. Program 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 may include an appointment to a teaching assistantship, research assistantship, or research fellowship. The Ph.D. Program Committee, comprised of members selected from the graduate faculty, is responsible for advising students.

### Degree Requirements for Students that have Obtained a Bachelor's Degree

The degree requires a minimum of 84 semester credit hours beyond the bachelor's degree.

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

Code	Title	Credit Hours
<b>A. M.B.A. Core Courses</b>		<b>9</b>
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:		
MBA 5233	Accounting Analysis for Decision Making	
MBA 5513	Managerial Economics	
MBA 5333	Financial Management	
MBA 5213	Management and Behavior in Organizations	
MBA 5313	Marketing Management	
MBA 5413	Management Science with Data Analytics	
MBA 5613	Strategic Management and Policy	
The Ph.D. Program Committee may consider the approval of transferring some or all of the credit hours of this requirement based on prior graduate coursework.		
<b>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).</b>		<b>9</b>
The Ph.D. Program Committee may consider the approval of transferring up to 9 credit hours of this requirement based on prior graduate coursework.		
<b>C. Required Course</b>		<b>3</b>
GBA 7103	Doctoral Teaching Seminar	
<b>D. Statistics and Research Methodology</b>		<b>18</b>
18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Ph.D. Program Committee. Courses include but are not limited to:		
ECO 6013	Microeconomic Theory	
ECO 6103	Econometrics I	
ECO 6113	Mathematical Economics	
GBA 7013	Research Methods I	
GBA 7023	Research Methods II	
MS 7033	Applications in Causal Structural Modeling	
STA 6923	Introduction to Statistical Learning	
STA 7023	Applied Linear Statistical Models	
STA 7033	Multivariate Statistical Analysis	
<b>E. Major Area Coursework</b>		<b>21</b>
1. PhD Level Courses (12 semester credit hours)		
MKT 7013	Seminar in Marketing Theory	
MKT 7023	Behavioral Seminar I	
MKT 7033	Topics in Strategy Research	
MKT 7043	Seminar in Experimental Design	

2. Directed Electives (9 semester credit hours) 9 semester credit hours of graduate-level directed electives as approved by the Ph.D. Program Committee.	
<b>F. Free elective</b>	<b>3</b>
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.	
<b>G. Doctoral Research (9 semester credit hours)</b>	<b>9</b>
<b>H. Doctoral Dissertation (minimum 12 semester hours)</b>	<b>12</b>
The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.	
<b>Total Credit Hours</b>	<b>84</b>

## Degree Requirements for Students that have Obtained a Master's Degree

The degree requires a minimum of 66 semester credit hours beyond the master's degree.

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

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
GBA 7103	Doctoral Teaching Seminar	
<b>B Statistics and Research Methodology</b>		<b>18</b>
18 semester credit hours of 6000- or 7000-level courses in Statistics, Research Methods, Management Science, or associated Economics courses as approved by the Ph.D. Program Committee. Courses include but are not limited to:		
ECO 6013	Microeconomic Theory	
ECO 6103	Econometrics I	
ECO 6113	Mathematical Economics	
GBA 7013	Research Methods I	
GBA 7023	Research Methods II	
MS 7033	Applications in Causal Structural Modeling	
STA 6923	Introduction to Statistical Learning	
STA 7023	Applied Linear Statistical Models	
STA 7033	Multivariate Statistical Analysis	
<b>C. Major Area Coursework</b>		<b>21</b>
1. PhD Level Courses (12 semester credit hours)		
MKT 7013	Seminar in Marketing Theory	
MKT 7023	Behavioral Seminar I	
MKT 7033	Topics in Strategy Research	
MKT 7043	Seminar in Experimental Design	
2. Directed Electives (9 semester credit hours) 9 semester credit hours of graduate-level directed electives as approved by the Ph.D. Program Committee.		
<b>D. Free elective</b>		<b>3</b>
One course to be approved by the Ph.D. Program Committee. The course may be from within or outside the College of Business and must be at the graduate level.		
<b>E. Doctoral Research (9 semester credit hours)</b>		<b>9</b>

<b>F. Doctoral Dissertation (minimum 12 semester credit hours)</b>	<b>12</b>
The initial Program of Study must be approved by the Ph.D. Program Committee and must be submitted to the Dean of the Graduate School for final approval.	
<b>Total Credit Hours</b>	<b>66</b>

## 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 Ph.D. Program Committee. No more than two attempts to pass qualifying examinations are allowed. Results of the written and oral examinations must be reported to the Ph.D. Program 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.

## Marketing (MKT) Courses

### 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. (Same as MKT 5023. Credit cannot be earned for both MBA 5313 and MKT 5023.) Differential Tuition: \$387.

### 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. Differential Tuition: \$387.

### 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MKT 5223. Sports Marketing and Management. (3-0) 3 Credit Hours.**

The sports industry, including team sports, spectator sports, participatory sports, and personal fitness and wellness, will be examined from a marketing perspective. Students will be given extensive instruction about how marketing theories can be applied to sports. An interdisciplinary approach will be used to teach students how to deal with real-world sports marketing issues. Some of the topics that will be covered include: the scope of the sports marketing industry; why corporations want to sponsor sports; why sports teams and organizations need corporate sponsors; how sports organizations engage in cause-related marketing; understanding sport consumers; how to target specific groups of fans; how to brand your sports organization; how to create and implement and evaluate sports marketing campaigns; and how to use a marketing perspective to develop and manage a sports venue. The curriculum will include Case Studies and other resources. Differential Tuition \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MKT 5373. Marketing Communication for Crisis Management. (3-0) 3 Credit Hours.**

This course will examine crisis planning and crisis communication from a theoretical perspective. It will emphasize how integrated marketing communication tools (i.e., marketing, advertising, branding, social media, public relations, etc.) can strategically be used by corporations and organizations to effectively anticipate potential crises, manage crisis events, and repair reputational damage once the crisis has subsided. Students will be introduced to crisis scenarios facing different types of organizations and businesses using case studies and other resources. The course provides an introduction to the field of crisis management and will be especially useful for mid-level executives and leaders as well as marketing and public relations professionals. Tuition Differential \$387.

**MKT 5443. Integrated Marketing Communications. (3-0) 3 Credit Hours.**

Organizations seek to deepen customer understanding and instill a customer-centric mindset for supreme customer experiences. This course will provide a framework for integrating various marketing strategies for paid, owned, and earned communications plans. Students will learn how to map out the critical points in the customer journey using digital strategies delivering the right message at the precise time with the desired content. You'll be able to combine the appropriate theories and models with practical information to create premium customer experiences and valuable brands. Differential Tuition: \$387.

**MKT 5463. Contemporary Leadership Strategies in Sport. (3-0) 3 Credit Hours.**

This course investigates leadership principles associated with the management and business of all aspects of the sport industry including professional, amateur, and college individual and team sports, venue development and management, and the personal fitness and wellness industry. The focus is on teaching principles of leadership theory and practice from a management perspective, and how leadership has been applied throughout the sport industry, both in the United States as well as globally. Students will explore problem-solving and how to serve as a leader in the sports industry; these principles of leadership will also be of value to individuals working in non-sports related settings. The curriculum will include case studies and other resources. Differential Tuition \$387.

**MKT 5533. Global Issues in Sport Management. (3-0) 3 Credit Hours.**

This course focuses on the business of international mega-events related to sport including the Olympics, the FIFA World Cup, the Rugby World Cup, and the Commonwealth games and other events. In addition, the course will also explore the business aspects of domestic sports leagues that are expanding into global markets (e.g., growth of the National Basketball Association in China, National Football League games played in the UK, etc.). The course will cover such topics as global sports fandom, the bidding process for global sport events, the economic impact of global sport, and related topics. The curriculum will include case studies and other resources. Differential Tuition \$387.

**MKT 5623. Sports and Entertainment Venues and Events, Development and Management. (3-0) 3 Credit Hours.**

This course focuses on the leadership required to develop, manage, and market all types of venues used throughout all aspects of the sports and entertainment industry, including stadiums, arenas, golf courses, fitness and wellness centers, and convention centers. Students will learn about the financing, development, and regulations regarding these venues. The course will introduce students to best management practices to manage venues, including issues related to security, crowd control, and the safety of employees and spectators at these venues. Students will learn how to develop, implement, and monitor venue best management practices. The curriculum will include case studies and other resources. Differential Tuition \$387.

**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. Differential Tuition: \$387.

**MKT 6033. Social Media Marketing. (3-0) 3 Credit Hours.**

Unlock the power of consumer engagement and learn how to ignite a brand preference using social media with the fifth-P of Participation (by consumers). Designed to create effective marketers of the 21st century, the course topics covered will include web 2.0, social media, video strategies, branding architecture, define target markets, conduct a market opportunity analysis (MOA) to improve a company's social media strategy. Students use hands-on tools and case studies while earning industry-recognized certifications. Differential Tuition: \$387.

**MKT 6243. Digital Marketing Foundations. (3-0) 3 Credit Hours.**

New digital marketing strategies are continuously emerging based on unprecedented access to vast amounts of information. Digital marketing remains one of the most effective ways to effectively increasing a brand's relevance, build customer confidence, and promote your organization's products and services. This intensive course takes a holistic view of digital marketing to leverage website structure, keyword strategies, organic search (SEO), email marketing, paid advertising campaigns (SEM/PPC), website analytics, online reputation management (ORM), mobile marketing. Students use hands-on tools and case studies while earning industry-recognized certifications. Differential Tuition: \$387.

**MKT 6473. Marketing Innovation and Data Analytics. (3-0) 3 Credit Hours.**

Prerequisite: MKT 6243 or an equivalent. Organizations are struggling to maximize their marketing potential using data intelligence. There is still a significant skill gap between marketers and companies that want to hire them for analytics roles. Marketing analytics is the use of data to maximize marketing outcomes using the analytics of segmentation, targeting and positioning, AB testing, experimental design in the digital age, data visualization, and marketing mix models. Students in this course will execute hands-on assignments and the latest information to learn about critical concepts, including artificial intelligence, the latest data technologies, and experimental design as well as skills such as extracting data from the web, accessing data using queries, and data analysis. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MKT 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$129.

**MKT 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$387.

**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). Differential Tuition: \$129.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

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

Prerequisites: Permission from 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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MKT 7033. Topics in Strategy Research. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. Contemporary perspective on theories, concepts, models and paradigms that underlie marketing strategy research. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$387.

**MKT 7083. Behavioral Seminar II. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. In-Depth Examination of current behavioral papers in JCR, JMR and other Journals. Differential Tuition \$387.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$774.

**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. Differential Tuition: \$129.

**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. Differential Tuition: \$387.

**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. Differential Tuition: \$774.

# COLLEGE OF EDUCATION AND HUMAN DEVELOPMENT

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The College of Education and Human Development offers a range of Master's and Doctoral programs, as well as focused Graduate Certificates. In addition, the College of Education and Human Development offers a range of Post-Baccalaureate and Graduate Educator Certification programs, and several programs that prepare students for state and national licensure.

## Post-Baccalaureate Teacher and Graduate Educator Certification

In the College of Education and Human Development, Post-Baccalaureate Teacher and Graduate Educator Certification programs ([http://education.utsa.edu/certification\\_program/Graduate\\_Degree\\_Professional\\_certification\\_programs/](http://education.utsa.edu/certification_program/Graduate_Degree_Professional_certification_programs/)) are available to students interested in obtaining master's level certifications for Initial Teacher Certification and Professional Certification for School Counselor, School Psychologist, Reading Specialist, Principal, and Superintendent.

## Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning, and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospitals, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform students of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/Docs/OC/htm/OC.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

**The following graduate degrees, certifications, and certificate programs are available:**

### Department of Bicultural-Bilingual Studies (p. 71)

- Master of Arts in Bicultural-Bilingual Education (p. 71)
  - Master of Arts in Bicultural-Bilingual Education with Teacher Certification (p. 71)
- Master of Arts in Teaching English as a Second Language (p. 71)
  - Master of Arts in Teaching English as a Second Language with Teacher Certification (p. 71)
- Doctor of Philosophy in Culture, Literacy and Language (p. 71)
- Graduate Certificate in Bilingual Reading Specialist (p. 76)
- Graduate Certificate in Teaching English as a Second Language (p. 76)
- Graduate Certificate in Technology for Language Education (p. 76)

### Department of Counseling (p. 82)

- Master of Science in Clinical Mental Health Counseling (p. 82)
- Master of Education in School Counseling (p. 82)

- School Counseling Certification (p. 82)
- Doctor of Philosophy in Counselor Education and Supervision (p. 82)
- Graduate Certificate in Bilingual Counseling (p. 86)
- Graduate Certificate in Integrated Behavioral Healthcare (p. 86)

### Department of Educational Leadership and Policy Studies (p. 91)

- Master of Education in Educational Leadership (p. 91)
  - Principal Certification (p. 91)
- Master of Education in Higher Education Administration (p. 91)
  - Superintendency Certification (p. 91)
- Doctor of Philosophy in Educational Leadership (p. 91)
- Graduate Certificate in Higher Education Administration (p. 95)

### Department of Educational Psychology (p. 101)

- Master of Arts in Educational Psychology (p. 101)
- Master of Arts in School Psychology (p. 101)
- Master of Science in Behavior Analysis (p. 101)
- Graduate Certificate in Applied Behavior Analysis (p. 107)
- Graduate Certificate in Language Acquisition and Bilingual Psychoeducational Assessment (p. 107)
- Graduate Certificate in Program Evaluation (p. 107)

### Department of Interdisciplinary Learning and Teaching (p. 116)

- Master of Arts in Curriculum and Instruction (p. 116)
  - Master of Arts in Curriculum and Instruction with Teacher Certification (p. 116)
- Master of Arts in Early Childhood and Elementary Education (p. 116)
- Master of Arts in Learning, Design, and Technology (p. 116)
- Master of Arts in Literacy Education (formerly Reading and Literacy (p. 116))
  - Master of Arts in Reading and Literacy with Reading Specialist Certification (p. 116)
- Master of Arts in Special Education (p. 116)
- Doctor of Philosophy in Interdisciplinary Learning and Teaching (p. 116)
- Graduate Certificate in I-STEM Education (p. 122)

### Department of Race, Ethnicity, Gender and Sexuality Studies (p. 134)

- Graduate Certificate in Mexican American Studies (p. 134)
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## Department of Bicultural-Bilingual Studies

The Department of Bicultural-Bilingual Studies offers three graduate degrees: the Master of Arts degree in Bicultural-Bilingual Education, the Master of Arts degree in Teaching English as a Second Language (TESL), and the Doctor of Philosophy degree in Culture, Literacy and Language. The Department also offers graduate certificates in Bilingual Reading Specialist, Teaching English as a Second Language (CertTESL), and Technology for Language Education (TLE). For individuals seeking initial Texas Teacher Certification, the Department offers concentrations for EC–6 Core Subjects with Bilingual Supplemental, 4–8 Core Subjects with Bilingual Supplemental, 7–12 Bilingual Supplemental, ESL EC–6 Core Subjects with ESL Supplemental, 4–8 Core Subjects with ESL Supplemental, and 7–12 ESL Supplemental as options. Additional information on Certification tracks is available through the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

## Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospitals, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform students of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/Docs/OC/htm/OC.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

- M.A. in Bicultural-Bilingual Education (p. 71)
  - Teacher Certification Option (p. 72)
- M.A. in Teaching English as a Second Language (p. 72)
  - Teacher Certification Option (p. 73)
- Ph.D. in Culture, Literacy and Language (p. 74)

## Master of Arts Degree in Bicultural-Bilingual Education

The Master of Arts degree in Bicultural-Bilingual Education offers students an advanced study in the design and implementation of bilingual/dual language education programs. Coursework incorporates theories of critical pedagogy and educational equity as well as perspectives on additive bilingualism and biliteracy. This interdisciplinary degree advances understandings of urban education, applied linguistics in bilingual settings, and multicultural children's literature. Grounded in social justice, the program of study examines theory and research related to effective bilingual/dual language education. The master's degree is offered under three options: thesis, non-thesis and an option with initial Teacher Certification.

## 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.

## Degree Requirements for Option I

Degree candidates are required to complete successfully a 30 semester-credit-hour program. Upon completion of at least 24 semester credit hours of coursework, the candidate is required to pass a written and oral comprehensive examination.

### Program of Study

Degree candidates must complete the following:

Code	Title	Credit Hours
<b>A. Required coursework. 30 semester credit hours of coursework from six major areas as follows:</b>		
Sociocultural Studies		
Select 9 hours from the following courses:		9
BBL 5013	Social Justice and Multiculturalism in U.S. Urban Settings	
BBL 5123	Sociolinguistics and Education	
BBL 5173	Sociocultural Issues and the Teaching of Reading	
BBL 5193	Multicultural Literature for Children	
Bilingual Education Theory		3
BBL 5113	Theoretical Foundations and Legislative Policies in Bicultural-Bilingual Education	
Linguistics and Second Language Studies		3
ESL 5013	Foundations of Second Language Acquisition	
Bilingual Teaching Methodology		
Select 6 hours from the following courses:		6
<b>B. Select one of the following options:</b>		
BBL 5033	Critical Pedagogies in Bilingual/Bicultural Content Instruction	
BBL 5063	Biliteracy in Bicultural-Bilingual Classrooms	
Research and Assessment		6
BBL 5053	Assessment in Bilingual and ESL Programs	
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education	
Option I. 6 semester credit hours of Master's Thesis		
English as a Second Language		3
ESL 5033	Reading and Writing in English as an Additional Language	
<b>Total Credit Hours</b>		<b>30</b>

## Degree Requirements for Option II

Code	Title	Credit Hours
<b>A. Required coursework. 24 semester credit hours of coursework from six major areas as follows:</b>		
Sociocultural Studies		
Select 3 hours from the following courses:		3



BBL 5013	Social Justice and Multiculturalism in U.S. Urban Settings	
BBL 5123	Sociolinguistics and Education	
BBL 5173	Sociocultural Issues and the Teaching of Reading	
BBL 5193	Multicultural Literature for Children	
<b>Bilingual Education Theory</b>		<b>3</b>
BBL 5113	Theoretical Foundations and Legislative Policies in Bicultural-Bilingual Education	
<b>Linguistics and Second Language Studies</b>		<b>3</b>
ESL 5013	Foundations of Second Language Acquisition	
<b>Bilingual Teaching Methodology</b>		
Select 6 hours from the following courses:		<b>6</b>
BBL 5033	Critical Pedagogies in Bilingual/Bicultural Content Instruction	
BBL 5063	Biliteracy in Bicultural-Bilingual Classrooms	
<b>Research and Assessment</b>		<b>6</b>
Select 6 hours from the following:		
BBL 5053	Assessment in Bilingual and ESL Programs	
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education	
BBL 6073	Ethnographic Research Methods in Bicultural-Bilingual Settings	
<b>English as a Second Language</b>		<b>3</b>
ESL 5033	Reading and Writing in English as an Additional Language	
6 semester credit hours of Master's Thesis		<b>6</b>
BBL 6983	Master's Thesis/Special Project	
<b>Total Credit Hours</b>		<b>30</b>

### Degree Requirements for Option III: With Teacher Certification

The Master of Arts Degree in Bicultural-Bilingual Education with Teacher Certification (BBED-C) in EC–6 Core Subjects with Bilingual Supplemental, 4–8 Core Subjects with Bilingual Supplemental program, or 7-12 Bilingual Supplemental program is designed for individuals seeking initial teacher 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 Teacher Certification is designed to prepare students for the Texas Teacher Certification requirements in:

- EC–6 Core Subjects with Bilingual Supplemental, or
- 4–8 Core Subjects with Bilingual Supplemental, or
- 7-12 Bilingual Supplemental

#### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through

53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development. Refer to Procedures for Teacher Certification (<http://catalog.utsa.edu/policies/admission/graduate/proceduresforteachercertification/>) at the graduate level for additional details.

#### Program of Study

The Master of Arts Degree in Bicultural-Bilingual Education with Teacher Certification in EC–6 Core Subjects with Bilingual Supplemental or 4–8 Core Subjects with Bilingual Supplemental 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. Information on these requirements is available through the Office of Professional Preparation, Assessment and Accreditation in the College of Education and Human Development.

Code	Title	Credit Hours
<b>Socio-Cultural Studies</b>		<b>3</b>
BBL 5193	Multicultural Literature for Children	
<b>Bilingual Education Theory</b>		<b>3</b>
BBL 5113	Theoretical Foundations and Legislative Policies in Bicultural-Bilingual Education	
<b>Linguistics and Second Language Studies</b>		<b>3</b>
ESL 5013	Foundations of Second Language Acquisition	
<b>Bilingual Teaching Methodology</b>		<b>6</b>
BBL 5033	Critical Pedagogies in Bilingual/Bicultural Content Instruction	
BBL 5063	Biliteracy in Bicultural-Bilingual Classrooms	
<b>Assessment</b>		<b>3</b>
BBL 5053	Assessment in Bilingual and ESL Programs	
<b>English as a Second Language</b>		
Select 6 hours from the following courses:		<b>6</b>
ESL 5033	Reading and Writing in English as an Additional Language	
ESL 5063	Language and Content-Area Instruction	
<b>Internship/Practicum</b>		
6 semester credit hours of internship/practicum:		<b>6</b>
BBL 6946	Instructional Internship in Teaching	
<b>Total Credit Hours</b>		<b>30</b>

### 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.

## Degree Requirements for Option I and Option II

Degree candidates are required to successfully complete a 30-semester-credit-hour program. Upon completion of at least 24 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 6 hours of Bicultural-Bilingual studies courses. A practicum is required: students who can document relevant teaching experience may petition to substitute an elective for the practicum. The Master's degree is offered under three options: thesis, non-thesis, and an option with initial teacher certification.

## Program of Study

Degree candidates must complete the following 30 semester credit hours of coursework:

Code	Title	Credit Hours
<b>A. Required coursework. 30 semester credit hours of coursework from four major areas as follows:</b>		
<b>Language Theory and Language Use</b>		<b>9</b>
BBL 5123	Sociolinguistics and Education	
ESL 5003	Linguistics for Second Language and Bilingual Specialists	
ESL 5013	Foundations of Second Language Acquisition	
<b>Classroom Practice and Program Designs</b>		
Select 9 hours from the following courses:		<b>9</b>
BBL 5053	Assessment in Bilingual and ESL Programs	
ESL 6963	English as a Second Language Teaching Practicum	
ESL 5053	Approaches to Second Language Instruction or ESL 5063 Language and Content-Area Instruction	
Select 3 hours from the following courses:		<b>3</b>
ESL 5033	Reading and Writing in English as an Additional Language	
ESL 5043	Listening and Speaking in English as an Additional Language	
ESL 5073	Technology in Language Teaching and Learning	
ESL 5083	Pedagogical Grammar	
ESL 6053	Program and Syllabus Design	
ESL 6063	Advanced Second Language Literacy	
ESL 6173	Language Instruction and Program Development for Newcomers	
<b>Research</b>		
Select 3 hours from the following courses:		<b>3</b>

ESL 6013 Second Language Acquisition Research

**B. Select one of the following options:** **6**

Option I. 6 semester credit hours of Master's Thesis

Option II. 3 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** **30**

## Degree Requirements for Option III

The M.A. in TESL with Teacher Certification (TESL-C) program is designed to prepare students seeking initial teacher certification at the graduate level in:

- EC-6 Core Subjects and ESL Supplemental, or
- 4-8 Core Subjects and ESL Supplemental, or
- 7-12 ESL Supplemental.

English learners (ELs), also referred to as Emergent Bilinguals, are among the fastest-growing group in U.S. schools, and ELs 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 ELs, and who understand how the process of acquiring English as a second or additional 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 humans learn additional languages, and focus on strategies, techniques and best practices for teaching ELs in a way that values their linguistic and cultural diversity, and addresses K-12 educational contexts in Texas.

## Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development. Refer to Procedures for Teacher Certification (<http://catalog.utsa.edu/policies/admission/graduate/proceduresforteachercertification/>) at the Graduate level for additional details.

## Program of Study

The M.A. in TESL with Teacher Certification (TESL-C) program requires admission to the graduate program and to the teacher certification program. Students must complete a supervised teaching experience.

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. Information on these requirements is available through the Office of Professional Preparation, Assessment and Accreditation in the College of Education and Human Development.

The TESL-C program consists of 30 semester credit hours, 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/](http://education.utsa.edu/DEGREES/article/Master_of_Arts_in_Teaching_English_as_a_Second_Language_-_EC-6_ESL_Generali/)) on the COEHD website) for additional information.

Code	Title	Credit Hours
<b>30 semester credit hours of required coursework from three major areas as follows:</b>		
<b>Language Theory and Use Core</b>		<b>9</b>
BBL 5123	Sociolinguistics and Education	
ESL 5003	Linguistics for Second Language and Bilingual Specialists	
ESL 5013	Foundations of Second Language Acquisition	
<b>Classroom Practice</b>		<b>12</b>
ESL 5033	Reading and Writing in English as an Additional Language	
ESL 5063	Language and Content-Area Instruction	
BBL 5053	Assessment in Bilingual and ESL Programs	
ESL 5043	Listening and Speaking in English as an Additional Language	
and 3 hours of prescribed electives according to student certification area.		<b>3</b>
ESL 5073	Technology in Language Teaching and Learning	
ESL 5083	Pedagogical Grammar	
ESL 6053	Program and Syllabus Design	
ESL 6173	Language Instruction and Program Development for Newcomers	
BBL 5173	Sociocultural Issues and the Teaching of Reading	
BBL 5193	Multicultural Literature for Children	
CI 5043	Classroom Management and Motivation	
ECE 6363	Differentiated Instruction in a Diverse Classroom	
<b>Certification and Teaching Requirements</b>		<b>6</b>
ESL 6946	Instructional Internship in English as a Second Language Teaching	
<b>Total Credit Hours</b>		<b>30</b>

## 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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. Master's 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. 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
  - e. 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)
  - f. Academic writing: A sample of academic writing such as a paper written for a course, a master's thesis, or a scholarly publication
  - g. For students whose master's degree is from a non-English speaking university, Test of English as a Foreign Language (TOEFL (<https://www.toeflgoanywhere.org/>)) score of 85 (Internet).

### 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

Code	Title	Credit Hours
<b>A. Foundation Course</b>		
BBL 7003	Proseminar in Culture, Literacy and Language	<b>3</b>
<b>B. Research Methods Courses</b>		<b>12</b>

BBL 7013	Research Design and Statistics for Culture, Literacy and Language
BBL 7023	Qualitative Research Methods for Culture, Literacy and Language
BBL 7043	Research Design and Qualitative Analysis for Culture, Literacy and Language
EDU 7043	Educational Research Statistics: Descriptive and Comparative

(Or other approved statistical methods course.)

### C. Core Courses 9

BBL 7123	Sociocultural Contexts of Literacy
BBL 7133	Bilingualism and Second Language Acquisition
BBL 7213	Ethnological Theory

### D. Designated Electives 12

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
BBL 7113	Seminar in Cultural Studies Research
BBL 7203	Seminar in Globalization and Transculturation in the Latina/o Experience
BBL 7223	Seminar in Biliteracy and Second Language Literacy
BBL 7233	Seminar in Second Language Learning & Multilingualism
BBL 7243	Seminar in Applied Linguistics
BBL 7253	Seminar in Mexican American & Latina/o Issues in Education

Other Designated Electives:

BBL 5043	Ethnography of Communication
BBL 5123	Sociolinguistics and Education
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education
BBL 6063	Research Methods in Bilingual and Second Language Studies
BBL 6073	Ethnographic Research Methods in Bicultural-Bilingual Settings
BBL 6093	Chicana/Latina Feminist Methodologies
BBL 6233	Advanced Topics in Language Policy
BBL 7083	Technology for Qualitative Research
ESL 5073	Technology in Language Teaching and Learning
ESL 6013	Second Language Acquisition Research
ESL 6173	Language Instruction and Program Development for Newcomers
BBL 5193	Multicultural Literature for Children

### E. Free Electives 9

Students will select additional graduate-level courses within the University in order to complete a coherent emphasis area. Selection must be made with the approval of their academic advisor and the Doctoral Program Coordinator (Graduate Advisor of Record). Selection of this coursework will be driven by two primary factors: the discipline in which a student has completed the Master's degree and the research goals for that student.

### F. Doctoral Research 15

BBL 7303	Directed Doctoral Research (3 hours minimum)
BBL 7313	Doctoral Dissertation (12 hours minimum)

### 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

## 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. 76)
- Graduate Certificate in Teaching English as a Second Language (p. 76)
- Graduate Certificate in Technology for Language Education (p. 76)

## 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 Education.

### Certificate Program Requirements

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

Code	Title	Credit Hours
Required Courses:		15
BBL 5053	Assessment in Bilingual and ESL Programs	
BBL 5063	Biliteracy in Bicultural-Bilingual Classrooms	
BBL 5173	Sociocultural Issues and the Teaching of Reading	
BBL 5193	Multicultural Literature for Children	
ESL 5033	Reading and Writing in English as an Additional Language	
<b>Total Credit Hours</b>		<b>15</b>

## 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 and is offered completely online. 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. It is possible for students to complete the CertTESL online with the selection of specific courses.

Practical, hands-on courses offer a general foundation in methods, techniques, and strategies for teaching English 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 learners develop strong intercultural communication skills.

Note: 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 English as an Additional Language, and ESL 6963 English as a Second Language Teaching Practicum. Teaching methods and literacy courses are selected in consultation with a student's advisor, based on career objectives. All required courses and ESL 5033 Reading and Writing in English as an Additional Language and ESL 5073 Technology in Language Teaching and Learning are offered online.

Code	Title	Credit Hours
<b>A. Core</b>		<b>3</b>
ESL 5013	Foundations of Second Language Acquisition	
<b>B. Language Skills</b>		
Required course:		3
ESL 5043	Listening and Speaking in English as an Additional Language	
Select 3 hours in literacy of the following courses:		3
ESL 5033	Reading and Writing in English as an Additional Language	
ESL 6173	Language Instruction and Program Development for Newcomers	
ESL 6063	Advanced Second Language Literacy	
<b>C. Teaching Methods</b>		<b>3</b>
Select 3 hours from the following courses:		
ESL 5053	Approaches to Second Language Instruction	
ESL 5063	Language and Content-Area Instruction	
ESL 5073	Technology in Language Teaching and Learning	
ESL 5083	Pedagogical Grammar	
<b>D. Practicum</b>		<b>3</b>
ESL 6963	English as a Second Language Teaching Practicum	
<b>Total Credit Hours</b>		<b>15</b>

## Graduate Certificate in Technology for Language Education

The Online Graduate Certificate program in Technology for Language Education (TLE) for future language teachers is designed to provide the instructional technology and digital tools knowledge to enhance the language teaching and language learning of their students. This TLE Online Graduate Certificate program aims to expose students to the latest technologies and ways in which students can incorporate them appropriately into various teaching environments (physical and digital). The proposed program's focus is on providing pedagogical

methods to TESL/TEFL, modern language majors, who typically focus on learning how to teach the four basic skills (listening, speaking, reading, and writing) as well as methodologies for teaching adults and children in diverse contexts, to prepare teachers to teach using digital technologies.

## Certificate Program Requirements

The Technology for Language Education (TLE) certificate requires successful completion of the following four graduate courses:

<b>A. Required courses</b>		<b>9</b>
ESL 5073	Technology in Language Teaching and Learning	
LDT 5003	Introduction to Learning, Design, and Technology	
LDT 5703	Technology and Learning Cultures	
<b>B. Prescribed electives. Select one of the following courses:</b>		<b>3</b>
ESL 5033	Reading and Writing in English as an Additional Language	
ESL 5043	Listening and Speaking in English as an Additional Language	
<b>Total Credit Hours</b>		<b>12</b>

## 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### BBL 5013. Social Justice and Multiculturalism in U.S. Urban Settings. (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. Course Fees: DL01 \$785; GH01 \$90; LRH1 \$20; STSH \$30.

### BBL 5023. Cultural Theories in Global Context. (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. (Formerly titled "Cultural Adaptation in Bilingual Societies.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### BBL 5033. Critical Pedagogies in Bilingual/Bicultural Content Instruction. (3-0) 3 Credit Hours.

Examines curriculum development, materials, and pedagogy applicable to the integrated and responsive teaching of mathematics, science, social studies, and language arts in bilingual/dual language classrooms. Emphasizes research-based methods that use the learner's multicultural/multilingual repertoires as a vehicle for bilingual/dual language content instruction. Offered in Spanish. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### 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.") Course Fees: DL01 \$75; GH01 \$90; LEA2 \$25; LRH1 \$20; STSH \$30.

### BBL 5063. Biliteracy in Bicultural-Bilingual Classrooms. (3-0) 3 Credit Hours.

Examines research and instructional practices supporting the acquisition of biliteracy through reading, writing, speaking, and listening for bilingual/dual language classrooms. Preparation and adaptation of holistic, thematically based materials and activities. Critical evaluation of existing materials in Spanish. Offered in Spanish and English. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### 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 bilingual/multilingual diverse student populations and communities. 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### BBL 5113. Theoretical Foundations and Legislative Policies in Bicultural-Bilingual Education. (3-0) 3 Credit Hours.

A critical analysis of the rationale for bicultural-bilingual education focusing on history, legislative measures, philosophy, and theory, in particular, sociocultural theories (e.g., Vygotskian theory). The study and analysis of bicultural-bilingual program designs, policies, research perspectives on effective implementation, and adaptation to community needs. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 5173. Sociocultural Issues and the Teaching of Reading. (3-0) 3 Credit Hours.**

Study of how social, cultural, and linguistic factors affect the teaching and learning of reading, writing, speaking, and listening in schools and homes. Critical analysis of how school curriculum, instruction, and assessment can be designed to support students from differing sociocultural backgrounds. Special attention is given to the role that social class, race, ethnicity, language varieties, gender, and second language learning play in literacy learning and teaching. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**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 from the 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. (Same as MAS 6003. Credit cannot be earned for both BBL 6003 and MAS 6003.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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 from the 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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/outside. (Same as MAS 6093. Credit cannot be earned for both BBL 6093 and MAS 6093.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 6103. Interpretivist/Decolonial Histories in Chicana/o Studies. (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. (Formerly titled "Chicana/o Historical Thought." Same as MAS 6103. Credit cannot be earned for both BBL 6103 and MAS 6103.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 6233. Advanced Topics in Language Policy. (3-0) 3 Credit Hours.**

Prerequisite: ESL 5003 or 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 6943. Instructional Internship in Teaching. (3-0) 3 Credit Hours.**

Prerequisite: Consent of student's graduate advisor. Individually supervised full-time student/clinical teaching in assigned classrooms for one semester (12 weeks) with related applied research activity. May be taken for teaching internship or clinical teaching. Taken on a credit/no-credit basis. May be repeated for credit, but not more than 6 hours may be applied toward the M.A. in Bicultural-Bilingual Teacher Education degree. Course Fees: GH01 \$90; INT1 \$150; STF1 \$75; STSH \$30.

**BBL 6946. Instructional Internship in Teaching. (6-0) 6 Credit Hours.**

Prerequisite: Consent of student's graduate advisor. Individually supervised full-time student/clinical teaching in assigned classrooms for one semester (12 weeks) with related applied research activity. May be taken for teaching internship or clinical teaching. Taken on a credit/no-credit basis. May be repeated for credit, but not more than 6 hours may be applied toward the M.A. in Bicultural-Bilingual Teacher Education degree. Course Fees: GH01 \$180; INT1 \$300; STF1 \$75; STSH \$60.

**BBL 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor, the student's program 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. Course Fees: GH01 \$30; STSH \$10.

**BBL 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor, the student's program 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. Course Fees: GH01 \$60; STSH \$20.

**BBL 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor, the student's program 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. Course Fees: GH01 \$90; STSH \$30.

**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). Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 6983. Master's Thesis/Special Project. (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. Course Fees: GH01 \$90; STSH \$30.

**BBL 7003. Proseminar in Culture, Literacy and Language. (3-0) 3 Credit Hours.**

Prerequisites: Consent of instructor and student must be in 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.



**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 7203. Seminar in Globalization and Transculturation in the Latina/o Experience. (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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 7213. Ethnological Theory. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. Study of the relations of theory and ethnography in the social sciences and humanities. Examines cultural theory, ethnography, comparison, history, and the current controversies that illustrate various theoretical perspectives. Particular emphasis on multicultural and multilingual contexts. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 7223. Seminar in Bilingualism 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 bilingualism and second language literacy to language maintenance and shift. May be repeated for credit when topics vary. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**BBL 7301. Directed Doctoral Research. (0-0) 1 Credit Hour.**

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. Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$60; STSH \$20.

**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. Course Fees: GH01 \$90; STSH \$30.

## 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**ESL 5033. Reading and Writing in English as an Additional Language. (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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**ESL 5043. Listening and Speaking in English as an Additional Language. (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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ESL 5073. Technology in Language Teaching and 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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 at advanced levels of English proficiency. 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 in a secondary or higher education setting. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ESL 6173. Language Instruction and Program Development for Newcomers. (3-0) 3 Credit Hours.**

A survey of issues relevant to newcomer populations learning English and developing literacy in second language contexts. Emphasis will be placed on program development, policy considerations, family, community, and individual identity topics, and teaching/learning strategies for English learners at the pre-emergent and emergent proficiency levels. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$30; INT1 \$50; STSH \$10.

**ESL 6943. Instructional Internship in English as a Second Language Teaching. (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. No more than 3 hours will apply to a Master's degree. Course Fees: GH01 \$90; INT1 \$150; STSH \$30.

**ESL 6946. Instructional Internship in English as a Second Language Teaching. (0-0) 6 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. No more than 6 hours will apply to a Master's degree. Course Fees: GH01 \$180; INT1 \$300; STSH \$60.

**ESL 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$30; STSH \$10.

**ESL 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$60; STSH \$20.

**ESL 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$90; STSH \$30.

**ESL 6963. English as a Second Language Teaching Practicum. (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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; STSH \$30.

## Department of Counseling

The Department of Counseling offers the Master of Science in Clinical Mental Health Counseling, Master of Education in School Counseling, and the Doctor of Philosophy in Counselor Education and Supervision. The Department also offers Graduate Certificates in Bilingual Counseling and Integrated Behavioral Healthcare. The Department supports students seeking Certification in the State of Texas through the School Counseling Certification Program. Information on state licensure and/or certification in Clinical Mental Health Counseling is also available.

## Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospitals, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform students of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/Docs/OC/htm/OC.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

- M.S. in Clinical Mental Health Counseling (p. 82)
- M.Ed. in School Counseling (p. 83)
  - School Counseling Certification (p. 84)
- Ph.D. in Counselor Education and Supervision (p. 84)

## 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 currently accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP).

### Program Admission Requirements

1. Application for admission is conducted through the Graduate School. Applicants must hold a 3.0 grade point average 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, 65 on the TOEFL paper-based test, or 7 on the IELTS.

3. Three Applicant Rating forms are required.
4. 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.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105. (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>)

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

### 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 develop, complete and pass a comprehensive portfolio requirement at the conclusion of their formal coursework.

Code	Title	Credit Hours
<b>A. 51 semester credit hours of required courses:</b>		<b>51</b>
COU 5113	Ethical, Legal, and Professional Issues in Counseling	
COU 5203	Introduction to Clinical Mental Health Counseling	
COU 5213	Counseling Theories	
COU 5223	Clinical Assessment and Appraisal Strategies for Counselors	
COU 5233	Group Theory and Process	
COU 5243	Diagnosis in Counseling	
COU 5283	Counseling in a Multicultural Setting	
COU 5393	Development of Counseling Skills	
COU 5613	Biopsychosocial Aspects of Addiction Counseling	
COU 5683	Practicum in Counseling	
COU 5713	Clinical Mental Health Counseling Internship I	
COU 5723	Clinical Mental Health Counseling Internship II	
COU 6153	Career Development and Choice	
COU 6523	Couple and Family Counseling Theories	
COU 6883	Trauma, Crisis, and Grief Counseling	
EDP 5033	Human Development Across the Life Span	
EDU 5003	Research Methods	
<b>B. 9 semester credit hours of elective courses</b>		<b>9</b>
<b>Total Credit Hours</b>		<b>60</b>

### 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, 2009) 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 website for the Fitness to Practice ([http://education.utsa.edu/counseling/fitness\\_to\\_practice/](http://education.utsa.edu/counseling/fitness_to_practice/)) policy.

Only two courses with the grade of "C" will be accepted toward this degree. Students must earn a grade of "B" or better in Development of Counseling Skills (COU 5393), and practicum and internship courses (COU 5683, COU 5713, and COU 5723). Students who earn a grade of "C" or lower in a clinical course must retake that course and earn a grade of "B" or better before progressing in the clinical course sequence.

A minimum of a 3.0 grade point average will be required for graduation. Students who obtain more than two grades of "C" will be placed on academic probation and may be required to complete appropriate remedial work.

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.

### Master of Education Degree in School Counseling

The Department of Counseling offers the Master of Education (M.Ed.) degree in School Counseling. The M.Ed. in School Counseling program is currently accredited by the Council for Accreditation of Counseling and Related Educational Programs (CACREP, 2009). The M.Ed. in School Counseling program prepares students with professional competencies necessary to organize, implement, and evaluate a comprehensive school counseling program in a K-12 school setting.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105. (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>)

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

Note that if you are pursuing a professional certification in School Counseling, you will have to apply to the Professional Certification Program in addition to applying for the graduate degree. You will have to provide evidence of your service record, valid teaching certificate,

and other admission requirements as listed on the application to the professional certification program. Contact the designated Student Development Specialist or the Assistant Director of the Teacher Certification program for more information.

## Program Admission Requirements

1. Application for admission is conducted through the Graduate School. Applicants must hold a 2.7 grade point average during the last 60 hours of their undergraduate studies to be eligible for admission to the counseling program. Applicants admitted into the program often exceed minimum requirements.
2. International students must have a minimum score of 100 on TOEFL Internet-based test, 65 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 Department of 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 comprehensive portfolio requirement at the conclusion of their formal coursework.

Code	Title	Credit Hours
<b>48 semester credit hours of required courses:</b>		<b>48</b>
COU 5103	Introduction to School Counseling	
COU 5213	Counseling Theories	
COU 5223	Clinical Assessment and Appraisal Strategies for Counselors	
COU 5233	Group Theory and Process	
COU 5243	Diagnosis in Counseling	
COU 5253	Child and Adolescent Counseling in a Systemic Context	
COU 5283	Counseling in a Multicultural Setting	
COU 5393	Development of Counseling Skills	
COU 5683	Practicum in Counseling <sup>1</sup>	
COU 5793	School Counseling Internship I <sup>2</sup>	
COU 5803	School Counseling Internship II <sup>2</sup>	
COU 5813	School Counseling Internship III <sup>2</sup>	
COU 6003	Consultation and Program Evaluation	
COU 6153	Career Development and Choice	
EDP 5033	Human Development Across the Life Span	
EDU 5003	Research Methods	
<b>Total Credit Hours</b>		<b>48</b>

1. Practicum in Counseling provides students with their first supervised counseling 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 and students must be supervised by a certified school counselor with a minimum of two years counseling experience.

**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' performance. The purpose of the FTP review process is to regularly monitor students' professional and personal development (CACREP 2009) 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 ([http://education.utsa.edu/counseling/fitness\\_to\\_practice/](http://education.utsa.edu/counseling/fitness_to_practice/)) policy. Only two courses with the grade of "C" will be accepted toward this degree. Students must earn a grade of "B" or better in all clinical courses (COU 5393 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 "C" or lower in a clinical course must retake that course and earn a grade of "B" or better before progressing in the clinical course sequence.

A minimum of a 3.0 grade point average will be required for graduation. Students who obtain more than two grades of "C" will be placed on academic probation and may be required to complete appropriate remedial work. Students on academic probation or not in good academic standing cannot enroll in practicum or internship courses and are ineligible to participate in the comprehensive portfolio.

## School Counseling Certification Program

Students interested in seeking employment as a professional school counselor in a Texas public school must apply to the UTSA School Counseling Certification Program (SCCP). For information on the SCCP application process, visit the Department of Counseling website ([http://education.utsa.edu/counseling/m.a.\\_in\\_school\\_counseling/](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.

Additionally, students wishing to be employed as Texas professional school counselors must successfully meet all other State certification requirements.

## Doctor of Philosophy Degree in Counselor Education and Supervision

The Ph.D. program in Counselor Education and Supervision is a full-time 48-semester credit hour program (admission requires a 60-credit master's degree in counseling from a CACREP accredited program, although applicants may be admitted with deficiencies). Applicants who did not graduate from a 60-credit CACREP-accredited master's

degree program will be required to complete additional background coursework up to the 60-credit requirement. Additional courses will be selected in consultation with the faculty advisor and will consist of courses that fulfill content areas required by CACREP that were not completed in the original master's degree program. Applicants who have 60-credit master's degrees from non-CACREP-accredited programs may be required to complete additional background courses if their master's degree coursework did not include all content areas required by CACREP. The program is intended to prepare professionals for 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 (<https://www.cacrep.org/>)). Program graduates will have opportunities to acquire: (a) advanced theoretical knowledge, (b) advanced clinical skills, (c) university teaching skills, (d) research skills, (e) advanced clinical supervision skills, and (f) leadership and advocacy skills. Students are expected to formulate their own philosophy and approach to counselor education and supervision. Multicultural and social justice competencies are emphasized throughout the program.

The Doctoral program objectives include opportunities for:

- Research
- Scholarly writing and publishing
- Clinical supervision with practicum students
- Supervised co-teaching experiences
- Advanced clinical competencies
- Advanced multicultural and social justice competencies
- Leadership and advocacy

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings that require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

### Program Admission Requirements

Admission to the program is limited and competitive. Meeting the minimum admission requirements does not guarantee acceptance into the program. Competitive applicants usually exceed minimum requirements.

1. A master's degree in counseling from a Council for Accreditation of Counseling and Related Educational Programs (CACREP) approved program requiring a minimum of 60 semester credit hours. Students with fewer than 60 semester credit hours and/or from a non-CACREP accredited program 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 a closely related mental health field.
3. A portfolio consisting of the following items, which will be evaluated by the Doctoral Program Committee:
  - a. A 60-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, 65 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 is 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

### 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 Student handbook).

Code	Title	Credit Hours
<b>A. General core courses</b>		<b>27</b>
COU 6003	Consultation and Program Evaluation	
COU 7123	College and University Teaching	
COU 7133	Seminar in Professional Development	
COU 7213	Advanced Theories in Counseling	
COU 7283	Advanced Multicultural Counseling	
COU 7313	Practicum in Counseling	
COU 7413	Internship I	
COU 7513	Internship II	
COU 7583	Supervision of Counseling	
<b>B. Research courses</b>		<b>12</b>
COU 6893	Foundations of Research in Counseling and Development	
COU 7103	Qualitative Research Methods in Counseling and Development	
COU 7893	Advanced Research in Counseling and Development	

EDU 7043	Educational Research Statistics: Descriptive and Comparative	
<b>C. Dissertation</b>		<b>9</b>
COU 7993	Dissertation	
COU 7996	Dissertation	
<b>Total Credit Hours</b>		<b>48</b>

## 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, 2009) to ensure that students demonstrate appropriate progress toward developing the necessary behaviors, attitudes, and professional competencies to practice as counselors-in-training. Please refer to the Department of Counseling website for the Fitness to Practice ([http://education.utsa.edu/counseling/fitness\\_to\\_practice/](http://education.utsa.edu/counseling/fitness_to_practice/)) policy.

Students must earn a grade of "B" or better in all courses. Students who earn a grade of "C" or lower in a course must retake that course and earn a grade of "B" or better.

Students must be in the process of completing their formal required coursework (all except dissertation) during the semester in which they take their doctoral qualifying examination (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, successfully defend their dissertation proposal, 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.

- Graduate Certificate in Bilingual Counseling (p. 86)
- Graduate Certificate in Integrated Behavioral Healthcare (p. 87)

## Graduate Certificate in Bilingual Counseling

The 12-hour Graduate Certificate in Bilingual Counseling (CBC) is designed to meet the needs of students interested in developing foundational skills in bilingual counseling in Spanish. The Certificate in Bilingual Counseling (CBC) is offered through the Department of Counseling (COU) with support from the Department of Bicultural-Bilingual Studies (BBL). The certificate is designed to meet growing PK-12 school and community needs.

### Admission Requirements

Admission to the M.Ed. in School Counseling, the M.S. in Clinical Mental Health Counseling, or the Ph.D. in Counselor Education and Supervision or related fields.

Attainment of Level 2 or Level 3 on a Department of Bicultural-Bilingual Studies Spanish proficiency test, specifically developed for this program (students may be allowed to take BBL 5023 and COU 7283 before passing

the language assessment at the discretion of the Education Specialist III with the Department of Bicultural-Bilingual Studies).

Additionally, the program is open to non-degree seeking licensed professional counselors and certified school counselors who would like to obtain the certificate.

### Certificate Requirements

Requirements for completion include:

- Completion of 12 graduate semester credit hours of approved UTSA coursework with a grade point average (GPA) of 3.0 or above
- Completion of a language assessment
- Successful completion of two recorded, transcribed, and analyzed counseling sessions in Spanish

Requirements include successful completion of the following four courses:

Code	Title	Credit Hours
<b>A. Counseling Required Courses:</b>		<b>6</b>
COU 7283	Advanced Multicultural Counseling (Offered each spring semester.)	
And at least three hours (one semester) of a designated Spanish internship section.		
COU 5713	Clinical Mental Health Counseling Internship I	
COU 5723	Clinical Mental Health Counseling Internship II	
COU 5793	School Counseling Internship I	
COU 5803	School Counseling Internship II	
COU 5813	School Counseling Internship III	
<b>B. Bicultural Bilingual Required Courses:</b>		<b>6</b>
BBL 5023	Cultural Theories in Global Context (Offered each fall semester.)	
BBL 6033	Topics in Bicultural Studies (Offered fall or spring semester depending on cohort numbers and need.)	
*Only counseling students who have passed required Language Proficiency exam may register for Counseling in Bilingual-Bicultural settings. This course is offered primarily in Spanish.		
<b>Total Credit Hours</b>		<b>12</b>

Students must be able to pass a Spanish language proficiency test demonstrating proficiency in listening and reading comprehension, speaking ability, and writing.

### M.Ed. in School Counseling Students (48 hours + 9 additional hours)

- These courses (9 hours) will be taken in addition to the 48-hour degree plan.
- School districts have indicated school counseling applicants with these skills are highly desirable.

### M.S. in Clinical Mental Health Students (60 hours + 3 additional hours)

- Three of the required courses can be substituted for the three required electives in the program.
- Thus, students would only need to take one course in addition to the required 60 hours for a total of 63 hours.

**Doctoral Students in Counselor Education and Supervision (no additional hours)**

- Two of the certification courses are already required (COU 7283 and COU 7413 or COU 7513).
- Students will only need to incorporate BBL 5023 and BBL 6033 into their degree plans to be considered for the certificate.

**Graduate Certificate in Integrated Behavioral Healthcare**

The 12-hour Graduate Certificate in Integrated Behavioral Healthcare (IBHC) is designed to provide students with specialized coursework and training to work in medical practice settings. This certificate builds on existing partnerships and coursework offered within the Department of Counseling. The certificate is designed to meet growing community healthcare needs.

**Admission Requirements**

All students will be required to be formally admitted to one of the three degree programs in the Department of Counseling (M.S. in Clinical Mental Health Counseling, M.Ed. in School Counseling, Ph.D. in Counselor Education and Supervision).

**Certificate Requirements**

Requirements include successful completion of the following four courses:

Code	Title	Credit Hours
<b>A. Required Integrated Behavioral Health Courses:</b>		<b>6</b>
COU 6973	Special Issues (IBHC-P: Integrated Behavioral Health in Primary Care)	
COU 6973	Special Issues (IBHC-I: Integrated Behavioral Health Interventions)	
<b>B. Required Internship Courses</b>		<b>6</b>
COU 5713	Clinical Mental Health Counseling Internship I (Repeated for a total of 6 hours at an approved IBHC field site)	
<b>Total Credit Hours</b>		<b>12</b>

**M.Ed. in School Counseling Students (48 hrs + 12 additional hours)**

These four courses (12 hours) will be taken in addition to the 48-hour degree plan.

**M.S. in Clinical Mental Health Students (60 hrs)**

Two of the required courses will serve as required electives in the program, and the internship courses will meet the need for the required program internships at approved internship sites.

**Doctoral Students in Counselor Education and Supervision (48 hrs + 6 additional hours)**

COU 6973 Special Issues IBHC-P: Integrated Behavioral Health in Primary Care and COU 6973 Special Issues IBHC-I: Integrated Behavioral Health Interventions will need to be taken in addition to the 48-hour degree plan. With consent of the instructor, students may substitute COU 7413 Internship I and COU 7513 Internship II for COU 5713 Clinical Mental Health Counseling Internship I (Repeated for a total of 6 hours).

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 5223. Clinical Assessment and Appraisal Strategies for Counselors. (3-0) 3 Credit Hours.**

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.") Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.



**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 5683. Practicum in Counseling. (0-0) 3 Credit Hours.**

Prerequisites: COU 5103 or COU 5203, COU 5213, COU 5233, COU 5283, COU 5393, and COU 6523. 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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 5713. Clinical Mental Health Counseling Internship I. (0-0) 3 Credit Hours.**

Prerequisites: COU 5243 and COU 5683. 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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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, community, and/or organizational 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.) Course Fees: COUN \$35; GGH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 6546. Clinical Mental Health Counseling Internship III. (0-0) 6 Credit Hours.**

Prerequisite: COU 5713. Students must submit an application, verifying prerequisite course completion, the semester before enrolling into Clinical Mental Health Counseling Internship III. Internship III 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 practicum. Course Fees: COUN \$35; GH01 \$180; LRH1 \$20; STSH \$60.

**COU 6563. Counselors in Organizational Settings, Organizational Health and Behavior. (3-0) 3 Credit Hours.**

Organizations confront a wide range of challenges when managing individuals in today's complex and fast-paced work environment. This course will provide an overview of several challenges and discuss how counselors can develop skills to help organizations effectively navigate these issues. Concepts from Counseling, Psychology, Systems Theory, Neuroscience, and Organizational Development will be covered to understand how organizations can develop a person-centered, inclusive, and psychological safe work environment. Course fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: COUN \$35; GH01 \$30; STSH \$10.

**COU 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: COUN \$35; GH01 \$90; STSH \$30.

**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). Course Fees: COUN \$35; GH01 \$30; STSH \$10.

**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"). Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$30; LRH1 \$20; STSH \$10.

**COU 7123. College and University Teaching. (3-0) 3 Credit Hours.**

Provides instruction on models, perspectives, research, and techniques pertaining to teaching within the graduate curriculum in counselor education. Issues related to values and beliefs about the learning process, needs of adult learners, pedagogical techniques, learning styles, and cultural assumptions about teaching and learning are explored. Students will learn how to structure, deliver, and evaluate instruction applicable to all domains of knowledge. Concurrent with enrollment in the course, students are required to serve as teaching assistant (TA) to a faculty member teaching a master's-level course in counseling. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 7213. Advanced Theories in Counseling. (3-0) 3 Credit Hours.**

Prerequisite: COU 5213. In-depth study and analysis of the traditional and contemporary theories of counseling, leadership and organizational theories 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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 7513. Internship II. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral status and permission from 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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**COU 7771. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral standing and permission in writing (form available) from 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. Course Fees: COUN \$35; GH01 \$30; STSH \$10.

**COU 7773. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral standing and permission in writing (form available) from 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. Course Fees: COUN \$35; GH01 \$90; STSH \$30.

**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.") Course Fees: COUN \$35; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$90; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$30; STSH \$10.

**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. Course Fees: COUN \$35; GH01 \$90; STSH \$30.

**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. Course Fees: COUN \$35; GH01 \$180; STSH \$60.

## Department of Educational Leadership and Policy Studies

The Department of Educational Leadership and Policy Studies offers the Master of Education in Educational Leadership, the Master of Education in Higher Education Administration, the Doctor of Philosophy in Educational Leadership, and the Graduate Certificate in Higher Education Administration.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospitals, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform students of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/Docs/OC/htm/OC.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

- M.Ed. in Educational Leadership (p. 91)
  - Principal Certification (p. 91)
- M.Ed. in Higher Education Administration (p. 92)
  - Superintendency Certification (p. 93)
- Ph.D. in Educational Leadership (p. 93)

### Master of Education Degree in Educational Leadership

Students seeking to apply for educational leadership careers in educational systems or organizations have three options for the Master of Education (M.Ed.) degree: (a) an emphasis in educational leadership for K-12 school administrators; (b) an emphasis in leadership in educational policy and advocacy; (c) an emphasis in teacher leadership; (d) an emphasis in bicultural-bilingual leadership. Each emphasis explores the unique problems, processes, and expertise associated with effective and equitable educational leadership. The program highlights the role of cultural, legal, community and organizational practices in the development of equal educational opportunity for all students.

#### Program Admission Requirements

The M.Ed. in Educational Leadership is for students aspiring to be school leaders and/or educational policy professionals. This program admits in the fall and spring semesters only. Admissions are based on the following criteria:

1. Evidence of relevant work experiences must be provided as documented by the submission of a résumé. For the educational leadership emphasis, applicants must be engaged in leadership activities outside the classroom.

2. Applicants must submit a one page statement of purpose that provides (1) the applicant's reasons for pursuing this graduate degree, (2) indication of emphasis area, and (3) career plans after obtaining the degree.
3. Applicants who do not meet University-wide requirements for unconditional admission may be admitted conditionally if they provide a letter of recommendation and/or evidence of academic potential through previous professional work in the field.

#### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

Note that if you are pursuing a professional certification as a Principal, you will have to apply to the Professional Certification Program in addition to applying for the graduate degree. You will have to provide evidence of your service record, valid teaching certificate, and other admission requirements as listed on the application to the professional certification program. Contact the designated Student Development Specialist or the Assistant Director of the Teacher Certification program for more information.

#### Principal Certification

The 36-semester credit hour degree program with an educational leadership emphasis for K-12 is also designed to meet principalship certification requirements.

Successful completion of the K-12 administration emphasis and passing of the state required examination could result in a recommendation to the State of Texas for principal certification. The 36-hour degree program with emphases in either educational policy and advocacy or teacher leadership are not designed to meet Texas Principal Certification requirements.

### Degree Requirements

#### Educational Leadership Emphasis

Code	Title	Credit Hours
<b>A. Courses</b>		<b>36</b>
EDL 5003	Introduction to School Administration	
EDL 5103	Introduction to School Finance and Budgeting	
EDL 5203	School and Community Relations in Education	
EDL 5303	Human Relations in Educational Administration	
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	Instructional Leadership
EDL 6941	Practicum in Educational Administration
EDL 6942	Practicum in Educational Administration
EDU 5003	Research Methods
EDU 6223	Education in a Culturally and Linguistically Diverse Society

**B. Comprehensive Examination**

A comprehensive examination is required as described separately in this catalog (see the Graduate Catalog, Master's Degree Regulations).

**Total Credit Hours** **36**

**Educational Policy Emphasis**

Code	Title	Credit Hours
<b>A. Courses</b> <span style="float: right;"><b>36</b></span>		
EDL 5003	Introduction to School Administration	
EDL 5103	Introduction to School Finance and Budgeting	
EDL 5203	School and Community Relations in Education	
EDL 5303	Human Relations in Educational Administration	
EDL 5503	Administration and Function of Special Programs	
EDL 5703	Legal Foundations in Education	
EDL 6033	Education Policy and Politics	
EDL 6133	Advocacy Leadership	
EDL 6941	Practicum in Educational Administration	
EDL 6942	Practicum in Educational Administration	
EDU 5003	Research Methods	
EDU 5103	Advanced Foundations of Education in Policy, Politics and Equity	
EDU 6223	Education in a Culturally and Linguistically Diverse Society	

**B. Comprehensive Examination**

A comprehensive examination is required as described separately in this catalog (see the Graduate Catalog, Master's Degree Regulations).

**Total Credit Hours** **36**

**Teacher Leadership Emphasis**

Code	Title	Credit Hours
<b>A. Courses</b> <span style="float: right;"><b>36</b></span>		
CI 5003	Theory of Curriculum and Instruction	
EDL 5003	Introduction to School Administration	
EDL 5203	School and Community Relations in Education	
EDL 5303	Human Relations in Educational Administration	
EDL 5503	Administration and Function of Special Programs	
EDL 5703	Legal Foundations in Education	
EDL 6013	Supervision: Teaching-Learning Process	
EDL 6023	Instructional Leadership	
EDL 6973	Special Problems	
EDP 5003	Psychological Learning Theories	
EDU 5003	Research Methods	
EDU 6223	Education in a Culturally and Linguistically Diverse Society	

**B. Comprehensive Examination**

A comprehensive examination is required as described separately in this catalog (see the Graduate Catalog, Master's Degree Regulations).

**Total Credit Hours** **36**

**Bicultural/Bilingual Leadership Emphasis**

Code	Title	Credit Hours
<b>A. Courses</b> <span style="float: right;"><b>36</b></span>		
BBL 5113	Theoretical Foundations and Legislative Policies in Bicultural-Bilingual Education	
BBL 6043	Advanced Topics in Bilingual and Dual-Language Education	
EDL 5003	Introduction to School Administration	
EDL 5103	Introduction to School Finance and Budgeting	
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	Instructional Leadership	
EDL 6941	Practicum in Educational Administration	
EDL 6942	Practicum in Educational Administration	
EDU 5003	Research Methods	
ESL 5063	Language and Content-Area Instruction	

**B. Comprehensive Examination**

A comprehensive examination is required as described separately in the catalog (see the Graduate Catalog, Master's Degree Regulations).

**Total Credit Hours** **36**

## Master of Education Degree in Higher Education Administration

The Higher Education Administration Master's degree within the Department of Educational Leadership and Policy Studies at UTSA focuses on comprehensive and social justice oriented preparation of leaders for entry and professional advancement in higher education, student affairs, and school to university transition. The program integrates classroom-based and field-based learning. We strive to prepare knowledgeable, forward thinking, competent, and compassionate leaders for college student affairs.

### Program Admission Requirements

The M.Ed. in Higher Education Administration is for students aspiring to be higher education leaders. This program admits in the fall and spring semesters only. Admissions are based on the following criteria:

1. Evidence of relevant work experiences must be provided as documented by the submission of a résumé. Higher education administration applicants must have at least one year of experience in student affairs or a related field.
2. Students applying for the higher education administration degree must provide a statement of purpose of one to two pages that includes: (a) the applicant's reasons for pursuing a master's degree in higher education administration, (b) a biographical sketch of the applicant's experiences relevant to higher education administration, and (c) career plans after obtaining a master's degree in higher education administration.

3. Applicants who do not meet University-wide requirements for unconditional admission may be admitted conditionally if they provide, a letter of recommendation and/or evidence of academic potential through previous professional work in the field.

## Degree Requirements

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>6</b>
EDU 5003	Research Methods	
HSA 5203	Multicultural Issues in Higher Education	
<b>B. Support Work</b>		<b>30</b>
HSA 5003	History of American Higher Education	
HSA 5023	Introduction to Higher Education and Student Affairs	
HSA 5103	College Student Development	
HSA 5403	Partnerships for College Readiness and Success	
HSA 6003	Higher Education Law	
HSA 6123	Program Planning and Evaluation in Higher Education and Student Affairs	
HSA 6143	Administrative Issues in Higher Education and Student Affairs	
HSA 6503	The Community College	
HSA 6933	Internship I in Educational Administration	
HSA 6943	Internship II in Educational Administration	
<b>C. Comprehensive Examination</b>		
A comprehensive examination is required as described separately in this catalog (see the Graduate Catalog, Master's Degree Regulations).		
<b>Total Credit Hours</b>		<b>36</b>

## Superintendency Certification

The 15-semester-credit-hour program is designed to prepare campus administrators for a position at the central office level with potential for a position as the superintendent. Program emphasis is on the function, relationships and changing dynamics of the central office leadership position and superintendency, paying special attention to the application of theory and practice.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

Note that if you are pursuing a professional certification as a Superintendent, you will have to apply to the Professional Certification

Program in addition to applying for the graduate degree. You will have to provide evidence of your service record, valid teaching certificate, and other admission requirements as listed on the application to the professional certification program. Contact the designated Student Development Specialist or the Assistant Director of the Teacher Certification program for more information.

## Admission Requirements:

- A master's degree
- Completion of a mid-management or principal's certificate

For more information, contact the Student Development Specialist in the Department of Educational Leadership and Policy Studies.

## Doctor of Philosophy 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 master's degree in education or other appropriate field
2. A grade point average of 3.5 or better out of a possible 4.0 in a master's degree program
3. Submission of an official score on the verbal, quantitative, and analytical writing sections of the Graduate Record Examination (GRE)
4. For applicants whose native language is not English, a score of at least 60 on the Test of English as a Foreign Language (TOEFL) paper version or 79 Internet version
5. 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, post secondary, governmental, or private industry settings)
6. 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
7. Submit a statement of purpose for either the K-12 leadership or the higher education administration emphasis.

### K-12 Leadership Emphasis

A statement of purpose outlining your interest in K-12 leadership, 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.

### Higher Education Administration Emphasis

A statement of purpose outlining your interest in higher education administration, at a minimum, (1) provide a detailed description of why you seek admission to this particular doctoral program and if you plan to attend as a full-time (9 hours per semester) or part-time (6 hours per semester) student; (2) describe your short term and long-term professional/career goals. What do you want the program faculty to know about you as a learner?; (3) provide a detailed description and explanation of your research/scholarly interests specifically related to this program area (i.e., higher education leadership/administration-college student affairs). How does your research-intellectual interests connect with faculty members' (specifically or generally) interests within the program area or across the department? Incorporate and cite relevant scholarship when describing your interests; (4) describe your views on and understanding of social justice and equity in education generally, and higher education/post-secondary education specifically. What does social justice and equity mean to you and how will those concepts guide your learning experience in this program?; (5) provide a few examples of your educational and/or professional experiences related to: (a) accepting and applying constructive criticism, (b) learning from others, (c) helping other students (i.e., peers, mentees, family members, etc.), (d) managing stressful situations and balancing life-work or life-education situations; (6) identify and describe at least one policy issue in higher education that you feel need reform. What type of changes are needed and why?

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 Ph.D in Educational Leadership is a 60-semester-credit-hour program. Degree candidates must complete 30 semester credit hours of core courses:

Code	Title	Credit Hours
<b>Core Courses (30 semester credit hours):</b>		
A.	6 semester credit hours of Culture:	6

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.	15 semester credit hours of Methodology:	15
	Survey of quantitative and qualitative research designs and methods and the uses of technology for data collection and analysis.	
C.	9 semester credit hours of Leadership:	9
	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.	
<b>Courses fulfilling the K–12 or higher education administration emphasis and cognate requirements (21 semester credit hours):</b>		
D.	15 semester credit hours of Area of emphasis:	15
	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.	
<b>Dissertation:</b>		
F.	A minimum of 9 semester credit hours of Dissertation:	9
	LDR 7991 Dissertation	
	LDR 7993 Dissertation	
	LDR 7994 Dissertation	
	LDR 7996 Dissertation	
<b>Total Credit Hours</b>		<b>60</b>

### 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

- 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
- 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 graduate 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 Higher Education Administration.

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.

### Certificate Program Requirements

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:

Code	Title	Credit Hours
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	
<b>Total Credit Hours</b>		<b>15</b>

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 Higher Education Administration 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 Student Policies, Admissions Policies, are applicable.

All other requirements for certificate programs described in Certificate Program Regulations 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5103. Introduction to School Finance and Budgeting. (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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5203. School and Community Relations in Education. (3-0) 3 Credit Hours.

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5303. Human Relations in Educational Administration. (3-0) 3 Credit Hours.

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5403. The Principalship: Educational Unit and Site Administration. (3-0) 3 Credit Hours.

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5503. Administration and Function of Special Programs. (3-0) 3 Credit Hours.

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5603. Applied Research Seminar in Educational Leadership. (3-0) 3 Credit Hours.

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

#### EDL 5703. Legal Foundations in Education. (3-0) 3 Credit Hours.

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.



**EDL 6013. Supervision: Teaching-Learning Process. (3-0) 3 Credit Hours.**

A study of impact strategies in instructional supervision and the development of communication and interpersonal skills needed for working with teachers. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6023. Instructional Leadership. (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 instructional leadership theory, practices, and contexts. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6033. Education Policy and Politics. (3-0) 3 Credit Hours.**

Introduction to the conceptual knowledge and skills to explore and analyze societal and organizational forces that affect educational policy and decision making and an understanding of how educational politics permeate educational systems and influence educational policy. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6133. Advocacy Leadership. (3-0) 3 Credit Hours.**

This course examines the strategies and tactics that successful advocates use to organize constituencies and achieve their purposes. Various types of advocacy will be emphasized, including community organizing, disabilities advocacy, advocacy for children, and civil and human rights advocacy. A primary focus will be on the connection of community organizations and schools. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6503. Central Office Instructional Leadership. (3-0) 3 Credit Hours.**

Prerequisite: Admission to superintendent certification program. This course focuses on the instructional leadership component leading to Texas Superintendent Certification with a concentration on curriculum planning, development, implementation and evaluation, instructional leadership and management, and supervision and staff development. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6513. Policy and Governance of Educational Community. (3-0) 3 Credit Hours.**

Prerequisite: Admission to superintendent certification program. This course focuses on the policy and governance component leading to Texas Superintendent Certification with a concentration on the ethics of leadership, leadership and school district culture, communications and community relations, and policy and governance. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6523. Organizational Leadership and Management. (3-0) 3 Credit Hours.**

Prerequisite: Admission to superintendent certification program. This course focuses on the administrative leadership component leading to Texas Superintendent Certification with a concentration on finance, budgeting, resource utilization, technology applications, physical plant, and support systems. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6533. Human Resources Leadership and Management. (3-0) 3 Credit Hours.**

Prerequisite: Admission to superintendent certification program. This course focuses on the human resources leadership and management component leading to Texas Superintendent Certification with a concentration on personnel recruitment, selection, induction, supervision, development, evaluation, and decision-making. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 6941. Practicum in Educational Administration. (0-0) 1 Credit Hour.**

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. Course Fees: GH01 \$30; INT1 \$50; LRH1 \$20; STSH \$10.

**EDL 6942. Practicum in Educational Administration. (0-0) 2 Credit Hours.**

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. Course Fees: GH01 \$60; INT1 \$100; LRH1 \$20; STSH \$20.

**EDL 6943. Practicum in Educational Administration. (0-0) 3 Credit Hours.**

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. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; STSH \$30.

**EDL 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$90; STSH \$30.

**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). Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 7273. Examining School Populations, Structures, and Culture. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 7433. Frameworks and Theories of Educational Policy Analysis. (3-0) 3 Credit Hours.**

Provides students with a foundational knowledge of the policymaking process and a deeper understanding of the cultural, political, economic, and social factors that influence educational policy. It is an overview of theories and conceptual frameworks for understanding educational policy making and outcomes/implications. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 7573. Research Theory and Design in Educational Administration. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDL 7771. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral standing and permission in writing (form available) from 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. Course Fees: GH01 \$30; STSH \$10.

**EDL 7773. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral standing and permission in writing (form available) from 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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDU 5103. Advanced Foundations of Education in Policy, Politics and Equity. (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 and educational equity. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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). Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDU 7023. Theory and Inquiry. (3-0) 3 Credit Hours.**

This course examines the role of theory in relation to the research process. Students will read and study a variety of different theoretical paradigms to better understand how to engage and write theory and its role in generating new forms of knowledge. A variety of different theoretical frameworks will be considered and their relationship(s) to the research process. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDU 7123. Advanced Qualitative Research. (3-0) 3 Credit Hours.**

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, hand-on work with software and data, and readings will be the main class activities. Students will be required to complete a pilot research project. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

## 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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**HSA 5023. Introduction to Higher Education and Student Affairs. (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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**HSA 5403. Partnerships for College Readiness and Success. (3-0) 3 Credit Hours.**

This course introduces school-university collaboration to improve students' readiness to transition from high school to college. The course covers theoretical models and real-world examples of effective practice, as well as how the policy context shapes opportunities to collaborate. Students are asked to consider which partnership approaches are transformative in that they systematically improve practice and/or outcomes. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**HSA 6143. Administrative Issues in Higher Education and Student Affairs. (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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**HSA 6513. Introduction to Student Services in Community Colleges. (3-0) 3 Credit Hours.**

This is an introduction to concepts, theories, and practices related to community college student services. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**HSA 6603. Systemic Barriers for Students in Community College. (3-0) 3 Credit Hours.**

This course provides an overview of the numerous systemic barriers experienced by students when navigating community college. To best understand the obstacles faced by community college students, the course first explores the history, development, and mission of junior colleges before examining the entry pathways, diverse educational trajectories, and systemic barriers found within this sector of higher education. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**HSA 6931. Internship I in Educational Administration. (0-0) 1 Credit Hour.**

This course is designed to provide exploratory experience for students in different functional areas of student affairs to help them gain perspective of the breadth and depth of student affairs work. Individually supervised field experience in student affairs and college administration of 150 hours to provide exposure to different functional areas and gain perspective of the breadth and depth of student affairs. With approval of program GAR, designated field experience hours undertaken in prior program courses may count toward the 150 hours required of this internship. May be repeated for a maximum of 3 hours. Course Fees: GH01 \$30; INT1 \$50; LRH1 \$20; STSH \$10.

**HSA 6932. Internship I in Educational Administration. (0-0) 2 Credit Hours.**

This course is designed to provide exploratory experience for students in different functional areas of student affairs to help them gain perspective of the breadth and depth of student affairs work. Individually supervised field experience in student affairs and college administration of 150 hours to provide exposure to different functional areas and gain perspective of the breadth and depth of student affairs. With approval of program GAR, designated field experience hours undertaken in prior program courses may count toward the 150 hours required of this internship. May be repeated for a maximum of 4 hours. Course Fees: GH01 \$60; INT1 \$100; LRH1 \$20; STSH \$20.

**HSA 6933. Internship I in Educational Administration. (0-0) 3 Credit Hours.**

This course is designed to provide exploratory experience for students in different functional areas of student affairs to help them gain perspective of the breadth and depth of student affairs work. Individually supervised field experience in student affairs and college administration of 150 hours to provide exposure to different functional areas and gain perspective of the breadth and depth of student affairs. With approval of program GAR, designated field experience hours undertaken in prior program courses may count toward the 150 hours required of this internship. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; STSH \$30.

**HSA 6943. Internship II in Educational Administration. (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. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; STSH \$30.

**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). Course Fees: GH01 \$30; STSH \$10.

**HSA 6973. Special Topics in Higher Education. (3-0) 3 Credit Hours.**

This course examines timely and/or cutting edge, social justice oriented topics and concepts in the field of Higher Education and Student Affairs. The in-depth exploration of key issues add value to students' knowledge about the profession and linking theory to practice. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

## **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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDR 7153. Reflective Leadership: The Personal Dimension. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDR 7183. Emerging Paradigms in Leadership. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDR 7343. Principles of Ethical Leadership. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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 Ph.D. degree requirements. Credit will be awarded upon completion of the dissertation. Course Fees: GH01 \$30; STSH \$10.

**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 Ph.D. degree requirements. Credit will be awarded upon completion of the dissertation. Course Fees: GH01 \$90; STSH \$30.

**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 Ph.D. degree requirements. Credit will be awarded upon completion of the dissertation. Course Fees: GH01 \$120; STSH \$40.

**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 Ph.D. degree requirements. Credit will be awarded upon completion of the dissertation. Course Fees: GH01 \$180; STSH \$60.

## 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 methods to prepare diverse 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 individuals across the lifespan; 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 foundation educational psychology concepts in areas such as learning, motivation, development, assessment, and research methods. At this time, the Department of Educational Psychology offers three graduate degrees: the Master of Arts degree in Educational Psychology (with two areas of concentration), the Master of Arts degree in School Psychology and the Master of Science degree in Behavior Analysis. The Department also offers three graduate certificates: Certificate in Applied Behavior Analysis, Certificate in Language Acquisition and Bilingual Psychoeducational Assessment, and Certificate in Program Evaluation.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospitals, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform students of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/Docs/OC/htm/OC.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

- M.A. in Educational Psychology (p. 102)
- M.A. in School Psychology (p. 104)
- M.S. in Behavior Analysis (p. 106)

## Master of Arts Degree in Educational Psychology

The Master of Arts (M.A.) degree in Educational Psychology aims to prepare culturally competent scientist-practitioners and researchers to effectively contribute to the applied psychological development and well-being of children and adolescents. Students receive the preparation and training necessary to provide responsive educational and psychological services to the local community, schools, and beyond and to engage in participatory and leadership roles in local, national, and international institutions and organizations.

The M.A. in Educational Psychology offers two areas of concentration from which students can choose based on their professional goals and interests, each of which prepares students for career-specific applications of the degree. The degree coursework provides students with a strong foundation in Educational Psychology theory and principles as well as the skills to apply this learning to relevant contexts (e.g., educational settings, clinic settings, community settings, industrial/organizational settings, home settings). Students who wish to complete an intensive research project have the option of completing a Master's Thesis for 6 semester credit hours.

### Program Admission Requirements

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 from a regionally accredited college or university in the United States, preferably in a related field such as Psychology or Education, 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).  
Applicants who do not meet University-wide requirements for unconditional admission may be admitted conditionally if scores from the Graduate Record Exam (GRE), letter of recommendation, and/or previous work in the field provide evidence of academic potential. These conditional admission decisions will be made on a case-by-case basis using criteria established by the department faculty.
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. There is not a cutoff score for the GRE tests; rather, scores on these tests will be balanced with GPA and other criteria. Individuals applying for the Behavior Analysis Concentration—Focused Flexible option—may petition the ABA program coordinator to have the GRE admissions requirements waived.
4. International 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 60 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 Educational Psychology, (2) area of concentration they are most interested in, (3) experiences relevant to the concentration they are most interested in, and (4) career plans.
7. Applicants who lack appropriate academic background in Psychology, Education, or a closely related field may be admitted conditionally, and specific leveling coursework may be required to address areas of deficiency. The hours of coursework required will be determined on a case-by-case basis between the student and the student's advisor.

Interested persons should contact the Student Development Specialist for the Educational Psychology program or check the website for more information.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

### Degree Requirements

Candidates for the M.A. degree in Educational Psychology must earn a minimum of 36 semester credit hours. Students must pass a comprehensive 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 M.A. in Educational Psychology has two areas of concentration, and students choose their concentration based on their academic and professional goals and interests. The curriculum for each concentration will be presented separately.

### Concentration in Behavior Analysis

This concentration aims to provide students with a foundation in behavior analysis and prepare students to sit for the Behavior Analyst Certification Exam (BCBA®) (<https://www.bacb.com/bcba/>) to obtain national certification and state licensure as a Behavior Analyst. Students will obtain competency in the basic principles of learning with an emphasis on treating children, youth, and adults in community, clinic, hospital, and as consultants in educational settings. The degree program prepares graduates for eligibility to become Board Certified Behavior Analysts (BCBA®) through approved coursework and

practicum opportunities. Typical clients include students diagnosed with developmental or other disabilities that can impact prosocial skill development (e.g., Autism, Emotional Disturbance, Conduct Disorder, Obsessive Compulsive Disorder, Phobias) as well as people without disabilities who need systematic support in the development of prosocial skills and behaviors. Certified behavior analysts at the master's level work in a variety of settings as independent practitioners or contracted employees for an organization (e.g., public school, preschool, private school, clinic, hospital). The educational objectives of this concentration are commensurate with professional competence and certification requirements as currently reflected by professional standards of the Behavior Analyst Certification Board.

There are two options within the concentration. The first option (Comprehensive Program) meets face-to-face on campus for most activities. It contains all of the coursework required by the Behavior Analysis Credentialing Board. It also embeds the 2,000 experience hours through fieldwork, practice, and research experiences supervised by UTSA faculty. Students completing the comprehensive option will complete their hours at UTSA approved sites. Students in the Comprehensive Program will also have a formal review halfway through their program to identify their fitness to enter Practicum and continue in the Comprehensive Program.

The second option (Focused Flexible Program) allows for flexible attendance options (online, hybrid, and/or face-to-face attendance). It also contains all of the coursework required by the Behavior Analysis Credentialing Board. Students in this sequence may also complete their experience hours during their program, however the site is typically chosen by the student. The second option does not have any research requirements although students are encouraged to discuss with their advisor if they are interested in research. Once students have begun coursework in the Focused Flexible Program, they cannot transfer to the Comprehensive Program without approval by the ABA coordinator. This will be assessed on a case-by-case basis.

#### Curriculum for the Concentration in Behavior Analysis: Comprehensive Program

Code	Title	Credit Hours
<b>A. 33 semester credit hours of required courses:</b>		<b>33</b>
EDP 5003	Psychological Learning Theories	
EDP 5043	Basic Behavior Analysis	
EDP 5503	Introduction to Behavior Analysis	
EDP 5633	Interventions and Supervision in Behavior Analysis	
EDP 5643	Verbal Behavior	
EDP 5783	Practicum I in Applied Behavior Analysis (must be repeated for a total of 6 credit hours)	
EDP 6223	Research in Single Case Design	
EDP 6263	Behavior Assessment	
EDP 6443	Capstone Class in Behavior Analysis	
EDP 6463	Professionalism and Ethics for Practitioners	
<b>B. 3 semester credit hours of electives from the following courses:</b>		<b>3</b>
EDP 5033	Human Development Across the Life Span	
EDP 5493	Field Experience in Behavior Analysis	
EDP 5603	Psychology of Human Motivation	
EDP 5893	Practicum II in Applied Behavior Analysis	
EDP 6983	Master's Thesis (Permission of the Graduate Advisor of Record and thesis director required. 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.)

Students may choose other elective courses with faculty approval.

**Total Credit Hours** **36**

#### Curriculum for the Concentration in Behavior Analysis: Focused Flexible Program

Code	Title	Credit Hours
<b>A. 21 semester credit hours of required courses:</b>		<b>21</b>
EDP 5003	Psychological Learning Theories	
EDP 5503	Introduction to Behavior Analysis	
EDP 5633	Interventions and Supervision in Behavior Analysis	
EDP 5643	Verbal Behavior	
EDP 6223	Research in Single Case Design	
EDP 6263	Behavior Assessment	
EDP 6403	Ethics for Applied Behavior Analysis	
<b>B. 15 semester credit hours of electives from the following courses:</b>		<b>15</b>
EDP 5033	Human Development Across the Life Span	
EDP 5043	Basic Behavior Analysis	
EDP 5603	Psychology of Human Motivation	
SPE 5403	Survey of Special Education	
SPE 5613	Legal Issues in Special Education	
SPE 6863	Technology for Individuals with Disabilities	
Students may choose other elective courses with faculty approval		

**Total Credit Hours** **36**

#### Concentration in General Educational Psychology

The General Educational Psychology concentration focuses on two areas of (a) human development, learning, motivation, cognition, emotion, and cultural and (b) measurement, statistics, and evaluation. This concentration also offers flexibility to students to select elective coursework that best matches the student's interests.

#### Curriculum for the Concentration in Educational Psychology:

Code	Title	Credit Hours
<b>A. 24 semester credit hours of required courses:</b>		<b>24</b>
EDP 5003	Psychological Learning Theories	
EDP 5033	Human Development Across the Life Span	
EDP 5053	Psychosocial Contexts of Education	
EDP 5303	Educational Measurement and Assessment	
EDP 5603	Psychology of Human Motivation	
EDP 6103	Research Methods and Statistics I	
EDP 6203	Research Methods and Statistics II	

For the remaining 3 hours of required coursework, students must select an additional course in research methods or statistics from COEHD. Students should select this course based on their interests and professional goals.

**B. 12 semester credit hours of elective coursework** **12**



Elective coursework may also be determined based on the students's program of study and in consultation with assigned advisor. Students may elect to take courses from relevant departments throughout COEHD (i.e. Bilingual Bicultural Studies, Counseling, Educational Leadership and Policy Studies, Educational Psychology, and/or Interdisciplinary Learning and Teaching) and UTSA (e.g., including but not limited to Psychology, Sociology, and Public Policy). While students may add the ABA certificate to their program, they may not use their master's degree electives to obtain the certificate. Students may opt to do a master's thesis and earn credits as part of their elective options.

EDP 6983 Master's Thesis (Permission of the Graduate Advisor of Record and thesis director required. Thesis research and preparation. 6 SCH required. 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.)

**Total Credit Hours**

**36**

## Standards and Procedures

Each area of concentration of the M.A. in Educational Psychology has academic and professional standards that must be met in order to progress in the program. These standards will be provided by the Graduate Advisor of Record, the student's advisor, and/or the Student Development Specialist. Successful completion of the program is contingent upon satisfactory scholastic performance, demonstration of the ability to apply knowledge and skills, and demonstration of professional and ethical behaviors consistent with relevant professional associations (e.g., American Psychological Association, Behavior Analyst Certification Board).

It is the duty of faculty members in the Educational Psychology program to evaluate all students according to these standards in all settings in which faculty members and students interact, including classes, practicum 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 behavioral, educational, evaluation, or psychological services to others, that student will be removed from continuation in the program. Students in the Applied Educational Psychology and Behavior Assessment and Intervention concentrations will be subject to the department's Fitness to Practice Policy, as described in the Program Handbook.

Further, many school districts and clinic settings require a criminal history review/criminal background check before allowing university students to complete field-based experiences at their sites. If a student is unable to obtain a field-based placement (e.g., practicum placement) due to results of a criminal history review/criminal background check, that student will not be able to meet the Educational Psychology program's requirements. If a student cannot complete course-required field work because of their criminal history, the student will be required to withdraw from the course. The student may retake the course if and when the criminal history changes, allowing them to be cleared by the site. If the offense is one that will preclude any further field work, the student will be dismissed from the Educational Psychology program. A student's criminal history also may affect their ability to obtain licensure or

certification. Students, and prospective students, who have concerns about their criminal history should consult the relevant licensing board (e.g., BCCB, TSBE) to help determine whether this history would impact the prospective applicant's ability to secure licensure with the board. This will allow students to make informed decisions about their educational and professional goals. For example, for applicants intending to pursue ABA board certification (e.g., BCBA, BCaBA), the Texas Department of Licensing and Regulation (TDLR (<https://www.tdlr.texas.gov/>)) oversees occupational licenses. TDLR will conduct and provide a criminal history evaluation (<https://www.license.state.tx.us/crimconvict.htm>).

Only two courses with a 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 students who obtain more than two grades of "C" will be required to complete a remediation plan (i.e., retaking appropriate coursework and/or taking other coursework as deemed necessary by the student's advisor and Graduate Advisor of Record). Students on academic probation or not in good academic standing will not be permitted to enroll in Practicum courses. Further, students must earn a grade of "B" or better in all Practicum courses.

## 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 will also 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.

### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

### 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). Applicants who do not meet University-wide requirements for unconditional admission may be admitted conditionally if scores from the Graduate Record Exam (GRE), letter of recommendation, and/or previous work in the field provide evidence of academic potential. These conditional admission decisions will be made on a case-by-case basis using criteria established by the departmental faculty.
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 3.5 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 60 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 leveling 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 and this coursework must be completed within the first year of study.

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.

## 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 faculty have adopted a policy that requires all school psychology students to take and pass the Praxis II (needed for application to become a Licensed Specialist in School Psychology and a Nationally Certified School Psychologist) as an objective measure of their knowledge specific to the practice of school psychology.

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

Code	Title	Credit Hours
66 semester credit hours of required courses:		66
EDP 5003	Psychological Learning Theories	
EDP 5033	Human Development Across the Life Span	
EDP 5603	Psychology of Human Motivation	
EDP 5303	Educational Measurement and Assessment	
EDP 6033	Legal, Ethical, and Professional Issues in School Psychology	
EDP 6103	Research Methods and Statistics I	
EDP 6203	Research Methods and Statistics II	
EDP 6213	School Based Counseling Theories	
EDP 6233	Mental Health Services in the Schools	
EDP 6243	Cognitive Assessment and Intervention	
EDP 6253	Academic Assessment and Intervention	
EDP 6263	Behavior Assessment	
EDP 6293	Consultation in the Schools	
EDP 6343	Social Emotional Assessment in the Schools	
EDP 6643	Child and Adolescent Psychopathology	
EDP 6703	Clinical Neuropsychology	
EDP 6733	Multicultural Assessment and Intervention	
EDP 6833	Practicum in School Psychology (must be repeated for a total of 6 credit hours)	
EDP 6943	Internship in School Psychology (must be repeated for a total of 6 credit hours)	
SPE 5403	Survey of Special Education	
<b>Total Credit Hours</b>		<b>66</b>

## 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, at a level that meets or exceeds 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.

Many school districts require a criminal history review/criminal background check before allowing university students to complete field-based experiences on their campuses. If a student is unable to obtain a field-based placement (e.g., practicum or internship placement) due to results of a criminal history review/criminal background check, that student will not be able to meet the School Psychology program's requirements. If a student cannot complete course-required field work because of their criminal history, the student will be required to withdraw from the course. The student may retake the course if and when the criminal history changes, allowing them to be cleared by the school district. If the offense is one that will preclude any further field work, the student will be dismissed from the School Psychology program. A student's criminal history also may affect their ability to obtain licensure. The Texas State Board of Examiners of Psychologists (TSBEP (<https://www.tsbep.texas.gov/>)) will conduct a preliminary evaluation of a prospective applicant's criminal history to determine whether this history would impact their ability to secure licensure with the Board (<https://www.tsbep.texas.gov/how-to-become-licensed/>). Students, and prospective students, who have concerns about their criminal history should take advantage of this preliminary review so that they can make informed decisions about their educational and professional goals.

Only one course with a 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 students who obtain more than one grade of "C" will be put on probation and may be required to complete appropriate remedial work.

## Master of Science Degree in Behavior Analysis

The Master of Science (M.S.) degree in Behavior Analysis aims to prepare graduate students to become scientist-practitioners trained to provide quality, impactful services for all populations benefitting from behavior analysis. This degree aims to provide students with a foundation in behavior analysis and prepare students to sit for the Behavior Analyst Certification Exam (BCBA® (<https://www.bacb.com/bcba/>)) to obtain national certification and state licensure as a Behavior Analyst. Students will obtain competency in the basic principles of learning with an emphasis on treating children, youth, and adults in community, clinic, hospital, and as consultants in educational settings. The degree program prepares graduates for eligibility to become Board Certified Behavior Analysts (BCBA®) through approved coursework and practicum opportunities. Typical clients include individuals diagnosed with developmental or other disabilities that can impact prosocial skill development (e.g., Autism, Emotional Disturbance, Conduct Disorder,

Obsessive Compulsive Disorder, Phobias) as well as people without disabilities who need systematic support in the development of prosocial skills and behaviors. Certified behavior analysts at the master's level work in a variety of settings as independent practitioners or contracted employees for an organization (e.g., public school, preschool, private school, clinic, hospital). The educational objectives of this degree are commensurate with professional competence and certification requirements as currently reflected by professional standards of the Behavior Analyst Certification Board.

## Program Admission Requirements

The number of students admitted to this program and/or concentrations 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 from a regionally accredited college or university in the United States, preferably in a related field such as Psychology or Education, or show 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 coursework taken (if applicable). Applicants who do not meet University-wide requirements for unconditional admission may be admitted conditionally based on letters of recommendation, and/or previous work in the field provide evidence of academic potential. These conditional admission decisions will be made on a case-by-case basis using criteria established by the department faculty.
3. International 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 60 on the TOEFL paper version, at least 79 on the TOEFL Internet version, or at least 6.5 on the IELTS.
4. 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.
5. Applicants must prepare a Statement of Purpose (approximately 500 words) which outlines the applicant's (1) reasons for pursuing the M.S. degree in Behavior Analysis, (2) area of concentration they are most interested in (i.e., Comprehensive or Focused), (3) experiences relevant to the concentration they are most interested in, and (4) career plans.
6. Applicants who lack appropriate academic background in Psychology, Education, or a closely related field may be admitted conditionally, and specific leveling coursework may be required to address areas of deficiency. The hours of coursework required will be determined on a case-by-case basis between the student and the student's advisor.

Interested persons should contact the Student Development Specialist for the Educational Psychology program or check the website for more information.

## Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship,

practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/docs/oc/htm/oc.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

## Degree Requirements

Candidates for the M.S. degree in Behavior Analysis must earn a minimum of 36 semester credit hours. Students will take a comprehensive 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.

### Master of Science in Behavior Analysis Concentrations

The M.S. in Behavior Analysis has two areas of concentration, and students choose their concentration based on their academic and professional goals and interests. The curriculum for each concentration will be presented separately.

The *Comprehensive concentration* is designed to provide the research, academic, and practical training necessary for students to become certified as a Board Certified Behavior Analyst and licensed as a Licensed Behavior Analyst in the state of Texas. The program includes research training, coursework and field-based experiences related to behavior assessment, intervention, and professional issues. It contains all of the coursework required by the Behavior Analysis Credentialing Board. It also embeds the 2,000 experience hours through fieldwork, practice, and research experiences supervised by UTSA faculty. Students completing the comprehensive option will complete their hours at UTSA partner sites. This program prepares students to work in a variety of settings (e.g., clinical, home, community based, and schools), with a focus on serving people of all ages with developmental disabilities (e.g., autism spectrum disorder).

The *Focused concentration* also contains all of the coursework required by the Behavior Analysis Credentialing Board. However, this concentration embeds flexibility by allowing students to select up to 15 hours of elective coursework. The *Focused concentration* does not have any research or practical (e.g., fieldwork or practicum) requirements. Students in this sequence may also complete their experience hours during their program, however the site is typically chosen by the student. Although, the focused concentration does not have any research requirements, students are encouraged to discuss with their advisor if they are interested in research. Once students have begun coursework in the Focused concentration, they cannot transfer to the Comprehensive Program without approval by the ABA program coordinator. This will be assessed on a case-by-case basis.

Interested persons with questions regarding the difference between the two concentrations should contact the Student Development Specialist for the Educational Psychology program or check the website for more information.

### Program of Study for the Comprehensive Concentration in Behavior Analysis

#### A. 33 semester credit hours of required courses: 33

EDP 5003	Psychological Learning Theories
EDP 5043	Basic Behavior Analysis
EDP 5493	Field Experience in Behavior Analysis
EDP 5503	Introduction to Behavior Analysis
EDP 5633	Interventions and Supervision in Behavior Analysis
EDP 5643	Verbal Behavior
EDP 5783	Practicum I in Applied Behavior Analysis
EDP 6223	Research in Single Case Design
EDP 6263	Behavior Assessment
EDP 6443	Capstone Class in Behavior Analysis
EDP 6463	Professionalism and Ethics for Practitioners

#### B. 3 semester credit hours of electives from the following courses: 3

EDP 5033	Human Development Across the Life Span
EDP 5603	Psychology of Human Motivation
EDP 6983	Master's Thesis

Students may choose other elective courses with faculty approval.

#### Total Credit Hours 36

### Program of Study for the Focused Concentration in Behavior Analysis

#### A. 21 semester credit hours of required courses: 21

EDP 5003	Psychological Learning Theories
EDP 5503	Introduction to Behavior Analysis
EDP 5633	Interventions and Supervision in Behavior Analysis
EDP 5643	Verbal Behavior
EDP 6223	Research in Single Case Design
EDP 6263	Behavior Assessment
EDP 6403	Ethics for Applied Behavior Analysis

#### B. 15 semester credit hours of electives: 15

Elective coursework may also be determined based on the student's program of study and in consultation with assigned advisor. Students may elect to take courses from relevant departments throughout COEHD (e.g., including but not limited to Bilingual Bicultural Studies, Early Childhood Education, and Educational Psychology) and UTSA (e.g., including but not limited to Psychology, Sociology, and Public Policy). Students may opt to do a master's thesis and earn credits as part of their elective options.

#### Total Credit Hours 36

- Graduate Certificate in Applied Behavior Analysis (p. 107)
- Graduate Certificate in Language Acquisition and Bilingual Psychoeducational Assessment (p. 108)
- Graduate Certificate in Program Evaluation (p. 109)

## Graduate Certificate in Applied Behavior Analysis

The Applied Behavior Analysis certificate is offered through the Department of Educational Psychology. 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. All students must apply and be accepted into the certificate program before counting any courses towards the certificate.

This certificate is designed to provide students with focused training in the area of applied behavior analysis. The certificate provides students with specialized skills in the application of behavior analysis to support the social communication, academic, and 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., clinic settings, hospital settings, home settings, and as consultants in educational settings). In addition, completion of the coursework linked with the certificate will meet most coursework requirements set forth by the Behavior Analyst Certification Board, Inc. (BACB (<https://www.bacb.com/bcba/>)). Additional coursework is required to meet BACB® coursework requirements and students can complete these courses upon admission to the ABA Certificate Program.

The following departmental requirements are applicable to the Certificate in Applied Behavior Analysis:

- A bachelor's degree from an accredited university.
- A minimum grade point average (GPA) of 3.0 for the last 30 hours of coursework.
- To maintain enrollment in the certificate program, students should maintain a 3.0 GPA throughout their tenure in the program.

#### Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

#### Certificate Program Requirements

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:

Code	Title	Credit Hours
<b>A. 9 semester credit hours of required courses:</b>		<b>9</b>
EDP 6223	Research in Single Case Design	
EDP 6263	Behavior Assessment	
EDP 5503	Introduction to Behavior Analysis	
<b>B. 6 semester credit hours - Students choose from either Block A OR Block B</b>		<b>6</b>
<b>BLOCK A</b>		

EDP 6833	Practicum in School Psychology	
EDP 6293	Consultation in the Schools	
<b>BLOCK B</b>		
EDP 5633	Interventions and Supervision in Behavior Analysis	
EDP 5643	Verbal Behavior	
<b>Total Credit Hours</b>		<b>15</b>

Please note that two additional courses (EDP 5003 Psychological Learning Theories and EDP 5643 Verbal Behavior) will be required for students to meet coursework requirements to apply for the BCBA® nationwide exam. These courses are not a requirement for the UTSA ABA Certificate but students will not be eligible for the national exam without these courses. There are also internship requirements in addition to the coursework requirements. Students must see the Applied Behavior Analysis Coordinator in the Department of Educational Psychology if they are interested in becoming eligible to take the Board Certified Behavior Analysis (BCBA (<https://www.bacb.com/bcba/>)) Examination. The coordinator will provide further instructions about the requirements for the BCBA®.

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 Student Policies, Admission Policies, are applicable.

All other requirements for certificate programs described in the Graduate Catalog, Certificate Program Regulations, apply to this program.

## 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, 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), with current status as a student in a graduate-level psychology program, or
- A master's or doctoral degree from an accredited university in an approved area of study (e.g., school psychology, counseling

psychology, clinical psychology) with completion of graduate-level coursework in academic assessment and cognitive assessment, or

- Current Educational Diagnostician Certificate
- Attainment of passing grade on a mandated Spanish proficiency test (e.g., designated university Spanish proficiency test, such as UTSA Assessment of Language Proficiency in Spanish [ALPS])

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 transcripts and 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 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 Associate 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 Program 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 portfolio
3. Maintain a 3.0 GPA throughout tenure in the program

Code	Title	Credit Hours
<b>A. EDP Required Courses:</b>		<b>9</b>
EDP 6273	Bilingual Psychoeducational Assessment	
EDP 6733	Multicultural Assessment and Intervention	
EDP 6833	Practicum in School Psychology	
<b>B. BBL Required Courses:</b>		<b>6</b>
BBL 5053	Assessment in Bilingual and ESL Programs	
ESL 5013	Foundations of Second Language Acquisition	
	or BBL 7133 Bilingualism and Second Language Acquisition	
<b>Total Credit Hours</b>		<b>15</b>

## Graduate Certificate in Program Evaluation

This 15-hour Certificate in Program Evaluation (CPE) is designed to meet the needs of students interested in developing foundational skills in program evaluation and research methods (including quantitative, qualitative, and mixed-method approaches). Skills in conducting formative evaluations, using stakeholder focus groups, and bringing the

lens of implementation science to the planned collection and analysis of data make these courses unique from most other research and statistics courses at UTSA. The CPE is offered through the Department of Educational Psychology in the College of Education and Human Development.

The Certificate in Program Evaluation allows non-degree-seeking students (e.g., professionals in the San Antonio community) as well as graduate students in COEHD and other Colleges to obtain recognition of advanced studies in Program Evaluation by completing a 15-semester-credit-hour course sequence. This certificate conforms to the training guidelines of the American Evaluation Association (AEA), which is the primary professional organization focusing on program evaluation training, supervision, and competencies.

### Admission Requirements

Current degree-seeking students can apply for CPE admission through the Department of Educational Psychology.

Non-degree-seeking (i.e., certificate-only) students can apply for CPE admission through the Graduate School admissions process. Students can enroll in either Fall or Spring semesters following admission to the program. Regular admission deadlines and procedures apply.

All applicants must meet/fulfill the following departmental requirements:

1. Have earned a baccalaureate degree from a regionally accredited institution in Education, Psychology, Public Administration, Economics, Sociology, or related field
2. Provide official transcripts for all undergraduate and graduate schools attended, regardless of whether a degree was received
3. Have had a grade point average (GPA) of at least 3.0 (on a 4.0 scale) in the last 30 hours of their baccalaureate degree program coursework and all graduate coursework
4. Provide a current résumé or curriculum vita
5. Provide a personal statement describing her/his interest in pursuing a Graduate Certificate in Program Evaluation, including discussion of ultimate plans for using the certification professionally, as well as any prior formal or informal experiences in program evaluation
6. Provide the names and contact information of two individuals who have agreed to serve as personal references for the candidate and who can address the candidate's potential for success in the CPE. For those who have been in the workforce for an extended period of time, these referees may be other professionals who have served in a supervisory capacity, although it is preferable to include at least one academic reference.

### Academic Standing

All current degree-seeking students seeking admission to the Certificate in Program Evaluation must be in good academic standing (i.e., GPA of 3.0 or above) within their departments. Non-degree-seeking applicants must have been in good academic standing (i.e., GPA of 3.0 or above) at the institution from which they earned their bachelor's degree and the institution from which they request to transfer graduate coursework as substitutes for either foundation courses. Those institutions must be regionally accredited.

Based on deficiencies or concerns by the CPE Program regarding any of the information provided (items 1-6 above), applicants may be denied admission to the CPE. Assessments by CPE faculty or field/practicum supervisors also may result in dismissal of candidates from the program, if there is sufficient evidence to suggest that the candidate may engage

in unprofessional behavior or improper implementation of program evaluation methods.

Each course in the certificate course sequence will be offered once per academic year. Students may consult with the Certificate in Program Evaluation (CPE) Coordinator to see if coursework and/or practicum or internship courses from other departments or programs could be substitutes for either foundational coursework or practicum required for the CPE certificate.

## Certificate Program 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. Maintain a 3.0 GPA throughout tenure in the program

Code	Title	Credit Hours
<b>A. Two of the following prerequisite foundational courses (which count towards the 15 total credit hours required for the certificate):</b>		<b>6</b>
EDP 5303	Educational Measurement and Assessment	
EDP 6103	Research Methods and Statistics I	
EDP 6203	Research Methods and Statistics II	
OR		
Other foundational coursework as approved by the Department of Educational Psychology		
<b>B. Three required core courses in the Certificate in Program Evaluation (CPE) program:</b>		<b>9</b>
EDP 6303	Program Evaluation I	
EDP 6313	Program Evaluation II	
EDP 6333	Practicum in Program Evaluation	
<b>Total Credit Hours</b>		<b>15</b>

## Educational Psychology (EDP) Courses

### EDP 5003. Psychological Learning Theories. (3-0) 3 Credit Hours.

There are two different versions of this course. The General version provides a current and comprehensive overview of theory and research related to learning. It covers topics such as behaviorism, social cognitive theory, information processing, constructivism, and motivation, and explores applications of learning principles in multiple contexts including classroom and virtual learning environments. The General version is appropriate for students in all areas of graduate study. The Applied Behavior Analysis version of EDP 5003 covers the same broad topics, but includes more of a behavioral focus (e.g., by comparing and contrasting behaviorism with other theoretical approaches to learning). The ABA version is taught by an instructor approved by the Behavior Analysis Certification Board, and thus is appropriate for students pursuing the Board Certified Behavior Analyst credential. Students should check the notes in the class schedule to make sure they are registering for the appropriate section of EDP 5003. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### EDP 5043. Basic Behavior Analysis. (3-0) 3 Credit Hours.

The purpose of this course is to develop competence in understanding how principles of behavior are discovered and described in the context of basic research. The class provides an overview of basic behavioral processes in the context of both human and non-human learning. There is a focus on the experimental analysis of behavior and critical analysis of research. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### EDP 5053. Psychosocial Contexts of Education. (3-0) 3 Credit Hours.

This course examines the role and sociocultural context of America's public education system. Students are challenged to critically deconstruct the primary goals of schooling through scholarly inquiry, debate, and discussion. The course is available to students from diverse disciplines including education, psychology, sociology, leadership, and policy. Throughout the course, students are encouraged to develop critical thinking and writing skills that can be applied within their chosen area of study. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### EDP 5303. Educational Measurement and Assessment. (3-0) 3 Credit Hours.

Introduces the study of assessment and measurement, 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. (Formerly titled "Principles and Techniques of Evaluation.") Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

### EDP 5493. Field Experience in Behavior Analysis. (3-0) 3 Credit Hours.

Prerequisite: EDP 5503 or consent of instructor. The purpose of this course is to develop skill in professional practice or research. This course will provide students with the opportunity to participate in supervised field-based applied research experiences in approved hospital, home, educational, or clinical settings. Emphasis is on orientation to behavior analysis in applied settings, learning the role of a behavior consultant within larger systems, implementations and evaluation of behavioral interventions for students struggling with problem behaviors. May be repeated for up to 6 hours of credit. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

### EDP 5503. Introduction to Behavior Analysis. (3-0) 3 Credit Hours.

This course presents an introduction to concepts and principles of behavior analysis to develop students' competence in the use of technical terminology. As an introductory course to behavior analysis, special attention will be paid to philosophy, terminology, and methods in behavior analysis. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**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 perspectives including educational, psychological and sociocultural. The goal of the course is to help students from diverse disciplinary backgrounds (e.g., counseling, education, health, leadership, psychology, sociology, sports) to develop foundational understandings of human motivational processes applied to diverse contexts and populations. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDP 5633. Interventions and Supervision in Behavior Analysis. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5503, EDP 6223, and EDP 6263 or consent of the instructor. The purpose of this course is to develop competency in the application of principles of behavior and multiple areas of investigation and practice. The course will provide students with the opportunity to acquire knowledge about evidenced-based instructional practices based on the principles of behavior analysis. Students will have the opportunity to learn to design appropriate interventions, how to apply those interventions, and to make decisions based on student data to inform future instructional practices. Students will also learn how to supervise from a behavior-analytic perspective and manage the implementation of interventions by others. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 5643. Verbal Behavior. (3-0) 3 Credit Hours.**

The purpose of this course is to develop competencies in the application of principles of behavior and multiple areas of investigation and practice. An advanced graduate course on the analysis of the verbal behavior of the proficient speaker and listener, and the biological, environmental, and motivational factors affecting it. Structural and developmental issues, as well as implications for language training and remediation are integrated throughout. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 5783. Practicum I in Applied Behavior Analysis. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5503, EDP 6223, and EDP 5493 (or equivalent) or consent of instructor. The purpose of this course is to develop skills in professional practice or research. 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 behavioral assessments and interventions for individuals with disabilities. This course requires fieldwork outside of the classroom. May be repeated for up to 6 hours of credit. Course Fees: GH01 \$75; INT1 \$150; LRH1 \$10; SPS1 \$42; STSH \$18.

**EDP 5893. Practicum II in Applied Behavior Analysis. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5503, EDP 6223, and EDP 5493 (or equivalent) or consent of instructor. The purpose of this course is to develop skill in professional practice or research. This course will provide the 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. May be repeated for up to 6 hours of credit. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; SPS1 \$42; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6103. Research Methods and Statistics I. (3-0) 3 Credit Hours.**

This course covers an overview of introductory research methods and statistics concepts commonly encountered in behavioral research literature. Students will be introduced to basic design features of qualitative, quantitative, and mixed methods approaches to research as well as basic statistical concepts including probability, sampling, tests, ANOVA, chi-square tests, and correlation/regression. Students will use these concepts to be able to develop as well as read and evaluate educational and psychological research.. (Formerly titled "Introductory Statistics.") Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6203. Research Methods and Statistics II. (3-0) 3 Credit Hours.**

Prerequisite: EDP 6103 or equivalent. This course extends upon topics covered in EDP 6103. Students are exposed to advanced research methods and statistics topics with a special emphasis on research design. Topics covered include design concepts associated with quantitative research (e.g., threats to experimental validity, quasi and experimental research designs, single case design and meta-analyses) as well as qualitative and mixed methods designs (case studies, ethnographies, interview research). Students will use these concepts to read, interpret, and evaluate the validity of conclusions drawn from educational and psychological research. (Formerly titled "Quasi and Experimental Research Design.") Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6223. Research in Single Case Design. (3-0) 3 Credit Hours.**

The purpose of this course is to develop student competence in the measurement of behavior, data collection analysis and graphic representation, and experimental design with a particular emphasis on single-subject design. 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. Requires an applied project. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.



**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. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**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.") Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**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; using academic assessment results to inform educational planning and intervention; and using assessment data for monitoring student academic progress. Videotaping of test administration is required for purposes of supervision and self-evaluation. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6263. Behavior Assessment. (3-0) 3 Credit Hours.**

Prerequisite: EDP 5503, EDP 6223, or consent of the instructor. This course provides a rigorous repertoire of knowledge and focuses on the application of behavior analytic theory to the assessment of socially important behavior. This course assumes that students enter with a strong foundation in the basic concepts of behavior analysis. This course is designed as a service-learning course and will provide the opportunity for students to not only embrace theory but successfully apply it in needed environments. Requires an applied project. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6273. Bilingual Psychoeducational Assessment. (3-0) 3 Credit Hours.**

Prerequisite: EDP 5303 or equivalent. Course examines practice in bilingual psychoeducational assessment. Students will have the opportunity to learn about: ethical, legal, and professional issues in bilingual assessment; theories of second language acquisition and language proficiency development and assessment; best practices in the use of interpreters in assessment; measurement of academic achievement via multiple approaches; and measurement of cognitive abilities via multiple approaches. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6293. Consultation in the Schools. (3-0) 3 Credit Hours.**

Prerequisites: EDP 6103 and EDP 6203. Examines the role of consultation with school personnel and families within the practice of school psychology. Major theoretical models of consultation with an emphasis on an integrated Model of School Consultation, specific approaches to service delivery, and ethical issues related to consultation in the schools are discussed. This course also includes methods of evaluating consultation outcomes at the individual student, systems, and program levels. Requires service-learning hours and the application of theoretical and conceptual foundations to consultation case studies. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6303. Program Evaluation I. (3-0) 3 Credit Hours.**

Prerequisites: EDP 6103 and EDP 6203. This course is the first part of a year-long sequence that introduces students to research design and data analysis in the context of evaluation. Students will learn about the history, professional standards, theories, and methods of program evaluation. This course examines principles and techniques needed to develop appropriate data collection and management strategies in alignment with evaluation questions. Students will also have hands-on practice with computer programs to build basic skills in organizing, managing, and analyzing evaluation data. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6313. Program Evaluation II. (3-0) 3 Credit Hours.**

Prerequisites: EDP 6103, EDP 6203, and EDP 6303. This course is the second part of a year-long sequence that introduces students to research design and data analysis in the context of evaluation. This course reviews the principles, merits, limitations, and applications of various quantitative methodologies for analyzing evaluation data. Students will also have hands-on practice with computer programs to build practical skills in conducting, interpreting, and reporting quantitative evaluation research. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6333. Practicum in Program Evaluation. (3-0) 3 Credit Hours.**

Prerequisites: Completion of Practicum Form indicating required coursework (i.e., EDP 6103, EDP 6203, EDP 6303, and EDP 6313) has been completed, and consent of instructor. Practicum in Program Evaluation is a one-semester supervised practical application course in which students work alongside evaluation practitioners in a professional setting to gain first-hand understanding of how to apply the theories, methods, and skills learned in prior classes. Settings might include educational institutions, government agencies, human service organizations, and for-profit and non-profit evaluation firms. Placements may be with internal or external evaluation entities. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6343. Social Emotional Assessment in the Schools. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5303 and EDP 6243. Theory and application and administration and scoring of specific instruments and techniques involved in social emotional and psychological assessment in the schools is emphasized. Additionally emphasis is on analysis, interpretation, and integration of intelligence, achievement, emotional, behavioral, and personality assessment results for diagnostic and treatment planning. Psychological report writing is required. (Formerly EDP 6323. Credit cannot be earned for both EDP 6323 and EDP 6343.) (Formerly titled "Advanced Psychological Assessment.") Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6403. Ethics for Applied Behavior Analysis. (3-0) 3 Credit Hours.**

The purpose of this course is to prepare students to understand legal constraints and ethical guidelines as pertinent to behavioral research and practice. This course is designed to teach ethical and professional conduct considerations in applied behavior analysis. This course follows the BACB® professional and ethical compliance code and is intended for students preparing to become and who are certified behavior analysts. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6443. Capstone Class in Behavior Analysis. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5503, EDP 6223, EDP 6263, EDP 5633, EDP 5643, or consent of instructor. Students in this course will engage in a number of professional development activities with the goal of preparing students for the Behavior Analysis Certification Exam and their future as a Behavior Analyst. The class is focused on professional development (e.g., mock interviews and development of curriculum vitae), portfolio building activities (e.g., completion of research competencies and professional presentation) and exam preparatory exercises. At the conclusion of this class and all class assignments/competencies, students will be eligible to schedule their comprehensive examination. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**EDP 6463. Professionalism and Ethics for Practitioners. (3-0) 3 Credit Hours.**

Prerequisite: Completion of EDP 5503 and EDP 5783 or approval by ABA program coordinator. This course is an introduction to the Behavior Analyst Certification Board's Professional and Ethical Compliance Code, related disciplinary systems, and professionalism in the practice of applied behavior analysis. Special emphasis is placed on the ethics underlying practices for supporting individuals with disabilities, and related cultural considerations. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6643. Child and Adolescent Psychopathology. (3-0) 3 Credit Hours.**

Prerequisite: EDP 5033 or equivalent. This course uses the DSM classification system 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. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6733. Multicultural Assessment and Intervention. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5303, EDP 6643, and EDP 6833. This course provides theory and research related to psycho-educational and function based assessment and intervention with diverse populations. Structured as a seminar, discussions include professional issues, trends, testing and assessment issues, and advancements in intervention and techniques with diverse populations. The development of cultural competence and exposure to culturally responsive practices in the schools is emphasized. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6833. Practicum in School Psychology. (3-0) 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 school and system 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. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; SPS1 \$42; STSH \$30.

**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 master's program has been completed. May be repeated for up to 6 hours credit. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$30; STSH \$10.

**EDP 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$90; STSH \$30.

**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). Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

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

Prerequisite: Permission of the Graduate Advisor of Record and thesis director required. 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. Course Fees: GH01 \$90; STSH \$30.

**EDP 6991. Independent Study in School Psychology Internship. (0-0) 1 Credit Hour.**

Prerequisite: Consent of instructor. Corequisite: EDP 6943. 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. Course Fees: GH01 \$30; SPS1 \$14; STSH \$10.

**EDP 7033. History and Systems of Psychology. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This course provides a historical examination of psychology's antecedents in philosophy and physiology, early systems of psychology, the development of psychology as a profession and of major professional conventions, the rise of evidence-based practice, and multicultural diversity in the practice of psychology. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7043. Systems Consultation and Prevention Science. (3-0) 3 Credit Hours.**

This course provides a historical examination of school and systems consultation following the evolution of consultation in contemporary school settings. Theory, research and practice in prevention science with an emphasis on individuals from birth to age 21; understanding and application of theories and methods of prevention science. Needs Assessment, System readiness, resource mapping, and leadership development will be discussed. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7103. Multivariate Statistics. (3-0) 3 Credit Hours.**

Prerequisite: EDP 6103 and EDP 6203, or consent of instructor. This course introduces students to statistical methods that consider several variables at once. Emphasis will be given to the applications of multivariate methods to data sets in education, psychology, and social sciences. Students will develop foundational knowledge as to how multivariate methods work, they will be able to apply these methods using computer software (e.g., SPSS, R, Stata), and they will be able to make inferences on from the results of multivariate statistical analyses. Understanding of linear regression is assumed for this course. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7203. Hierarchical Linear Modeling. (3-0) 3 Credit Hours.**

Prerequisite: EDP 6103 and EDP 6203, or consent of instructor. This course offers an overview of the theories and use of hierarchical linear models. Students will learn the techniques of hierarchical linear models and apply the methods to multilevel data in education, psychology, and social sciences. Topics covered include multilevel analyses, random intercept and slope models, 2- and 3-level models, hypothesis testing, model assessment, longitudinal (repeated measures) data, and generalized hierarchical models for categorical variables. Understanding of linear regression is assumed for this course. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7213. Supervision and Teaching in Psychology. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. Introduction to knowledge and skills necessary for effective supervision and teaching in psychology. Students will be required to engage in supervision and teaching experiences to demonstrate competency in skill acquisition. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7303. Research Evaluation in the Behavioral Sciences. (3-0) 3 Credit Hours.**

This course provides students with knowledge to develop skills in synthesizing and evaluating the methodological soundness of behavioral science research. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7313. Advanced Analysis for Single-Case Experiments. (3-0) 3 Credit Hours.**

Prerequisite: EDP 7303. This course covers methods for analyzing data from single-case experiments (e.g., multiple baseline, reversal, and alternating treatment studies) including applications of visual analysis, effect size estimation, and meta-analysis. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7323. Competitive Grant Writing and Development. (3-0) 3 Credit Hours.**

This course is designed to provide students with the knowledge and skills to perform one of the most critical functions for any academic, public, or nonprofit sector agency: gaining funds through proposals. Students learn how to find a funding source among various funders and how to plan and write a proposal. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7343. Advanced Applied Behavior Analysis. (3-0) 3 Credit Hours.**

This course is an advanced study of applied behavior analysis. The content of the course is related to principles and advanced concepts in applied behavior analysis. Students learn how to gather information about an advanced topic and how to present that information to others. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7403. Prevention and Intervention with At-Risk Families. (3-0) 3 Credit Hours.**

Prerequisite: Consent of the instructor. The purpose of this course is to provide educational practitioners and related personnel with the conceptual and theoretical foundation for understanding the nature and impact of systemic barriers and exposure to childhood risks in literacy, physical, and mental health development of vulnerable, at-risk families and their young children within a developmental framework. Professional psychology's and education's response to these factors, including intervention, is also examined. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7413. Bilingual Special Education. (3-0) 3 Credit Hours.**

The purpose of this course is to provide educational practitioners and related personnel with the knowledge and skills needed for understanding and working with bilingual populations within the special education context. Students learn theory, policy, and practice important to bilingual populations' linguistic and educational programming needs. Major theories of second language acquisition processes will be learned along with bilingual instructional paradigms and learning needs. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7603. Longitudinal Data Analyses. (3-0) 3 Credit Hours.**

Prerequisite: EDP 6103 and EDP 6203, or consent of instructor. This course covers statistical models for drawing scientific inferences from continuous and discrete longitudinal data in education, psychology, and social sciences. Topics include longitudinal study design; exploring longitudinal data; linear and generalized linear regression models for correlated data, including marginal, random effects, and transition models; and handling missing data. Understanding of linear regression is assumed for this course. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7613. Item Response Theory. (3-0) 3 Credit Hours.**

Prerequisite: EDP 5303 or consent of instructor. This course introduces concepts, theory, and application of item response theory (IRT) in educational and psychological fields with computer applications for data analysis. Topics include one-, two-, and three -parameter models; item and test information functions; test characteristics curves; test design; item fit and selection; tests for unidimensionality and model fit; IRT equating; adaptive testing strategies; item banking; and Bayesian, maximum likelihood, and EM estimation. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7623. Advanced Psychological Measurement. (3-0) 3 Credit Hours.**

Prerequisites: EDP 5303, EDP 6103, and EDP 6203. This course covers advanced concepts in psychometric theory, test construction, item analysis, norms, reliability, validity studies, and professional standards for test development. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7633. Structural Equation Modeling. (3-0) 3 Credit Hours.**

Prerequisite: EDP 6103 and EDP 6203 or consent of instructor. This course introduces the basic theoretical background necessary for the application of Structural Equation Modeling (SEM) using computer software (e.g., Mplus, Stata, and R) and data in education, psychology, and social sciences. Topics include model specification, identification, path analysis, estimation, testing fit, respecification, confirmatory factor analysis and issues concerning the interpretation of SEM results. Understanding of linear regression is assumed for this course. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7643. Qualitative Research Methods in Educational Psychology. (3-0) 3 Credit Hours.**

This course covers basic concepts of qualitative research methods including qualitative designs (e.g., case studies, ethnographies), data collection approaches (e.g., observations, interviews, document analyses) and approaches to qualitative coding techniques (e.g., discourse analysis, grounded theory analysis). Students will learn both how to conduct and evaluate qualitative research. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7783. Special Topics in Educational Psychology. (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 Topics courses may be repeated for credit when topics vary, but not more than 6 hours will apply to the Doctoral degree. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7833. Advanced Practicum. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. Appropriate for advanced students in educational psychology programs, this course will include instruction and supervision of fieldwork in a variety of possible settings. Content and requirements will vary based on students' previous coursework and professional goals. May be repeated for up to 6 hours credit. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7943. Doctoral 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 750 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 doctoral program has been completed. May be repeated for up to 6 hours credit. Course Fees: GH01 \$90; LRH1 \$20; SPS1 \$42; STSH \$30.

**EDP 7991. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: Admission to candidacy for the Doctoral degree and consent of student's Graduate Advisor of Record. Dissertation research and preparation. May be repeated for credit, but no more than 9 hours will apply to the doctoral degree. Credit will be awarded upon completion of the dissertation. Course Fees: GH01 \$30; STSH \$10.

**EDP 7993. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: Admission to candidacy for the Doctoral degree and consent of student's Graduate Advisor of Record. Dissertation research and preparation. May be repeated for credit, but no more than 9 hours will apply to the doctoral degree. Credit will be awarded upon completion of the dissertation. Course Fees: GH01 \$90; STSH \$30.

# 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 equity 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 five Master of Arts degrees: Curriculum and Instruction; Early Childhood and Elementary Education; Learning, Design, and Technology; Literacy Education (formerly Reading and Literacy); and Special Education, as well as the Doctor of Philosophy in Interdisciplinary Learning and Teaching. The Department also offers a Graduate Certificate in I-STEM Education. For individuals seeking Texas Teacher Certification, the Department offers initial Certification in Grades 4-8 Mathematics and Science and Grades 4-8 English, Language Arts, Reading, and Social Studies through the Teacher Certification option of the Master's in Curriculum and Instruction, as well as the Texas Reading Specialist Certification.

## Criminal History Policy and Acknowledgement

The College of Education and Human Development (COEHD) prepares educators and professionals for fields which require fieldwork, internship, practicum, service-learning and/or clinical teaching. Placements occur in educational, clinical, health care facilities, hospitals, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform students of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105 (<https://statutes.capitol.texas.gov/Docs/OC/htm/OC.53.htm>).

All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

- M.A. in Curriculum and Instruction (p. 116)
  - Teacher Certification Option (p. 117)
- M.A. in Early Childhood and Elementary Education (p. 118)
- M.A. in Learning, Design, and Technology (p. 118)
- M.A. in Literacy Education (formerly Reading and Literacy (p. 119))
  - Reading Specialist Certification (p. 120)
- M.A. in Special Education (p. 120)
- Ph.D. in Interdisciplinary Learning and Teaching (p. 121)

## Master of Arts Degree in Curriculum and Instruction

This degree 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.

### 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.

### Degree Requirements for Option I and Option II

Education degrees have four required components: a core of common courses, a program emphasis, support work, and a comprehensive examination.

#### Option I: Thesis

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>9</b>
CI 5003	Theory of Curriculum and Instruction	
CI 5013	Curriculum, Instruction and Assessment	
EDU 5003	Research Methods	
<b>B. Program Emphasis</b>		<b>12</b>
CI 6103	Research in Action	
CI 6673	Policy and Critical Issues in Teaching	
or CI 6123	Critical Perspectives in Curriculum and Instruction	
Any two graduate level CI courses		
<b>C. Support Work</b>		<b>12</b>
CI 6983	Master's Thesis	
6 semester credit hours of graduate electives (3 semester credit hours in an approved statistics course or an additional research course is recommended)		
Students in some programs may take support courses in their teaching fields. It is recommended that thesis students take an appropriate statistics course or an additional research course as part of the support work.		
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>33</b>

#### Option II: Non-Thesis

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>9</b>
CI 5003	Theory of Curriculum and Instruction	
CI 5013	Curriculum, Instruction and Assessment	
EDU 5003	Research Methods	
<b>B. Program Emphasis</b>		<b>12</b>
CI 6103	Research in Action	

- CI 6673 Policy and Critical Issues in Teaching  
or CI 6123 Critical Perspectives in Curriculum and Instruction

Any two graduate level CI courses

**C. Support Work** **15**

15 semester credit hours of graduate electives

Students in some programs may take support courses in their teaching fields.

**D. Comprehensive Experience**

For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.

**Total Credit Hours** **36**

Students who want to specialize in a teaching field may do so by taking courses in that field to support the degree in Curriculum and Instruction. Students should see the Graduate Advisor of Record for information about this option. Students should see their faculty graduate advisor for information about teacher certification option.

Curriculum and Instruction degree emphases include:

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

## Degree Requirements for Option III: Teacher Certification

The Master of Arts in Curriculum and Instruction with Teaching certification (MACIT) is designed for individuals seeking a graduate degree in Curriculum and Instruction with teaching certification in the middle grades. Graduate students must be admitted into both the degree program and the Teacher Certification program. Courses in the MACIT option explore theories and ideas of curriculum, instruction, and culturally responsive methods of teaching students with diverse learning needs. The MACIT option also includes field experiences in local schools, as students can apply what they have learned in the graduate studies. All MACIT students will complete a portfolio as a culminating experience at the end of their program. The MACIT program is a 36-hour program designed to meet the Texas Teacher Certification requirements for:

- Grades 4–8 Mathematics and Science
- Grades 4–8 English, Language Arts, Reading, and Social Studies

### Criminal History Policy and Acknowledgement

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All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement form, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

Refer to Procedures for Teacher Certification (<http://catalog.utsa.edu/policies/admission/graduate/proceduresforteachercertification/>) at the graduate level for additional details.

## Grades 4-8 Mathematics and Science

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>9</b>
CI 5003	Theory of Curriculum and Instruction	
CI 5013	Curriculum, Instruction and Assessment	
EDU 5003	Research Methods	
<b>B. Concentration and Support Courses</b>		<b>12</b>
CI 6123	Critical Perspectives in Curriculum and Instruction	
ESL 5063	Language and Content-Area Instruction	
LTED 5743	Secondary Literacy Development	
SPE 5403	Survey of Special Education	
<b>C. Methods and Internship Courses</b>		<b>15</b>
15 semester credit hours of graduate electives:		
CI 5043	Classroom Management and Motivation	
CI 6303	Advanced Methods in Subject-Matter Fields (Science)	
CI 6303	Advanced Methods in Subject-Matter Fields (Math)	
CI 6943	Interdisciplinary Internship (repeated Fall and Spring)	
or CI 6946	Interdisciplinary Internship	
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>36</b>

## Grades 4-8 English, Language Arts, Reading, and Social Studies

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>9</b>
CI 5003	Theory of Curriculum and Instruction	
CI 5013	Curriculum, Instruction and Assessment	
EDU 5003	Research Methods	
<b>B. Concentration and Support Courses</b>		<b>12</b>
CI 6123	Critical Perspectives in Curriculum and Instruction	
ESL 5063	Language and Content-Area Instruction	
LTED 5743	Secondary Literacy Development	
SPE 5403	Survey of Special Education	
<b>C. Methods and Internship Courses</b>		<b>15</b>
15 semester credit hours of graduate electives:		
CI 5043	Classroom Management and Motivation	
CI 6303	Advanced Methods in Subject-Matter Fields (Social Studies)	
CI 6303	Advanced Methods in Subject-Matter Fields (ELA)	

CI 6943 Interdisciplinary Internship (repeated Fall and Spring)  
 or CI 6946 Interdisciplinary Internship

**D. Comprehensive Experience**

For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.

**Total Credit Hours** **36**

## Master of Arts Degree in Early Childhood and Elementary Education

This degree 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.

### 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.

### Degree Requirements

Education degrees have four required components: a core of common courses, a program emphasis, support work, and a comprehensive experience.

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

#### Thesis Option

Code	Title	Credit Hours
<b>A. Core Courses</b> <span style="float: right;"><b>9</b></span>		
CI 5003	Theory of Curriculum and Instruction	
EDU 5003	Research Methods	
ILT 5003	Principles of Interdisciplinary Learning and Teaching	
<b>B. Program Emphasis</b> <span style="float: right;"><b>18</b></span>		
ECE 5133	Language and Discourse Development in Young Children	
ECE 5513	Curriculum, Materials and Methods in Early Childhood/Elementary Education	
ECE 6423	Advanced Studies in Play	
ECE 6453	Responsible Assessment and Evaluation in Early Childhood and Elementary Education	
ECE 6503	Theoretical Foundations of Early Childhood and Elementary Education	
ECE 6523	Family Engagement, Policy and Advocacy	
<b>C. Support Work</b> <span style="float: right;"><b>6</b></span>		

ECE 6983 Master's Thesis (6 semester credit hours)

Students in some programs may take support courses in their teaching fields. 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**

Students must contact the Graduate Advisor of Record or their academic advisor for further details.

**Total Credit Hours** **33**

#### Non-Thesis Option

Code	Title	Credit Hours
<b>A. Core</b> <span style="float: right;"><b>9</b></span>		
CI 5003	Theory of Curriculum and Instruction	
EDU 5003	Research Methods	
ILT 5003	Principles of Interdisciplinary Learning and Teaching	
<b>B. Program Emphasis</b> <span style="float: right;"><b>21</b></span>		
ECE 5133	Language and Discourse Development in Young Children	
ECE 5513	Curriculum, Materials and Methods in Early Childhood/Elementary Education	
ECE 6423	Advanced Studies in Play	
ECE 6453	Responsible Assessment and Evaluation in Early Childhood and Elementary Education	
ECE 6503	Theoretical Foundations of Early Childhood and Elementary Education	
ECE 6523	Family Engagement, Policy and Advocacy	
ECE 6653	Action Research in Childhood Settings	
<b>C. Support Work</b> <span style="float: right;"><b>6</b></span>		

6 semester credit hours of graduate electives

Students in some programs may take support courses in their teaching fields.

**D. Comprehensive Experience**

The comprehensive experience for the Master of Arts in Early Childhood and Elementary Education varies depending on the student's selected concentration. Students must contact the Graduate Advisor of Record or their academic advisor for further details.

**Total Credit Hours** **36**

## Master of Arts Degree in Learning, Design, and Technology

The Master of Arts (M.A.) degree in Learning, Design, and Technology offers the opportunity for an advanced study and professional development program in the field of learning and teaching with technology.

The M.A. degree in Learning, Design, and Technology (LDT) focuses on the understanding, design, and application of learning environments and activities supported by current and emergent technologies, in both formal and informal settings. Emphasis is placed on culturally-relevant and technology-mediated approaches to learning and teaching, such as instructional design, games and learning, virtual worlds, educational robotics, new literacies, youth cultures, and digital storytelling. The program is designed for students seeking to expand their knowledge of

learning technologies, instructional design, and multimedia development for learning, as well as those seeking leadership roles in these areas.

## 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.

## Degree Requirements

Degree candidates are required to complete 30 hours. Upon completion of 30 hours, the candidate is required to pass a comprehensive examination.

Courses required for this degree are:

Code	Title	Credit Hours
<b>A. Core Courses</b>		<b>15</b>
LDT 5003	Introduction to Learning, Design, and Technology	
LDT 5313	Development of Learning Technologies	
LDT 5343	Instructional Design	
LDT 5703	Technology and Learning Cultures	
LDT 6003	Research in Learning, Design, and Technology	
<b>B. Program Emphasis</b>		<b>12</b>
12 semester credit hours of graduate courses in Learning, Design, and Technology (LDT)		
<b>C. Support Work</b>		<b>3</b>
3 semester credit hours of graduate electives		
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>30</b>

All coursework and course substitutions must be approved by the student's academic advisor prior to registration.

## Master of Arts Degree in Literacy Education (formerly Reading and Literacy)

NOTE: The M.A. in Reading and Literacy will change to Literacy Education starting fall 2022.

This degree is designed to provide theory, research, knowledge, and field experiences for students who plan to teach humanizing and transformative literacies. Reading and writing are presented as linguistic, cognitive, and sociocultural, sociopolitical, and sociohistorical processes within the language system and in relation to other language arts. Students select one of the following options: Thesis Option, Non-thesis Option, Non-thesis Option for students also pursuing the Texas Reading Specialist Certification, and Non-thesis Option for student seeking dual credit preparation. Students planning to pursue the Reading Specialist certification must apply and be accepted into this program. Core literacy courses (LTED) organize the student experience around a cohort model. Students work with their cohort director (academic advisor) to select other classes to fulfill their professional needs.

## 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.

## Degree Requirements

Education degrees have four required components: a core of common courses, a program emphasis, support work, and a comprehensive examination.

Courses required for the Master of Arts Degree in Literacy Education include:

### Option I: Thesis

Code	Title	Credit Hours
<b>A. Core</b>		<b>12</b>
CI 5003	Theory of Curriculum and Instruction	
ILT 5003	Principles of Interdisciplinary Learning and Teaching	
LTED 6033	Survey of Literacy Research	
LTED 6833	Theoretical Foundations of Literacy Education	
<b>B. Program Emphasis</b>		<b>9</b>
LTED 6073	New Literacies Using Critical Perspectives	
LTED 5743	Secondary Literacy Development or LTED 582: Early Language and Literacy Development	
LTED 7863	Russian Contributions to Literacy, Psychology and Learning	
<b>C. Support Work</b>		<b>12</b>
LTED 6983	Master's Thesis (6 semester credit hours of thesis)	
3 semester credit hours of graduate electives		
3 semester credit hours in children's or young adult literature		
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.		
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>33</b>

### Option II: Non-Thesis

Code	Title	Credit Hours
<b>A. Core</b>		<b>12</b>
CI 5003	Theory of Curriculum and Instruction	
ILT 5003	Principles of Interdisciplinary Learning and Teaching	
LTED 6033	Survey of Literacy Research	
LTED 6833	Theoretical Foundations of Literacy Education	
<b>B. Program Emphasis</b>		<b>9</b>
LTED 6073	New Literacies Using Critical Perspectives	



LTED 5743	Secondary Literacy Development or LTED 582: Early Language and Literacy Development	
LTED 6843	Practice-Based Literacy Research	
<b>C. Support Work</b>		<b>15</b>
12 semester credit hours of graduate electives		
3 semester credit hours in children's or young adult literature		
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.		
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>36</b>

**Option III: Non-Thesis option for students also pursuing the Texas Reading Specialist Certification**

**Criminal History Policy and Acknowledgement**

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All COEHD prospective students in a licensure or certification program are required to acknowledge that they have been made aware of these requirements and that they have read the COEHD Criminal History Policy. For more information and for completing the acknowledgement from, please visit the Office of Professional Preparation, Assessment, and Accreditation in the College of Education and Human Development.

Note that if you are pursuing a professional certification as a Reading Specialist, you will have to apply to the Professional Certification Program in addition to applying for the graduate degree. You will have to provide evidence of your service record, valid teaching certificate, and other admission requirements as listed on the application to the professional certification program. Contact the designated Student Development Specialist or the Assistant Director of the Teacher Certification program for more information.

Code	Title	Credit Hours
<b>A. Core</b>		<b>12</b>
CI 5003	Theory of Curriculum and Instruction	
ILT 5003	Principles of Interdisciplinary Learning and Teaching	
LTED 6033	Survey of Literacy Research	
LTED 6833	Theoretical Foundations of Literacy Education	
<b>B. Program Emphasis</b>		<b>12</b>
LTED 5743	Secondary Literacy Development	
LTED 5823	Early Language and Literacy Development	
LTED 6073	New Literacies Using Critical Perspectives	
LTED 6843	Practice-Based Literacy Research	
<b>C. Support Work</b>		<b>12</b>

LTED 5793	Literacy Coaching	
LTED 6763	Re-mediating Literacy	
LTED 6941	Internship in Literacy (repeated for a total of 3 credit hours)	
3 semester credit hours in children's or young adult literature		
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.		
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>36</b>

## Master of Arts Degree in Special Education

The degree in Special Education is designed for those students seeking an opportunity for initial, additional, or advanced preparation for educating individuals with disabilities in the inclusive classroom. 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.

### 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.

### Degree Requirements

Education degrees have four required components: a core of common courses, a program emphasis, support work, and a comprehensive examination.

#### Inclusive Education

This specialization will focus on inclusive educational practices emphasizing the skills and competencies necessary to prepare individuals to be educators and leaders in the field of special education. This program is designed for not only special educators who wish to gain advanced knowledge in their field, but also general educators who wish to learn to implement effective practices for students with disabilities receiving an inclusive education in their classroom.

Code	Title	Credit Hours
<b>A. Core</b>		<b>3</b>
ILT 5003	Principles of Interdisciplinary Learning and Teaching	
<b>B. Program Emphasis</b>		<b>24</b>
SPE 5403	Survey of Special Education	
SPE 5613	Legal Issues in Special Education	
SPE 5633	Methods for Teaching Individuals with Mild/Moderate Disabilities	

SPE 5653	Behavior and Classroom Management in the Inclusive Classroom	
SPE 6133	Introduction to Single-Subject Methodology	
SPE 6443	Collaboration and Consultation in Educational and Clinical Settings	
SPE 6623	Seminar on Current and Critical Issues in Special Education	
SPE 6863	Technology for Individuals with Disabilities	
<b>C. Support Work</b>		<b>9</b>
9 hours of Graduate Electives		
<b>D. Comprehensive Experience</b>		
For information on the comprehensive experience, students should contact the Graduate Advisor of Record or their academic advisor.		
<b>Total Credit Hours</b>		<b>36</b>

## 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 60 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 this catalog.

Code	Title	Credit Hours
<b>A. Research Methods Courses:</b>		<b>12</b>
ILR 7643	Advanced Application of Research on Interdisciplinary Learning and Teaching	
ILT 7013	Overview of Research Design for Instructional Inquiry	
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>B. Core Courses:</b>		<b>18</b>
ILT 7003	Exploration of Interdisciplinary Learning and Teaching	
ILT 7133	Socio-constructivist and Cognitivist Perspectives on Interdisciplinary Learning & Teaching	
ILT 7143	Internship	
ILT 7153	Critical Cultural Perspectives on Interdisciplinary Learning and Teaching	
ILT 7633	Multiple Behavioral and Contextual Perspectives on Interdisciplinary Learning and Teaching	
ILT 7733	Evaluation of Educational Research	

<b>C. Cognate Courses:</b>	<b>18</b>
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.	
<b>D. Doctoral Research Seminar and Doctoral Dissertation:</b>	<b>12</b>
3 credit hours of Advanced Research	
ILT 7981	Doctoral Dissertation (a minimum of 9 semester credit hours of Doctoral Dissertation are required)
or ILT 7983	Doctoral Dissertation
<b>Total Credit Hours</b>	<b>60</b>

## Graduate Certificate in I-STEM Education

This 12-hour Graduate Certificate in I-STEM Education (Interdisciplinary Science, Technology, Engineering, and Math) is designed for graduate students from all disciplines who wish to focus on issues related to I-STEM education. The goals of the Graduate Certificate in I-STEM Education are to provide graduate students with a comprehensive educational foundation to understand local and global STEM issues, and support them to acquire the analytic skills needed to effectively implement appropriate instructional strategies for varying audiences. The Graduate Certificate in I-STEM Education will be awarded to students at the master's or doctoral levels. The Graduate Certificate in I-STEM Education requires 12 credit hours.

The following departmental requirements are applicable to the Graduate Certificate in E-STEM Education:

- 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.
- 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.

## Certificate Program Requirements

To meet the curricular requirements for the Graduate Certificate in I-STEM Education, students must complete 12-semester-credit-hours with a grade point average of 3.0 or above from the following courses:

Code	Title	Credit Hours
<b>Required Courses (choose 12 semester credit hours from the following courses):</b>		
CI 6613	Nature and Meaning of Interdisciplinary STEM Education	12
CI 6623	Inquiry in Interdisciplinary STEM Education	
CI 6633	Equity, Agency, and Participation in Interdisciplinary STEM Education	
CI 6643	Assessment in Interdisciplinary STEM Education	
CI 6913	Advanced Topics in Interdisciplinary STEM Education	

CI 6963	Interdisciplinary STEM Education Trends and Issues	<b>Total Credit Hours</b>	<b>12</b>
Students seeking admission to the Graduate Certificate in I-STEM Education 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 in I-STEM Education. All other requirements for admission as a special graduate student described in the Student Policies, Admission Policies, are applicable. All other requirements for certificate programs described in Certificate Program Regulations of this catalog apply to this program.			

## Curriculum and Instruction (CI) Courses

**CI 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. (Formerly C&I 5003. Credit cannot be earned for both C&I 5003 and CI 5003.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**CI 5013. Curriculum, Instruction and Assessment. (3-0) 3 Credit Hours.** Prerequisite: CI 5003. Examination of different pedagogical approaches to the teaching and learning process in schools, with emphasis on the development of curriculum for classroom instruction, evaluation, organization, and management. (Formerly C&I 5013. Credit cannot be earned for both C&I 5013 and CI 5013.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 5043. Credit can only be earned for one of the courses: C&I 5043, EDP 5043, or CI 5043.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 5523. Same as ECE 6753. Credit can only be earned for one course: ECE 6753, C&I 5523, or CI 5523.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 5703. Credit cannot be earned for both CI 5703 and C&I 5703.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 5933. Credit cannot be earned for both CI 5933 and C&I 5933.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6063. Research in Subject Matter Fields. (3-0) 3 Credit Hours.**

Prerequisite: CI 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. (Formerly C&I 6063. Credit cannot be earned for both CI 6063 and C&I 6063.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6103. Same as ECE 6653. Credit can only be earned for one course: CI 6103, C&I 6103, or ECE 6653.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6123. Critical Perspectives in Curriculum and Instruction. (3-0) 3 Credit Hours.**

An examination of curriculum at the intersection of power, identity, knowledge, and cultural politics. Critical theoretical frameworks introduced in this course include critical social theories and postmodernism. (Formerly C&I 7123 and C&I 6123. Credit can only be earned for one course: CI 6123, C&I 6123 or C&I 7123.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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? (Formerly C&I 6133. Credit cannot be earned for both CI 6133 and C&I 6133.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6303. Advanced Methods in Subject-Matter Fields. (3-0) 3 Credit Hours.**

Prerequisite: CI 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. (Formerly C&I 6303.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6383. Community-Based Research. (3-0) 3 Credit Hours.**

Overview of curricular and instructional principles for Community-Based Research (CBR). (Formerly ALT 6933 and C&I 6383. Credit can only be earned for one course: C&I 6383, ALT 6933, or CI 6383). Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6513. Same as ECE 6513. Credit can only be earned for one course: C&I 6513, ECE 6513, or CI 6513.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6603. Critical Pedagogy. (3-0) 3 Credit Hours.**

Students will become familiar with key concepts and principles of critical theory, critical pedagogy, and social justice education to inform their teaching, leadership, scholarship, and perhaps, their lives. The course also focuses on writing scholarly essays about critical pedagogy that encourages scholarly discourse with peers. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6613. Nature and Meaning of Interdisciplinary STEM Education. (3-0) 3 Credit Hours.**

This course focuses on the nature and meaning of STEM with special emphasis on the role of interdisciplinary STEM in educational environments. Participants will be asked to take a critical perspective on questions, such as: "What is Interdisciplinary STEM Education?" and "What about Interdisciplinary STEM Education is most important for a student to know?" The course will address the nature of STEM disciplines (the theories and problems which characterize them); the relationship between theory and empirical work; and the role of learning and teaching in pre-K-16 environments. (Formerly C&I 5613 and C&I 6613. Credit can only be earned for one course: C&I 6613, C&I 5613, or CI 6613.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6623. Inquiry in Interdisciplinary STEM Education. (3-0) 3 Credit Hours.**

This course will explore developing and designing learning environments for interdisciplinary STEM Education through inquiry. Provides a broad foundation into the teaching, learning, and research of interdisciplinary STEM Education in both formal and informal contexts. (Formerly C&I 5623 and C&I 6623. Credit can only be earned for one course: C&I 6623, C&I 5623, or CI 6623.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6633. Equity, Agency, and Participation in Interdisciplinary STEM Education. (3-0) 3 Credit Hours.**

This course will focus on equity, agency, and participation issues in interdisciplinary STEM Education as they relate to diverse demographics and communities. 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. (Formerly C&I 5633 and C&I 6633. Credit can only be earned for one course: C&I 6633, C&I 5633, or CI 6633.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6643. Assessment in Interdisciplinary STEM Education. (3-0) 3 Credit Hours.**

This course explores a broad range of issues related to interdisciplinary research in assessment of student understanding in Science, Technology, Engineering, and Mathematics (STEM) and the underlying perspectives that guide what it means for students to understand fundamental STEM ideas. Topics on authentic assessment, elicitation of student thinking, formative assessment, and ethics and equity in assessment from an interdisciplinary perspective in STEM will be covered. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6663. 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. (Formerly C&I 5663 and C&I 6663.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6673. Policy and Critical Issues in Teaching. (3-0) 3 Credit Hours.**

Prerequisites: CI 5003 and CI 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 and C&I 6673. Credit can only be earned for one course: C&I 6673, C&I 5673, or CI 6673.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6693. Credit cannot be earned for both CI 6693 and C&I 6693.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Same as ECE 6733. Formerly C&I 6733. Credit can only be earned for one course: ECE 6733, C&I 6733, or CI 6733.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6773. Same as ECE 6773. Credit can only be earned for one course: ECE 6773, C&I 6773, or CI 6773.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6903. Environmental Issues Investigations. (3-0) 3 Credit Hours.**

Rationale and strategies for investigating environmental issues at local, state, regional, or national levels. Select and implement actions to resolve issues through political, economic, legal, educational, and lifestyle avenues. (Formerly C&I 6903. Same as ECE 6903. Credit can only be earned for one course: C&I 6903, ECE 6903, or CI 6903.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6913. Advanced Topics in Interdisciplinary STEM Education. (3-0) 3 Credit Hours.**

Topics and critical issues in interdisciplinary STEM education. Topics include focus on (1) research and development of innovative STEM learning and emerging STEM learning environments in both in and out of school settings, and (2) research that advances the field of formal and informal STEM Education. May be repeated for credit when topics vary. (Formerly C&I 6913.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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 and C&I 6923. Credit can only be earned for one course: C&I 6923, C&I 5923, or CI 6923.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6931. Credit cannot be earned for both CI 6931 and C&I 6931.) Course Fees: GH01 \$30; LRH1 \$20; STSH \$10.

**CI 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. (Formerly C&I 6933. Credit cannot be earned for both CI 6933 and C&I 6933.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 6943. Interdisciplinary Internship. (0-0) 3 Credit Hours.**

Prerequisite: Consent of student's graduate advisor. Individually supervised experience in assigned placements for one semester to assist students in developing professional and leadership skills. May be taken for teaching internship or student teaching. Enrollment in CI 6943 (3 credit hours) requires a total of 130 hours in the field and enrollment in CI 6946 (6 credit hours) requires a total of 260 hours in the field. Taken on a credit/no-credit basis. May be repeated for credit, but not more than 6 hours may be applied toward the M.A. in Education degree. (Formerly C&I 6943.) Course Fees: GH01 \$90; LRH1 \$20; STF1 \$57; STSH \$30.

**CI 6946. Interdisciplinary Internship. (0-0) 6 Credit Hours.**

Prerequisite: Consent of student's graduate advisor. Individually supervised experience in assigned placements for one semester to assist students in developing professional and leadership skills. May be taken for teaching internship or student teaching. Enrollment in CI 6943 (3 credit hours) requires a total of 130 hours in the field and enrollment in CI 6946 (6 credit hours) requires a total of 260 hours in the field. Taken on a credit/no-credit basis. May be repeated for credit, but not more than 6 hours may be applied toward the M.A. in Education degree. (Formerly C&I 6946.) Course Fees: GH01 \$180; LRH1 \$20; STF1 \$57; STSH \$60.

**CI 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. (Formerly C&I 6951.) Course Fees: GH01 \$30; STSH \$10.

**CI 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. (Formerly C&I 6953.) Course Fees: GH01 \$90; STSH \$30.

**CI 6963. Interdisciplinary STEM Education Trends and Issues. (3-0) 3 Credit Hours.**

Introduction to historical and contemporary K-16 STEM Education developments, opportunities, and challenges from both discipline-based and integrative approaches. Students will examine current Interdisciplinary STEM Education initiatives and considerations pertaining to policy, structure, process, and student learning. (Formerly C&I 6963. Credit cannot be earned for both CI 6963 and C&I 6963.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6973.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**CI 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. (Formerly C&I 6983.) Course Fees: GH01 \$90; STSH \$30.

**CI 7153. Critical Multicultural Education in Urban Schools. (3-0) 3 Credit Hours.**

Historical and theoretical overview of multicultural education across multiple contexts including urban education. Specific focus is paid to the emergence of Critical Multicultural Education as a pedagogical and curricular tool used to transform schools through the exploration of research in the field and in engaging with curriculum transformation processes. Students engage in the development of a strong theoretical foundation from which to think more complexly about equity and diversity related schooling processes. (Formerly C&I 7153. Credit cannot be earned for both CI 7153 and C&I 7153.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**CI 7771. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work as part of the regular course offerings. May be repeated for credit, but no more than 6 hour will apply to the Doctoral degree. (Formerly C&I 7771.) Course Fees: GH01 \$30; STSH \$10.

**CI 7773. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral standing and permission in writing (form available) of the instructor and the student's Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work as part of the regular course offerings. May be repeated for credit, but no more than 6 hours will apply to the Doctoral degree. (Formerly C&I 7773.) Course Fees: GH01 \$90; STSH \$30.

**CI 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. (Formerly C&I 7893.) Course Fees: GH01 \$90; STSH \$30.

**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 biological and environmental influences on infant and toddler development. A discussion of the diverse environments where children thrive and potential negative factors that may hinder development. Identifies issues related to early intervention including culturally and linguistically appropriate assessment and instructional practice. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 5133. Language and Discourse Development in Young Children. (3-0) 3 Credit Hours.**

This course focuses on the study of early acquisition and development of all aspects of language knowledge. Emphasis on identifying the sequence of 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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 5443. Social/Emotional Development in Children. (3-0) 3 Credit Hours.**

Study of children's socioemotional development of diverse children. Focus on building positive parent-child relationships, sibling relationships, peer relationships, sense of self, resiliency, self-control, friendship, and prosocial behaviors. Examination of societal issues that may lead to aggression in children. (Formerly ECE 5453. Credit cannot be earned for both ECE 5443 and ECE 5453.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 5513. Curriculum, Materials and Methods in Early Childhood/Elementary Education. (3-0) 3 Credit Hours.**

This course focuses on the study of curriculum and instructional methods in early childhood and elementary classrooms. Emphasis on identification and analysis of curriculum design, methods of instruction, and materials that are congruent with developmentally appropriate practices (DAP). Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6123. Leadership in Early Childhood Education. (3-0) 3 Credit Hours.**

This course is designed for those who are interested in becoming leaders in early childhood contexts. Students explore the various components related to successful leadership of early childhood programs in inclusive setting. The students will be able to identify ways to build systems for professional relationships, examine ways to promote authentic learning, and become familiar with leadership and management standards. (Formerly titled "Leadership and Administration of Early Childhood Programs.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6163. Brain-Based Research and Learning in EC and Elementary Education. (3-0) 3 Credit Hours.**

This course is designed to examine the numerous influences on early brain development and learning for young children. Students examine brain research from a multicultural dimension as they focus on meeting the demands of learners within our ever-changing society. Discussions concentrate on implications for classroom practice and on forming positive relationships with families to positively impact our work with young children. (Formerly titled "Biological Basis of Child Development: Brain Based Research and Learning.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6183. Reconceptualizing Sociocultural Contexts in Early Childhood Education. (3-0) 3 Credit Hours.**

Exploration of sociocultural contexts in early childhood education. Focus on social justice issues affecting children in the U.S. and globally such as immigration, poverty, genocide, discrimination, hunger, education, domestic violence, child abuse and child labor among others. A view of cultural practices with a particular emphasis on gender issues across diverse groups. (Formerly titled "Seminar in Early Childhood Education in Cross-Cultural Perspective.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6213. Current Issues in Early Childhood and Elementary Education. (3-0) 3 Credit Hours.**

Studies of current issues in early childhood and elementary schools and other educational settings with an emphasis on critical reflection on how these issues impact diverse populations. 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6423. Advanced Studies in Play. (3-0) 3 Credit Hours.**

This course focuses on the examination and analysis of play research and practice as it relates to different areas of young children's development including cultural, 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6453. Responsible Assessment and Evaluation in Early Childhood and Elementary Education. (3-0) 3 Credit Hours.**

This course focuses on appropriate measures to collect, document, and assess young children in classroom settings. Students examine current research on effective assessment strategies for understanding children's development in multiple contexts. Class discussions concentrate on the various influences on assessment outcomes and the implications for developing supportive interactions with families as a means to influence the growth of every child. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6503. Theoretical Foundations of Early Childhood and Elementary Education. (3-0) 3 Credit Hours.**

This course analyzes the theoretical basis for young children's development within our culturally and linguistically diverse society. Pedagogical applications and implications of theoretical principles are examined for relevance in today's classrooms. Readings focus on the need to create respectful partnerships with families and learning environments that are healthy, supportive, and challenging for every child. (Formerly ECE 5503. Credit cannot be earned for both ECE 6503 and ECE 5503.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 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. (Same as CI 6513. Formerly C&I 6513. Credit can only be earned for one course: ECE 6513, C&I 6513, or CI 6513.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6523. Family Engagement, Policy and Advocacy. (3-0) 3 Credit Hours.**

Examination of family theories and their influence on increasing understanding about families. Identification of different parenting styles that support/affect children's well-being. Focus on social policies that directly impact children, families and communities in a culturally, linguistically, and socioeconomic diverse society. Emphasis on inclusive family engagement. (Formerly titled Family Development, Policy and Advocacy.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**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 and C&I 6103. Same as CI 6103. Credit can only be earned for one course: ECE 6653, ECE 6643, C&I 6103, or CI 6103.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 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. (Same as CI 6733, formerly C&I 6733. Credit can only be earned for one course: ECE 6733, C&I 6733 or CI 6733.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 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. Same as CI 6773 formerly C&I 6773. Credit can only be earned for one course: ECE 6773, C&I 6773 or CI 6773. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 6903. Environmental Issues Investigations. (3-0) 3 Credit Hours.**

Rationale and strategies for investigating environmental issues at local, state, regional, or national levels. Select and implement actions to resolve issues through political, economic, legal, educational, and lifestyle avenues. Same as CI 6903 (formerly C&I 6903). Credit can only be earned for one course: ECE 6903, C&I 6903, or CI 6903. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 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. Course Fees: GH01 \$30; STSH \$10.

**ECE 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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ECE 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. Course Fees: GH01 \$90; STSH \$30.

**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. (Same as SPE 7133. Credit cannot be earned for both ILR 7133 and SPE 7133.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**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). Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**ILT 7133. Socio-constructivist and Cognitivist Perspectives on Interdisciplinary Learning and 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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$; INT1 \$150; STSH \$30.



**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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$30; LRH1 \$20; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**ILT 7951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral standing and permission in writing (form available) from 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. Course Fees: GH01 \$30; STSH \$10.

**ILT 7953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral standing and permission in writing (form available) from 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. Course Fees: GH01 \$30; STSH \$20.

**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). Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**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. Course Fees: GH01 \$30; STSH \$10.

**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. Course Fees: GH01 \$90; STSH \$30.

**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. Course Fees: GH01 \$180; STSH \$60.

**Learning, Design and Technology (LDT) Courses****LDT 5003. Introduction to Learning, Design, and Technology. (3-0) 3 Credit Hours.**

This introductory course provides an overview of the theoretical and practical foundations that inform learning, design, and technology. Course content and activities are designed to lead to an understanding of the history, theories, and philosophies driving the field. (Formerly IST 5003. Credit cannot be earned for both LDT 5003 and IST 5003.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5223. Digital Citizenship. (3-0) 3 Credit Hours.**

This course explores what it means to be a good citizen in a digital society with respect to how we present ourselves online, consume and use digital resources, interact with others in digital environments, and how we use technologies in our everyday lives. This course investigates digital citizenship issues as they relate to K-12 and adult learning environments, professional and academic contexts, and everyday life. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5233. Universal Design and Learning. (3-0) 3 Credit Hours.**

This course focuses on key concepts related to universal design for learning and their application in instructional design, training, and education. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5313. Development of Learning Technologies. (3-0) 3 Credit Hours.**

This course is an introduction to technology development for technology-based learning environments. It provides knowledge and skills to create effective and accessible user interfaces, experiences, and designs. The course also explores key concepts and industry standard practices for eLearning project. (Formerly IST 5313. Credit cannot be earned for both LDT 5313 and IST 5313.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5323. Learner-Centered Design. (3-0) 3 Credit Hours.**

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. (Formerly IST 5323. Credit cannot be earned for both LDT 5323 and IST 5323.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5343. Instructional Design. (3-0) 3 Credit Hours.**

This course is an investigation of theories, principles, and processes of instructional and digital learning design including their application to instructional artifacts and curriculum development. (Formerly IST 5343. Credit cannot be earned for both LDT 5343 and IST 5343.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5363. Distance Learning and Teaching. (3-0) 3 Credit Hours.**

This course offers an in-depth exploration of tools, resources, and strategies to design, develop, and support online learning. Students create a learning space through a real-world and project-based approach. (Formerly IST 5363. Credit cannot be earned for both LDT 5363 and IST 5363.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5383. Technology for Training and Professional Development. (3-0) 3 Credit Hours.**

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. (Formerly IST 5383. Credit cannot be earned for both LDT 5383 and IST 5383.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 5703. Technology and Learning Cultures. (3-0) 3 Credit Hours.**

This course is an examination of technology-delivered and technology-mediated learning 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, development, implementation, and evaluation of teaching and learning. (Formerly IST 5703. Credit cannot be earned for both LDT 5703 and IST 5703.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 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 and IST 5883. Credit cannot be earned for both LDT 5883 and IST 5883 or C&I 5883.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6003. Research in Learning, Design, and Technology. (3-0) 3 Credit Hours.**

This course provides an overview of research designs and methods used in the field of learning, design, and technology. (Formerly IST 6003. Credit cannot be earned for both LDT 6003 and IST 6003.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6103. Learning in Virtual Worlds. (3-0) 3 Credit Hours.**

Virtual and augmented reality learning environments provide additional opportunities for learning through active participation in designed settings. This course explores learning in virtual and augmented spaces across formal and informal learning contexts. (Formerly IST 6103. Credit cannot be earned for both LDT 6103 and IST 6103.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6223. Interest-Driven Learning. (3-0) 3 Credit Hours.**

This course explores constructs like curiosity, attention, and interest, and their role in formal and informal learning. The course also considers the different facets of personal interests and their relationship to learning, self-expression, and creativity. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6353. Multimedia Design and Development. (3-0) 3 Credit Hours.**

This course explores the design and development of multi-modal materials and resources in learning settings by investigating issues related to interactivity, usability, and aesthetics. (Formerly IST 6353. Credit cannot be earned for both LDT 6353 and IST 6353.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6373. Games and Learning. (3-0) 3 Credit Hours.**

Playing, creating, sharing, discussing, and analyzing games can prompt rich cultural and learning experiences in both formal and informal settings. This course promotes a scholarly understanding of contemporary theories and research on game-based learning. (Formerly IST 6373. Credit cannot be earned for both LDT 6373 and IST 6373.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6513. Makerspaces and Educational Robotics. (3-0) 3 Credit Hours.**

This course explores the world of makerspaces and educational robotics, and how they support STEM education and 21st century learning, particularly in the areas of innovation, creativity, collaboration, critical thinking, and problem solving. This course places students in the roles of active makers of creative and innovative products. (Formerly IST 6513. Credit cannot be earned for both LDT 6513 and IST 6513.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 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 tools. This course provides an overview of new literacies and youth cultures, and their relationships, offering theoretical and practical approaches to leverage them in learning settings. (Formerly IST 6623. Credit cannot be earned for both LDT 6623 and IST 6623.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 6943. Internship. (0-0) 3 Credit Hours.**

Prerequisites: Consent of instructor and Graduate Advisor of Record. This internship is an individually supervised field experience that involves the design, development, implementation, or evaluation of technology-mediated learning experiences. (Formerly IST 6943. Credit cannot be earned for both LDT 6943 and IST 6943 or other internships.) Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; STSH \$30.

**LDT 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Approval of the instructor and the Graduate Advisor of Record. Designed for students needing specialized work not normally or not often available as part of the regular course offerings, this experience entails independent reading, research, discussion and/or writing under the direction of a faculty member. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the degree. (Formerly IST 6951. Credit cannot be earned for both LDT 6951 and IST 6951.) Course Fees: GH01 \$30; STSH \$10.

**LDT 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Approval of the instructor and the Graduate Advisor of Record. Designed for students needing specialized work not normally or not often available as part of the regular course offerings, this experience entails independent reading, research, discussion and/or writing under the direction of a faculty member. May be repeated for credit, but no more than 6 hours, regardless of discipline, will apply to the degree. (Formerly IST 6953. Credit cannot be earned for both LDT 6953 and IST 6953.) Course Fees: GH01 \$90; STSH \$30.

**LDT 6973. Special Problems. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This course 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 no more than 6 hours, regardless of discipline, will apply to the degree. (Formerly IST 6973. Credit cannot be earned for both LDT 6973 and IST 6973.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 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. Course Fees: GH01 \$90; STSH \$30.

**LDT 7013. Field Research in Learning, Design, and Technology. (3-0) 3 Credit Hours.**

This course is designed to support students in doing field research in learning, design, and technology, including observations, interviews, and analysis. Students will undertake their own research study and discuss relevant literature. (Formerly IST 7013. Credit cannot be earned for both LDT 7013 and IST 7013.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 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 learning, design, and technology. (Formerly IST 7023. Credit cannot be earned for both LDT 7023 and IST 7023.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 7043. Technology and Global Learning. (3-0) 3 Credit Hours.**

This course is a structured exploration of the conditions, platforms, and implications of technology-supported learning in culturally and linguistically diverse contexts. (Formerly IST 7043. Credit cannot be earned for both LDT 7043 and IST 7043.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LDT 7771. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral standing and permission from the student's academic 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 as part of the regular course offerings. May be repeated for credit, but no more than 6 hours will apply to the doctoral degree. (Formerly IST 7771. Credit cannot be earned for both LDT 7771 and IST 7771.) Course Fees: GH01 \$30; STSH \$10.

**LDT 7773. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. Independent reading, research, discussion, and/or writing under the direction of a faculty member. For students needing specialized work as part of the regular course offerings. May be repeated for credit, but no more than 6 hour will apply to the Doctoral degree. Course Fees: GH01 \$90; STSH \$30.

**LDT 7893. Directed Doctoral Research. (0-0) 3 Credit Hours.**

Supervised research on a topic in learning, design, and technology. May be repeated for credit, but no more than 6 hours may be applied to the Doctoral degree. (Formerly IST 7893. Credit cannot be earned for both LDT 7893 and IST 7893.) Course Fees: GH01 \$90; STSH \$30.

## Literacy Education (LTED) Courses

### **LTED 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. (Formerly C&I 5723. Credit cannot be earned for both C&I 5723 and LTED 5723.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 5743. Secondary Literacy Development. (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. Emphasizes strategies for meeting the needs of the wide range of ability levels found in secondary schools. Course contains a field experience. (Formerly C&I 5743. Credit cannot be earned for both C&I 5743 and LTED 5743.) Course Fees: GH01 \$90; LRH1 \$20; STF1 \$57; STSH \$30.

### **LTED 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. (Formerly C&I 5753. Credit cannot be earned for both C&I 5753 and LTED 5753.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 5793. Literacy Coaching. (3-0) 3 Credit Hours.**

Study of coaching as a means of professional development for teachers of literacy. Critically reviews traditional models of professional development and more recent, innovative ways of interacting with teachers from a cultural, historical, and political perspective. Course contains a field experience in working with beginning teachers. (Formerly C&I 5793. Credit cannot be earned for both C&I 5793 and LTED 5793.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 5823. Early Language and Literacy Development. (3-0) 3 Credit Hours.**

Study of the language and literacy development of young children from birth to the acquisition of conventional reading and writing. Examines young children's emergent literacy concepts and interactions with text and considers ways that early childhood educators can develop appropriate approaches to teaching reading and writing in classroom settings. Course contains a field experience. (Formerly C&I 5823. Credit cannot be earned for both C&I 5823 and LTED 5823.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 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. (Formerly C&I 5843. Credit cannot be earned for both C&I 5843 and LTED 5843.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 6023. 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. (Formerly C&I 5833. Credit cannot be earned for both C&I 5833 and LTED 6023.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 6033. Survey of Literacy Research. (3-0) 3 Credit Hours.**

A review of past and current research concerning literacy, curricula, instructional practices, and the politics and paradigms that have driven them. Uses a cross-discipline perspective from cognitive psychology, sociolinguistics, anthropology, and cultural approaches. Provides an opportunity for students to acquire critical analytic skills in evaluating research. (Formerly C&I 6033. Credit cannot be earned for both C&I 6033 and LTED 6033.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 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. (Formerly C&I 6043. Credit cannot be earned for both C&I 6043 and LTED 6043.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 6073. New Literacies Using Critical Perspectives. (3-0) 3 Credit Hours.**

In our globalized world, literacy has taken on many meanings and has moved beyond linguistic forms to all representations of language. In this course, we will explore research-based and pedagogical definitions and applications of new literacies (literacies that fall outside of the ever-shrinking "mainstream") through a critical lens, including the new understanding of what it means to be literate in present day, referred to as the "ethos stuff," as well as the new hardware and software of communication, referred to as the "technical stuff." (Formerly titled "Multiple Literacies Using Critical Perspectives." Formerly C&I 6073. Credit cannot be earned for both C&I 6073 and LTED 6073.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **LTED 6763. Re-mediating Literacy. (3-0) 3 Credit Hours.**

A sociohistorical-political critique of traditional notions of the remediation of reading difficulties. Special attention to ways of re-mediating reading instruction through the use of alternative views of reading development and culturally responsive models of reading instruction with individual children through a guided field-based practicum. (Formerly C&I 5763. Credit cannot be earned for both C&I 5763 and LTED 6763.) Course Fees: GH01 \$90; LRH1 \$20; STF1 \$57; STSH \$30.

### **LTED 6803. San Antonio Writing Project Leadership Institute. (3-0) 3 Credit Hours.**

Corequisite: LTED 6813. This course is designed to provide opportunities for teachers and teacher leaders to engage in personal and professional writing, research on writing and writing instruction, and the role of writing in social change. Students will explore their own writing, and critically examine writing pedagogies of writing across all content areas from pre-K through university level academics. (Formerly C&I 6803. Credit cannot be earned for both C&I 6803 and LTED 6803.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 6813. San Antonio Writing Project Leadership Institute Advanced. (3-0) 3 Credit Hours.**

Corequisite: LTED 6803. This course provides opportunities for professional growth and study of writing theory. Students will research, develop, critically evaluate and present mini-lessons that demonstrate their understanding of writing for social change. Upon successful completion of class, students will be invited to apply to serve as Teacher Leaders with the San Antonio Writing Project. (Formerly C&I 6813. Credit cannot be earned for both C&I 6813 and LTED 6813.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 6833. Theoretical Foundations of Literacy Education. (3-0) 3 Credit Hours.**

A socio-historical examination of theories of literacies and literacy education. Students examine various conceptualizations of literacy and how these conceptualizations have changed over time. Focus is given to critical theories and perspectives that emphasize humanizing and transformative literacy practices. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 6843. Practice-Based Literacy Research. (3-0) 3 Credit Hours.**

Prerequisite: CI 5003 (formerly C&I 5003), ILT 5003, LTED 6833, and LTED 6033 (or concurrent enrollment). Students must be in the final 12 hours of program to enroll; course contains capstone experience. Ideally taken with final LTED 6941. Course focuses on practice-based research for teachers, teacher leaders, and reading specialists/literacy coaches. Students design, conduct, and disseminate a study that focuses on pedagogy that convokes social change. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 6941. Internship in Literacy. (0-0) 1 Credit Hour.**

Prerequisite: Consent of student's graduate advisor. Individually supervised field experience in assigned classrooms for one semester (12 weeks) with related applied research activity and seminars. Maybe repeated for credit, but not more than 3 hours may be applied toward the M.A. in Education degree. Course Fees: GH01 \$30; INT1 \$50; STF1 \$57; STSH \$10.

**LTED 6943. Internship in Literacy. (0-0) 3 Credit Hours.**

Prerequisite: Consent of student's graduate advisor. Individually supervised field experience in assigned classrooms for one semester (12 weeks) with related applied research activity and seminars. Maybe repeated for credit, but not more than 3 hours may be applied toward the M.A. in Education degree. Course Fees: GH01 \$90; INT1 \$150; LRH1 \$20; STF1 \$57; STSH \$30.

**LTED 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$30; STSH \$10.

**LTED 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$90; STSH \$30.

**LTED 6973. Special Topics in Literacy. (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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fees: GH01 \$90; STSH \$30.

**LTED 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 7403. Credit cannot be earned for both C&I 7403 and LTED 7403.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 7803. A Historical Perspective of American Reading Instruction. (3-0) 3 Credit Hours.**

This course explores some of the history(ies) of reading instruction in the United States through a critical lens. The course is designed to provide students with a deeper understanding of the origins of current methods, materials, and perspectives on literacy instruction in the United States as well as support them in learning to conduct historical literacy research of their own. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 7853. Knowledge Construction from Texts. (3-0) 3 Credit Hours.**

Reviews research that examines sociocognitive and social constructivist processes in meaning making and knowledge building during textual interactions. Focuses on comprehension strategies and disciplinary reading practices. (Formerly C&I 5853 and C&I 7853. Credit cannot be earned for more than one of the following: C&I 5853, C&I 7853, and LTED 7853.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 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 and C&I 7863. Credit cannot be earned for more than one of the following: C&I 5863, C&I 7863, and LTED 7863.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 7873. Sociopolitical Contexts of Literacy Assessment. (3-0) 3 Credit Hours.**

Examination and critique of reading and writing assessment policies and practices and the sociopolitical and historical contexts of data-driven instruction. Considers strengths and weaknesses of assessment tools such as standardized tests, observations, and portfolios, and ways educators may use and critique the results from these approaches to effectively inform instruction. (Formerly C&I 5873. Credit cannot be earned for both C&I 5873 and LTED 7873.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**LTED 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. Course Fees: GH01 \$90; STSH \$30.

## 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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 5513. Assessment of Individuals with Disabilities. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403 or consent of instructor. This course will provide the opportunity for students to acquire an understanding of the principles of assessment for students with disabilities or who are at-risk. Students will learn how to evaluate and interpret formal and informal assessments in order to make data-based programming decisions and determine special education eligibility. (Formerly titled "Curriculum and Instructional Applications for Children and Youth in Special Education.") Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 5613. Legal Issues in Special Education. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 5633. Methods for Teaching Individuals with Mild/Moderate Disabilities. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403 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 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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 5643. Methods for Teaching Individuals with Moderate/Severe Disabilities. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403 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. Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 5653. Behavior and Classroom Management in the Inclusive Classroom. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403 or consent of instructor. This course provides students with a critical examination of evidence-based practices to promote individual, classroom, and school-wide pro-social behavior in the inclusive classroom. Students will use behavioral assessment to inform decisions and creating positive academic environments. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 6133. Introduction to Single-Subject Methodology. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403. 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 EDP 6223 and ILR 7133. Credit cannot be earned for more than one course.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 6443. Collaboration and Consultation in Educational and Clinical Settings. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5503. This course provides students with a strong foundation in professional skills related to collaboration, consultation, staff supervision and management, and training using applied behavior analysis. Special emphasis is placed on applying these skills to support individuals with disabilities and relevant stakeholders in multiple settings. (Formerly titled "Collaboration and Consultation in Special Education.") Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### **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. This is a capstone course to be completed in the final semester. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 6863. Technology for Individuals with Disabilities. (3-0) 3 Credit Hours.**

Prerequisite: SPE 5403 or consent of instructor. This course will provide students with the opportunity to acquire knowledge 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. (Formerly SPE 6943. Credit cannot be earned for both SPE 6863 and SPE 6943.) Course Fees: DL01 \$75; GH01 \$90; LRH1 \$20; STSH \$30.

### **SPE 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. Course Fees: GH01 \$30; STSH \$10.

### **SPE 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. Course Fees: GH01 \$90; STSH \$30.

### **SPE 6983. Master's Thesis. (0-0) 3 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fees: GH01 \$90; STSH \$30.

### **SPE 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. Course Fees: GH01 \$90; STSH \$30.

# Department of Race, Ethnicity, Gender, and Sexuality Studies

Currently, the Department of Race, Ethnicity, Gender, and Sexuality Studies offers a certificate in Mexican American Studies at the graduate level.

## Graduate Certificate in Mexican American Studies

The Mexican American Studies certificate is a 12-semester-credit-hour graduate certificate program that offers specialized training for educators who wish to become better prepared to teach Mexican American Studies in public schools.

The goal is to provide graduate students with a comprehensive educational foundation for meeting state educational needs to enhance the teaching and learning of Mexican American Studies content areas in social studies and fine arts in secondary schools. For those who want to teach community college courses or dual credit courses, 6 extra graduate hours are needed to fulfill the 18 hours as required by the SACSCOC's accreditation.

### Admission Requirements

The certificate program will admit students in the *Fall only*. Students can complete the certificate in one calendar year. Students who apply for the certificate must have a Bachelor of Arts degree in humanities or an education field. All applicants must meet UTSA Graduate School admission requirements (<https://graduateschool.utsa.edu/admissions/>) and be in good standing at the last institution attended. Current students may apply by completing the UTSA Graduate Certificate Form ([https://graduateschool.utsa.edu/images/uploads/UTSAGraduateCertificateForm\\_FILLABLE3.pdf](https://graduateschool.utsa.edu/images/uploads/UTSAGraduateCertificateForm_FILLABLE3.pdf)).

### Certificate Program Requirements

To meet the curricular requirements for the Graduate Certificate in Mexican American Studies, students must complete 12-semester-credit-hours with a grade point average of 3.0 or above from the following courses:

Code	Title	Credit Hours
<b>A. Required course:</b>		<b>3</b>
MAS 5223	Pedagogies of Social Transformation in Chicana/o Education	
<b>B. Select three of the four courses listed below:</b>		<b>9</b>
MAS 5203	Chicanas/os and Latinas/os in the Media	
MAS 5213	Chicana/o Literature	
MAS 6093	Chicana/Latina Feminist Methodologies	
MAS 6103	Interpretivist/Decolonial Histories in Chicana/o Studies	
<b>Total Credit Hours</b>		<b>12</b>

## African American Studies (AAS) Courses

**AAS 6943. Internship in African American Studies. (0-0) 3 Credit Hours.**  
A supervised experience, relevant to the student's program of study within selected community organizations and agencies. May be repeated for a total of 6 semester credit hours. Course Fees: GH01 \$90; INT1 \$150; STSH \$30.

**AAS 6953. Independent Study. (0-0) 3 Credit Hours.**  
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 will apply to the Master's Degree. Course Fees: GH01 \$90; STSH \$30.

**AAS 6973. Special Topics in African American Studies. (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. Special problems/topics 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. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

## Mexican American Studies (MAS) Courses

**MAS 5203. Chicanas/os and Latinas/os in the Media. (3-0) 3 Credit Hours.**

Close examination of the depictions of Chicanas/os and Latinas/os in US news and entertainment and film, problematizing mediated content as a site for the production and maintenance of culture, ideology, and political power. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**MAS 5213. Chicana/o Literature. (3-0) 3 Credit Hours.**

Introduction to the major writers of Chicana/o literature through the study of fiction, nonfiction, poetry, drama, and illustrated texts. Includes study of the cultural expressions within an historical and social context, cultivating critical principles that guide Chicana/o literature. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**MAS 5223. Pedagogies of Social Transformation in Chicana/o Education. (3-0) 3 Credit Hours.**

Exploration of the various pedagogical philosophies and practices that have shaped teaching/learning in Chicana/o social movements, grassroots community educational spaces, and institutions of learning, from elementary school to higher education. Particular attention is given to decolonial, Chicana feminist, indigenous, neo-Marxist/liberatory, and anti-oppression pedagogies. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**MAS 6003. Research Design and Inquiry in Mexican American Studies. (3-0) 3 Credit Hours.**

This course 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. (Same as BBL 6003. Credit cannot be earned for both MAS 6003 and BBL 6003.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**MAS 6093. Chicana/Latina Feminist Methodologies. (3-0) 3 Credit Hours.**

This course examines 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/outside. (Same as BBL 6093. Credit cannot be earned for both MAS 6093 and BBL 6093.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**MAS 6103. Interpretivist/Decolonial Histories in Chicana/o Studies. (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. (Formerly titled "Chicana/o Historical Thought." Same as BBL 6103. Credit cannot be earned for both MAS 6103 and BBL 6103.) Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**MAS 6943. Internship in Mexican American Studies. (0-0) 3 Credit Hours.**

A supervised experience, relevant to the student's program of study within selected community organizations and agencies. May be repeated for a total of 6 semester credit hours. Course Fees: GH01 \$90; INT! \$150; STSH \$30.

**MAS 6953. Independent Study. (0-0) 3 Credit Hours.**

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 may count towards Master's Degree. Course Fees: GH01 \$90; STSH \$30.

**MAS 6973. Special Topics in Mexican American Studies. (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. Special problems/topics courses may be repeated for credit when the topics vary, but no more than 6 hours, regardless of discipline, will apply toward the Master's degree. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.

**Women's, Gender and Sexuality Studies (WGSS) Courses****WGSS 6943. Internship in Women's, Gender, and Sexuality Studies. (0-0) 3 Credit Hours.**

A supervised experience, relevant to the student's program of study within selected community organizations and agencies. May be repeated for a total of 6 semester credit hours. Course Fees: GH01 \$90; INT1 \$150; STSH \$30.

**WGSS 6953. Independent Study. (0-0) 3 Credit Hours.**

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 may count towards Master's Degree. Course Fees: GH01 \$90; STSH \$30.

**WGSS 6973. Special Topics in Women's, Gender, and Sexuality Studies. (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. Special problems/topics courses may be repeated for credit when the topics vary, but no more than 6 hours, regardless of discipline, will apply towards the Master's degree. Course Fees: GH01 \$90; LRH1 \$20; STSH \$30.



# KLESSE COLLEGE OF ENGINEERING AND INTEGRATED DESIGN

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The Klesse College of Engineering and Integrated Design offers the following certificate and graduate programs:

## Department of Biomedical Engineering and Chemical Engineering (p. 136)

- Master of Science in Biomedical Technology Commercialization (p. 136)
- Master of Science in Biomedical Engineering (p. 136)
- Master of Science in Engineering Education (p. 136)
- Doctor of Philosophy in Biomedical Engineering (p. 136)
- Graduate Certificate in Engineering Education (p. 144)
- Graduate Certificate in Medical Device Commercialization and Entrepreneurship (p. 144)

## Department of Electrical and Computer Engineering (p. 150)

- Master of Science in Electrical Engineering (p. 150)
- Master of Science in Computer Engineering (p. 150)
- Master of Science in Advanced Materials Engineering (p. 150)
- Doctor of Philosophy in Electrical Engineering (p. 150)
- Integrated Bachelor's/Master's Program (p. 150)
- Graduate Certificate in Cloud Computing (p. 158)

## Department of Mechanical Engineering (p. 168)

- Master of Science in Advanced Manufacturing and Enterprise Engineering (p. 168)
- Master of Science in Aerospace Engineering (p. 168)
- Master of Science in Mechanical Engineering (p. 168)
- Doctor of Philosophy in Mechanical Engineering (p. 168)

## School of Architecture and Planning (p. 178)

- Master of Architecture - The Professional Program (p. 178)
- Master of Science in Architecture - The Research Program (p. 178)
- Master of Science in Urban and Regional Planning (p. 178)
- Graduate Certificate in High-Performance Design and Sustainability (p. 182)
- Graduate Certificate in Historic Preservation (p. 182)
- Graduate Certificate in Urban and Regional Planning (p. 182)

## School of Civil and Environmental Engineering, and Construction Management (p. 191)

- Master of Science in Civil Engineering (p. 191)
- Master of Civil Engineering (p. 191)
- Master of Science in Facility Management (Online) (p. 191)
- Doctor of Philosophy in Civil Engineering (p. 191)
- Doctor of Philosophy in Environmental Science and Engineering (p. 191)
- Graduate Certificate in Construction Engineering, Science and Management (p. 200)
- Graduate Certificate in Facility Management (Online) (p. 200)

## Department of Biomedical Engineering and Chemical Engineering

The Department of Biomedical Engineering and Chemical Engineering offers a Graduate Certificate in Medical Device Commercialization and Entrepreneurship, a Graduate Certificate in Engineering Education, a Master of Science degree in Biomedical Engineering, a Master of Science degree in Biomedical Technology and Commercialization, a Master of Science degree in Engineering Education, and a Doctor of Philosophy degree in Biomedical Engineering.

- M.S. in Biomedical Technology Commercialization (p. 136)
- M.S. in Biomedical Engineering (p. 137)
- M.S. in Engineering Education (p. 139)
- Ph.D. in Biomedical Engineering (p. 141)

## Master of Science Degree in Biomedical Technology Commercialization

A Master of Science (M.S.) degree in Biomedical Technology Commercialization (BTC) at The University of Texas at San Antonio (UTSA) is a joint graduate program between the Department of Biomedical Engineering and Chemical Engineering in the College of Engineering and Integrated Design and the Department of Information Systems and Cyber Security in the College of Business. This is a non-thesis degree program and the M.S. degree will be awarded to candidates who have satisfactorily completed all degree requirements for the program.

The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and the Graduate Catalog, Master's Degree Regulations).

## Admission Requirements

Students who hold an undergraduate degree in engineering, sciences, or business administration may apply to the program. The minimum requirements for admission to the Master of Science degree in Biomedical Technology Commercialization program are described below. Note that 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, engineering or business discipline. Students with borderline grade point average (that is between 2.9 and 3.0) will be required to satisfactorily complete selected courses as a condition of acceptance.
- The Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores is not required for admission consideration.
- A minimum of one letter of recommendation attesting to the applicant's readiness for graduate study.
- Students whose native language is not English must achieve a university-wide minimum score on either the Test of English as a Foreign Language (TOEFL) paper or internet version or the International English Language Testing System (IELTS). The current university-wide minimum score for TOEFL paper version is 60, TOEFL internet version is 79 and IELTS is 6.5. Students are also encouraged to visit the Graduate Catalog on any changes in the university-wide

minimum scores for TOEFL/IELTS. Note that TOEFL/IELTS scores older than two years are not valid or accepted. This test score is waived for international students from countries where English is the official language, or for students who have earned a regionally accredited bachelor's degree or higher in the United States or in countries where English is the official language as indicated in the Graduate Catalog.

A complete application includes the application form, official transcripts, letter(s) of recommendation, and English Proficiency test (TOEFL or IELTS) scores if applicable.

## Degree Requirements and Program of Study

The Master of Science (M.S.) degree in Biomedical Technology Commercialization (BTC) will consist of at least 30 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 program director and the admissions committee for Biomedical Technology Commercialization. If recommended by the program director and admissions committee, the request will then be submitted to the Dean of the Graduate School for approval. The required curriculum for all students is as follows:

Code	Title	Credit Hours
<b>A. Core courses</b>		<b>18</b>
Required Core Courses offered in the College of Engineering:		
BME 6123	Medical Device Design	
BME 6403	Biomedical Terminologies for Entrepreneurs	
BME 6413	Working Knowledge in the Biomedical Industries	
Required Core Courses offered in the College of Business:		
MOT 5053	Technology Commercialization	
MOT 5243	Essentials of Project and Program Management	
MOT 5343	Financial Aspects of Management of Technology	
<b>B. Electives</b>		<b>9</b>
A minimum of 9 semester credit hours of prescribed courses selected from approved courses below or substitution of appropriate courses by the program director.		
BME 6303	Introduction to Python with Applications to Biomedical Industries	
BME 6723	Bioinstrumentations	
BME 6913	Biomaterials II	
BME 6943	Biomaterials and Cell Signaling	
BME 6953	Biomat for Drug deliv/Pharmaco	
MOT 5213	Organizational Systems for Management of Technology	
MOT 5253	Starting the High-Tech Firm	
<b>C. Final Project</b>		<b>3</b>
The final project, in the area of Biomedical Technology Commercialization, is a one semester project and will be conducted under the guidance of an instructor and approved by the program. Students may opt for a comprehensive exam in lieu of a final project. Students opting for comprehensive exam will need prior approval from the program director. Project/exam will be documented and filed with the student's dossier, indicating successful completion of the project/exam.		

BME 6133 Biomedical Project II

**Total Credit Hours**

**30**

## 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 (UT Health San Antonio). 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 Non-Thesis 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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 60 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

The Master of Science (M.S.) degree in Biomedical Engineering (BME) will consist of at least 32 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, some courses are offered at The University of Texas Health Science Center at San Antonio (UT Health). To enroll in UT Health courses (UT Health Catalog (<http://catalog.uthscsa.edu/>)), students must register through the UT Health website (<http://www.uthscsa.edu/>). Any questions concerning registration at UT Health should be directed to the BME Program Office at UT Health. The required curriculum for all students in the Thesis Option is as follows:

Code	Title	Credit Hours
<b>A. Core courses</b>		<b>17</b>
Required Core Courses offered at UTSA:		
BME 6033	BME Engineering Analysis	
BME 6303	Introduction to Python with Applications to Biomedical Industries	
BME 6703	Biomedical Imaging	
BME 6803	Experimental Biomechanics	
BME 6903	Biomaterials	
Required Core Courses offered at UT Health :		
BIME 6004	Biology for Bioengineers <sup>1</sup>	
BIME 6006	Physiology for BME <sup>1</sup>	
TSCI 5070	Responsible Conduct of Patient-Oriented Clinical Research	

<sup>1</sup> Select one of these two courses to satisfy core requirements.

<b>B. Research seminar</b>	<b>3</b>
BME 6011 (or BME 6090 at UT Health) is required for three semesters, in order to satisfy the requirements for the Master's degree program in Biomedical Engineering.	

<b>C. Elective courses</b>	<b>6</b>
A minimum of 6 semester credit hours of elective courses selected from the list below. Courses not on this list may be taken with the approval of the BME Program.	

UTSA Prescribed Elective Courses:

BME 6053	Independent Study in Biomedical Engineering (or BME 6052, BME 6051)
BME 6093	Topics in Biomedical Engineering
BME 6123	Medical Device Design
BME 6143	Biomedical Device Development
BME 6203	Physiology for Engineers
BME 6213	Cellular Engineering
BME 6233	Cardiovascular Bioengineering
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 6893	Topics in Biomechanics
BME 6913	Biomaterials II
BME 6923	Tissue Engineering
BME 6933	Tissue-Biomaterials Interactions
BME 6943	Biomaterials and Cell Signaling
BME 6963	Fundamentals to Polymer Science with Select Biomedical Applications
ME 5713	Mechanical Behavior of Materials
MOT 5163	Management of Technology
MOT 5243	Essentials of Project and Program Management
UT Health Prescribed Elective Courses:	
BIME 5091	Independent Study
CSAT 5022	Interprofessional Human Gross Anatomy
CSAT 5095	Experimental Design and Data Analysis
INTD 5007	Advanced Cell and Molecular Biology
INTD 6033	Cell Signaling Mechanisms
MICR 5051	Introduction to Immunology
PHAR 5013	Principles of Pharmacology
RADI 6016	Physics of Diagnostic Imaging II
RADI 6051	Statistical Parametric Imaging

**D. A minimum of 6 semester credit hours of biomedical engineering Master's Thesis Research is required. 6**

BIME 6098	Thesis
BME 6981	Master's Thesis Research
BME 6982	Master's Thesis Research
BME 6983	Master's Thesis Research
BME 6986	Master's Thesis Research

**Total Credit Hours 32**

<sup>1</sup> Only one course is needed to satisfy the core requirement.

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 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 UT Health 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 UT Health.

### 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 UT Health, 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 UT Health or to the Graduate School at UTSA that the Master's degree be awarded.

### Degree Requirements and Program of Study – Non-Thesis Option

The Non-Thesis Option is not offered to new incoming students. All students enrolled in the Non-Thesis Option will require approval from the Program Director and the Graduate Advisor of Record. The Master of Science (M.S.) degree in Biomedical Engineering (BME) (Non-Thesis Option) will consist of at least 36-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, some courses are offered at The University of Texas Health Science Center at San Antonio (UT Health). To enroll in UT Health courses (UT Health Catalog (<http://catalog.uthscsa.edu/>)), students must register through the UT Health

website (<http://www.uthscsa.edu>). Any questions concerning registration at UT Health should be directed to the BME Program Office at UT Health. The required curriculum for all BME students in the Non-Thesis Option is as follows:

Code	Title	Credit Hours
<b>A. Core Courses:</b>		<b>18</b>
Required Core Courses offered at UTSA: (All courses listed below.)		
BME 6033	BME Engineering Analysis	
BME 6703	Biomedical Imaging	
BME 6803	Experimental Biomechanics	
BME 6903	Biomaterials	
BME 6961	Comprehensive Examination	
Required Core Courses offered at UT Health:		
BIME 6004	Biology for Bioengineers <sup>1</sup>	
BIME 6006	Physiology for BME <sup>1</sup>	
TSCI 5070	Responsible Conduct of Patient-Oriented Clinical Research	
<sup>1</sup> Select one of these two courses to satisfy core requirements.		
<b>B. Research seminar</b>		<b>3</b>
BME 6011 (or BIME 6090 at UT Health) is required for three semesters, in order to satisfy the requirements for the Master's degree program in Biomedical Engineering.		
<b>C. Electives</b>		<b>15</b>
A minimum of 15 semester credit hours of prescribed elective courses selected from the Thesis option above. Courses not on this list may be taken with the approval of the BME Program.		
<b>Total Credit Hours</b>		<b>36</b>

## Master of Science in Engineering Education

The Master of Science (M.S.) degree program in Engineering Education is a graduate program designed by the Klesse College of Engineering and Integrated Design and the College of Education and Human Development. It promotes the integration of engineering education and engineering research through collaboration among professors in both colleges. It provides a training platform for those educators who plan to teach engineering or pre-engineering subjects in high schools, community colleges, or four-year engineering programs. The program focuses deeply on a pedagogy that values the wide diversity of students in Texas and their unique strengths and offers mentoring and support through an equally diverse faculty. The interdisciplinary nature of the program also allows for the integration of both theory and application of pedagogical approaches in formal, informal, and corporate settings. The M.S. degree program in Engineering Education can prepare such educators to strengthen their students' opportunities for academic success and workforce and career preparation in the STEM fields.

This is a non-thesis degree program, and the M.S. degree will be awarded to candidates who have satisfactorily completed all degree requirements for the program.

The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and the Graduate Catalog, 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 Engineering Education 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, engineering or STEM education discipline. It is expected that these students will have B.S. degrees with an emphasis in either engineering, engineering technology, computer science, science, mathematics or education (with specialization in teaching STEM subjects) disciplines.
- Official transcripts will need to be submitted prior to admission. For international applicants or applicants that have completed their degree outside of the USA, please provide an officially translated transcript certifying course-by-course equivalence with the US grading system and showing cumulative GPA.
- GRE scores are not required.
- Students whose native language is not English must achieve a university-wide minimum score on the Test of English as a Foreign Language (TOEFL) iBT or the International English Language Testing System (IELTS). The current university-wide minimum score for the TOEFL iBT is 79 and IELTS is 6.5. This test score is waived for international students from countries where English is the official language or for students who have earned a regionally accredited bachelor's degree or higher in the United States or in countries where English is the official language as indicated in the *Student Policies* admission section.
- A minimum of two letters of recommendation are required to attest to the applicant's readiness for graduate study.
- A statement of purpose between 500 words -1000 words that conveys who you are, presents your academic and professional interests, discusses what you expect to gain from this graduate program and how you will add value to the graduate program community. Please also discuss your commitment to diversity, equity and inclusion in engineering classrooms and spaces
- Students will begin to be admitted in the Spring and Fall semesters 2023 and may then move toward a rolling basis as needed after that.

A complete application includes the application form, official transcripts, letters of recommendation, English proficiency test (TOEFL or IELTS) scores if applicable, and the statement of purpose.

## Degree Requirements

### A. Core Courses (select 3 courses from below) 9

NOTE: EGR course descriptions are located below the degree requirements.

EGR 6183	Engineering Education Methods
EGR 6973	Special Problems
or	
CI 6973	Special Problems
EGR 6913	Advanced Topics in Interdisciplinary STEM Education
or	
CI 6913	Advanced Topics in Interdisciplinary STEM Education

### B. Seminar 1

EGR 6991	Research Seminar	
<b>C. Graduate Project</b>		<b>3</b>
EGR 6943	Graduate Project	
<b>D. Practicum</b>		<b>2</b>
EGR 6932	Engineering Education Practicum	
<b>E. Electives (select 3 courses from below)</b>		<b>9</b>
EGR 6283	Mentored Teaching in Engineering	
EGR 6293	Professional Development in Engineering Education	
EGR 6313	Teaching Engineering through Visualization	
EGR 6453	Engineering for Inclusiveness and Social Justice	
EGR 6463	Engineering Social Responsibility and Ethics	
EGR 6513	Human Centered Design and the Impact of Modern Technologies	
EGR 6653	Foundations of Engineering Education Research Methodologies	
EGR 6853	Advanced Engineering Education Research and Assessment Methodologies	
CI 6613	Nature and Meaning of Interdisciplinary STEM Education	
CI 6623	Inquiry in Interdisciplinary STEM Education	
CI 6633	Equity, Agency, and Participation in Interdisciplinary STEM Education	
CI 6643	Assessment in Interdisciplinary STEM Education	
Other Electives		6
The degree program requires 6 elective semester credit hour (SCH) courses. These elective courses will be graduate level courses primarily from the College of Engineering and Integrated Design from the various departments such as biomedical engineering, civil engineering, computer engineering, electrical engineering, materials engineering and mechanical engineering.		
<b>Total Credit Hours</b>		<b>30</b>

## Engineering (EGR) Courses

**EGR 6113. Curriculum, Instruction, and Assessment. (3-0) 3 Credit Hours.** Prerequisite: CI 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. Differential Tuition: \$165.

**EGR 6183. Engineering Education Methods. (3-0) 3 Credit Hours.** This course focuses on pedagogical principles, assessment, and integration of content in engineering classrooms. The course also provides students with opportunities to develop engineering content and curriculum for classroom and laboratory instruction, including modules, lessons, activities and team-based experiences. Research on learning, teaching, and assessment methods, as well as motivation, cognition, metacognition, and program development, will be explored. Differential Tuition: \$165.

**EGR 6283. Mentored Teaching in Engineering. (3-0) 3 Credit Hours.** This course enables deeper understanding of teaching and learning through practice, feedback, and reflection as performed regularly in assigned teaching duties. Educational goals and objectives are identified and become central to reflect on the impact and assessment of the activities and methods used to achieve student learning. Differential Tuition: \$165.

**EGR 6313. Teaching Engineering through Visualization. (3-0) 3 Credit Hours.**

This course helps students understand various technologies through computer visualizations by analyzing and developing images and other forms of visual representation of data. Examples include medical imaging, communication technology, transportation technology, energy and power technology. Differential Tuition: \$165.

**EGR 6453. Engineering for Inclusiveness and Social Justice. (3-0) 3 Credit Hours.**

This course examines the role of engineers in society, the complexity of sociotechnical challenges, the importance of diversity and inclusion in spaces where engineering is practiced, and the ways in which engineering can be used as a vehicle to rectify injustices created by engineered designs and artifacts. The course also provides the tools to critically analyze engineering systems, challenge dominant engineering discourses, increase an awareness of diversity, equity, and inclusion, and reshape the practice of engineering. Differential Tuition: \$165.

**EGR 6463. Engineering Social Responsibility and Ethics. (3-0) 3 Credit Hours.**

This course provides a foundational perspective for engineering ethics and social responsibility in relationship to individuals, industry, and the public welfare in both education and practice. The course places emphasis on the unified nature of ethics, morality, legal responsibility, and social issues. Differential Tuition: \$165.

**EGR 6513. Human Centered Design and the Impact of Modern Technologies. (3-0) 3 Credit Hours.**

This course explores the issues faced by society as technology becomes an integral part of human life. The course prepares students to think critically, practically, creatively, and responsively about technological and sociological challenges and encourages them to examine solutions of their own. The course also explores and discusses the socio-technological and user interplay in engineering design. Differential Tuition: \$165.

**EGR 6653. Foundations of Engineering Education Research Methodologies. (3-0) 3 Credit Hours.**

This course introduces students to various research methodologies in engineering education, including strategies for identifying a research question, collecting support literature, using appropriate methodologies and analysis, and reporting results. Students will learn about the ethical conduct of research by engaging in the course activities. Differential Tuition: \$165.

**EGR 6853. Advanced Engineering Education Research and Assessment. (3-0) 3 Credit Hours.**

This course offers students an in-depth engagement with research study design and methodologies in engineering education research and assessment. Advanced methodologies such as case-control studies, advanced survey design, design of experimental, etc. will be outlined and exemplar research studies will be analyzed to demonstrate the methodology and to highlight its contribution. Students will broaden their understanding of assessment and evaluation and how it can be expanded into research. Differential Tuition: \$165.

**EGR 6913. Advanced Topics in Interdisciplinary STEM Education. (3-0) 3 Credit Hours.**

Topics and critical issues in interdisciplinary STEM education. Topics include focus on (1) research and development of innovative STEM learning and emerging STEM learning environments in both in and out of school settings, and (2) research that advances the field of formal and informal STEM Education. May be repeated for credit when topics vary. Differential Tuition: \$165.

**EGR 6932. Engineering Education Practicum-Community and Challenge Based Learning. (2-0) 2 Credit Hours.**

The purpose of this course is to expose students to challenge-based instructional pedagogies under the supervision of the faculty advisor. It is a practical introduction to engineering education that considers technical, social justice challenges in the community. The course allows for the development of transforming leadership competencies, connects students to their surrounding community through an engineering lens and provides for an experiential, collaborative learning experience that integrates knowledge. May be repeated for a total of 4 credit hours. Differential Tuition: \$110.

**EGR 6943. Graduate Project. (3-0) 3 Credit Hours.**

A semester-long project with the approval of a supervising faculty member. Credit will be awarded upon successful submission of a written report. 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. Differential Tuition: \$165.

**EGR 6973. Special Problems: Becoming an Engineering Educator. (3-0) 3 Credit Hours.**

An organized course offering the opportunity for specialized study in engineering education for instructors in either a college/university setting or a K#12 educational classroom. Covers theoretical foundations of engineering curriculum design and a culturally responsive teaching framework for teaching engineering content and using engineering design as the impetus for student learning of associated science & mathematics. Orientation will be provided to enhance other valuable skills for engineering educators such as writing proposals, managing active learning classrooms, and developing teaching methods to enable diverse student learning. May be repeated for credit when topics vary. Differential Tuition: \$165.

**EGR 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 the discipline in which the project is in progress. Differential Tuition: \$55.

## 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 (UT Health San Antonio). 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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 60 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

The Doctor of Philosophy degree in Biomedical Engineering (BME) will consist of at least 82-semester-credit-hours for students with a 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, some courses are offered at The University of Texas Health Science Center at San Antonio (UT Health). To enroll in UT Health courses (UT Health Catalog (<http://catalog.uthscsa.edu/>)), students must register through the UT Health website (<http://www.uthscsa.edu>). Any questions concerning registration at UT Health should be directed to the BME Program Office at UT Health.

Code	Title	Credit Hours
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Students with a M.S. degree in Biomedical Engineering will be reviewed on a case-by-case basis. All other students who have obtained a Master of Science degree in Biomedical Engineering from UTSA are required to complete the following courses:

CSAT 5095	Experimental Design and Data Analysis (at UT Health)	
One prescribed BME elective		
Course requirements in Sections B, D (5 credits), E, and F of doctoral program		

Students will be required to complete a minimum of 82 hours for students matriculating into the doctoral program with a B.S. degree. The minimum required curriculum for all students is as follows:

Code	Title	Credit Hours
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### A. Core Courses: 17

Required Core Courses offered at UTSA:		
BME 6033	BME Engineering Analysis <sup>1</sup>	
BME 6303	Introduction to Python with Applications to Biomedical Industries	
BME 6703	Biomedical Imaging <sup>1,3</sup>	
BME 6803	Experimental Biomechanics <sup>1</sup>	
BME 6903	Biomaterials <sup>1</sup>	
Required Core Courses offered at UT Health:		
BIME 6004	Biology for Bioengineers <sup>1,2</sup>	
BIME 6006	Physiology for BME <sup>1,2</sup>	
CSAT 5095	Experimental Design and Data Analysis	
TSCI 5070	Responsible Conduct of Patient-Oriented Clinical Research	
RADI 5015	Physics of Diagnostic Imaging I <sup>1,3</sup>	

<sup>1</sup> Select any four (4) courses to satisfy the core requirements.

<sup>2</sup> Only one of these courses may be counted toward the core requirements.

<sup>3</sup> Only one of these courses may be counted toward the core requirements.

### B. Research seminar 8

BME 6011 (at UTSA) or BIME 6090 (at UT Health) must 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 elective courses selected from the list below. Courses not on this list may be taken with the approval of the BME Program. 9

UTSA Prescribed Elective Courses:		
BIO 5433	Systems Neuroscience	
BIO 5483	Computational Neuroscience	
BME 6043	Critical Thinking and Writing for BME	
BME 6053	Independent Study in Biomedical Engineering (or BME 6051, BME 6052)	
BME 6093	Topics in Biomedical Engineering	

BME 6123	Medical Device Design
BME 6143	Biomedical Device Development
BME 6213	Cellular Engineering
BME 6233	Cardiovascular Bioengineering
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 6893	Topics in Biomechanics
BME 6913	Biomaterials II
BME 6923	Tissue Engineering
BME 6933	Tissue-Biomaterials Interactions
BME 6943	Biomaterials and Cell Signaling
BME 6963	Fundamentals to Polymer Science with Select Biomedical Applications
ME 5713	Mechanical Behavior of Materials
UT Health Prescribed Elective Courses:	
BIME 5091	Independent Study
CSAT 5022	Interprofessional Human Gross Anatomy
IBMS 5000	Fundamentals of Biomedical Science
INTD 5007	Advanced Cell and Molecular Biology
INTD 6033	Cell Signaling Mechanisms
MICR 5051	Introduction to Immunology
PHAR 5013	Principles of Pharmacology
PHAR 5014	Integrated Physiology and Therapeutics
RADI 6016	Physics of Diagnostic Imaging II
RADI 6051	Statistical Parametric Imaging

**D. Supervised Teaching** 1

A minimum of 1 semester credit hour of Supervised Teaching is required to satisfy the degree's requirement. Students may take up to 3 semester credit hours. (1-3 semester credit hours)

BIME 6071	Supervised Teaching
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**E. Doctoral Research and Dissertation** 12

1. Doctoral Research requires a minimum of 6 semester credit hours.

BME 7951	Doctoral Research
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BME 7952	Doctoral Research
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BME 7953	Doctoral Research
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BME 7956	Doctoral Research
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BIME 6097	Research
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2. Doctoral Dissertation requires a minimum of 6 semester credit hours.

BME 7991	Doctoral Dissertation
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BME 7992	Doctoral Dissertation
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BME 7993	Doctoral Dissertation
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BME 7996	Doctoral Dissertation
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BIME 7099	Dissertation
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**F. Electives** 35

The remainder of the hours can be BME approved graduate level courses or research credits.

Students in the program must complete at least 82 semester credit hours for graduation. 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.

**Total Credit Hours**

82

**Advancement to Candidacy**

All students seeking a doctoral degree must be admitted to candidacy after passing a doctoral qualifying examination. Students should consult Doctoral Degree Regulations in 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 UT Health 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 UT Health 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 UT Health.

**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 UT Health, one member of the graduate faculty outside of the BME Graduate Faculty from either UTSA or UT Health, and one member from outside both institutions. In addition, there is a minimum of 50 percent dissertation committee membership from UTSA for students with a Supervising Professor from UTSA. 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 UT Health 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/UT Health Joint Graduate Program in Biomedical Engineering.

- Graduate Certificate in Engineering Education (p. 144)
- Graduate Certificate in Medical Device Commercialization and Entrepreneurship (p. 145)

## Graduate Certificate in Engineering Education

The Graduate Certificate in Engineering Education is a 9-semester credit hour program offered as a collaborative effort between the Colleges of Engineering and Integrated Design and Education and Human Development. The program will have an emphasis on engineering curriculum development, instruction, and assessment methods to support student learning outcomes. It covers history and attributes of different engineering fields. The proposed program also promotes the integration of mathematics and science in the context of engineering.

This program is targeted for both engineering students wishing to prepare as future engineering instructors in a college or university and for teachers in the field (or future teachers) interested in preparing to teach engineering at the middle and high school level in formal and informal educational settings. It provides a training platform for those educators who plan to teach engineering or pre-engineering subjects. This unique program also allows for the collaboration of students and faculty from both technical and educational fields as peers.

## Program Objectives

The Graduate Certificate in Engineering Education will inspire engineering educators at all levels to succeed and excel in the following ways:

Objective 1: To advance the development of innovative approaches to engineering education.

Objective 2: To provide access and opportunity for engineering educators to improve their teaching skills and classroom management.

Objective 3: To promote a broad and diverse community of engineering educators that engages all members to share new ideas and best practices.

## Admission Requirements

Applicants with a bachelor's degree in engineering, sciences, or education discipline may apply to the certificate program.

A minimum grade point average (GPA) of 3.0 for the last two years of work toward the bachelor's degree is required.

To maintain enrollment in the certificate program, students should maintain a 3.0 GPA throughout their tenure in the program

To meet the curricular requirements for the Graduate Certificate in Engineering Education, students must complete 9-semester-credit-hours to include the following three courses. Courses may be taken in any order.

EGR 6183	Engineering Education Methods	3
EGR 6283	Mentored Teaching in Engineering	3
EGR 6973	Special Problems	3
or		
CI 6973	Special Problems	

**Total Credit Hours** **9**

## Engineering (EGR) Courses

### EGR 6183. Engineering Education Methods. (3-0) 3 Credit Hours.

This course focuses on pedagogical principles, assessment, and integration of content in engineering classrooms. The course also provides students with opportunities to develop engineering content and curriculum for classroom and laboratory instruction, including modules, lessons, activities and team-based experiences. Research on learning, teaching, and assessment methods, as well as motivation, cognition, metacognition, and program development, will be explored. Differential Tuition: \$165.

### EGR 6283. Mentored Teaching in Engineering. (3-0) 3 Credit Hours.

This course enables deeper understanding of teaching and learning through practice, feedback, and reflection as performed regularly in assigned teaching duties. Educational goals and objectives are identified and become central to reflect on the impact and assessment of the activities and methods used to achieve student learning. Differential Tuition: \$165.

### EGR 6973. Special Problems: Becoming an Engineering Educator. (3-0) 3 Credit Hours.

An organized course offering the opportunity for specialized study in engineering education for instructors in either a college/university setting or a K#12 educational classroom. Covers theoretical foundations of engineering curriculum design and a culturally responsive teaching framework for teaching engineering content and using engineering design as the impetus for student learning of associated science & mathematics. Orientation will be provided to enhance other valuable

skills for engineering educators such as writing proposals, managing active learning classrooms, and developing teaching methods to enable diverse student learning. May be repeated for credit when topics vary. Differential Tuition: \$165.

## Graduate Certificate in Medical Device Commercialization and Entrepreneurship

The Graduate Certificate program in Medical Device Commercialization and Entrepreneurship (MDCE) is administered by the Department of Biomedical Engineering and Chemical Engineering in the College of Engineering and Integrated Design. This certificate is for students who are interested in gaining entry into the biomedical industry workforce. The MDCE graduate certificate will be awarded to candidates who have satisfactorily completed all the requirements for the program and are in good academic standing.

The regulations for this certificate comply with the general University regulations (refer to Student Policies, General Academic Regulations, and the Graduate Catalog, Master's Degree Regulations).

### Admission Requirements

Undergraduate and graduate students who are currently in engineering, sciences, or business discipline may apply to the certificate program.

The minimum requirements for admission to the Graduate Certificate program in Medical Device Commercialization and Entrepreneurship are described below. Note that satisfying these requirements does not guarantee admission.

- All applicants (graduate and undergraduate students) 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, engineering or business discipline. Students with deficiencies in the above courses will be required to satisfactorily complete selected courses as a condition of acceptance.
- Current undergraduate students must be in the final three semester of their program and must have a grade point average of 3.0 or better in their discipline. Students are limited to only registering for 6 semester credit hours of the certificate courses, and these courses should not be counted towards their undergraduate degree of study. The final 6 semester credit hours required for the award of the certificate should be taken after completing their undergraduate program.
- Current graduate students or students must be in good academic standing, that is, having a grade point average of 3.0 or better.
- Applicants who have already completed their undergraduate degree program of study, are currently not in a graduate program, and are not working in a medical device industry 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, engineering or business discipline. Students with borderline grade point average (that is between 2.9 and 3.0) will be required to satisfactorily complete selected courses as a condition of acceptance.
- Applicants who are currently employed in a medical device industry and does not meet the 3.0 grade point average needed for admission, work experience will be taken into account. A 0.5 grade point average credit will also be applied for students given for every full-time year of experience in the medical device industry. For example, if a candidate had a 2.0 grade point average with two years of industry experience, the grade point average will be calculated to be 3.0 (given the two years work experience) at that time of application.

- Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) scores is not required for admission consideration.
- A minimum of one letter of recommendation attesting to the applicant's readiness for this certificate program.
- Students whose native language is not English must achieve a university-wide minimum score on either the Test of English as a Foreign Language (TOEFL) paper or internet version or the International English Language Testing System (IELTS). The current university-wide minimum score for TOEFL paper version is 60, TOEFL internet version is 79 and IELTS is 6.5. Students are also encouraged to visit the Graduate Catalog on any changes in the university-wide minimum scores for TOEFL/IELTS. Note that TOEFL/IELTS scores older than two years are not valid or accepted. This test score is waived for international students from countries where English is the official language, or for students who have earned a regionally accredited bachelor's degree or higher in the United States or in countries where English is the official language as indicated in the Graduate Catalog.

A complete application includes the application form, official transcripts, letter(s) of recommendation, and English Proficiency test (TOEFL or IELTS) scores if applicable

### Certificate Requirements and Program of Study

The Graduate Certificate in Medical Device Commercialization and Entrepreneurship will consist of at least 12 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 program director and the admissions committee for this certificate program. If recommended by the program director and admissions committee, the request will then be submitted to the Dean of the Graduate School for approval. The required curriculum for all students is as follows:

Code	Title	Credit Hours
12 hours of coursework chosen from the following, in consultation with your graduate advisor. 12		
BME 6213	Cellular Engineering	
BME 6143	Biomedical Device Development	
BME 6153	Medical Device Project Management	
BME 6073	Professional Science Master's Practicum <sup>1</sup>	
BME 6133	Biomedical Project II	
BME 6163	Medical Technology Regulatory	
BME 6173	Biomedical Commercialization and Entrepreneurship	
BME 6303	Introduction to Python with Applications to Biomedical Industries	
BME 6723	Bioinstrumentations <sup>2</sup>	
BME 6953	Biomat for Drug deliv/Pharmaco	
<b>Total Credit Hours</b>		<b>12</b>

<sup>1</sup> Students currently working in the biomedical industry or undertaking biomedical industry experiences have the option to request experiential credits using a competency-based exam. Students will have to register for BME 6073 and must submit a written request to take the competency-based exam. Three (3)

semester credit hours will be awarded for the course upon passing the competency-based exam. The administration of the exam and the period of experiences needed to qualify for the exam will be the responsibility of the program director.

<sup>2</sup> One of BME 6203, BME 6723 or BME 6953 can be taken as a specialization elective if desired to fit industry specific technical competency. Students can only count one of these courses towards the certificate program.

## 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 UT Health San Antonio.) Differential Tuition: \$55.

### **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 UT Health San Antonio.) Differential Tuition: \$55.

### **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 and ME 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, EGR 6013, or ME 6013.) Differential Tuition: \$165.

### **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. Differential Tuition: \$165.

### **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. Differential Tuition: \$55.

### **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. Differential Tuition: \$110.

### **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. Differential Tuition: \$165.

### **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.) Differential Tuition: \$165.

### **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. Differential Tuition: \$165.

### **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. Differential Tuition: \$165.

### **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 UT Health San Antonio. Credit cannot be earned for both BME 6103 and BIME 6004.) Differential Tuition: \$165.

### **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. Differential Tuition: \$165.

**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.) Differential Tuition: \$55.

**BME 6133. Biomedical Project II. (3-0) 3 Credit Hours.**

Prerequisite: 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 non-thesis 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). Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**BME 6153. Medical Device Project Management. (3-0) 3 Credit Hours.**

Prerequisite: Consent of the 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. Differential Tuition: \$165.

**BME 6163. Medical Technology Regulatory. (3-0) 3 Credit Hours.**

Prerequisites: Graduate standing, consent of the instructor and of the Graduate Advisor of Record, and BME 6123. This course provides an overview of product quality and safety responsibilities during device development, the regulatory framework, both nationally as well as internationally, and product monitoring standards. An understanding of the approval submission process and the nature of benchmarking and testing products as well as product classifications will be covered. Differential Tuition: \$165.

**BME 6173. Biomedical Commercialization and Entrepreneurship. (3-0) 3 Credit Hours.**

Prerequisites: Graduate standing, consent of the instructor and of the Graduate Advisor of Record, and BME 6123. A review of the steps and processes involved in starting a biomedical technology-based commercial 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. Differential Tuition: \$165.

**BME 6203. Physiology for Engineers. (3-0) 3 Credit Hours.**

Prerequisite: Consent of the instructor or completion of BIME 6004 (UT Health San Antonio). 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. Differential Tuition: \$165.

**BME 6213. Cellular Engineering. (3-0) 3 Credit Hours.**

Prerequisites: Consent of the instructor and completion of BIME 6004 (UT Health San Antonio) 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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**BME 6303. Introduction to Python with Applications to Biomedical Industries. (3-0) 3 Credit Hours.**

Students will be exposed to coding for applications using Python in the biomedical industries. The course aims to provide students with the ability to apply Python to analyze biological data and solve contemporary problems in the biosciences, bioengineering and biomedicine. Differential Tuition: \$165.

**BME 6313. Computational Bioengineering and Biomedicine. (3-0) 3 Credit Hours.**

Prerequisite: 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.) Differential Tuition: \$165.

**BME 6403. Biomedical Terminologies for Entrepreneurs. (3-0) 3 Credit Hours.**

Prerequisite: Completion of or concurrent enrollment in BME 6123. Designed to provide students with an introduction to concepts and terminologies that span across the fields of biomedical engineering, technologies, medical devices and healthcare. Differential Tuition: \$165.

**BME 6413. Working Knowledge in the Biomedical Industries. (3-0) 3 Credit Hours.**

Prerequisite: Completion of or concurrent enrollment in BME 6403. Designed to provide students with an introduction to biomedical industries and medical product categories. Examples will be provided for specific companies in regards to the technologies, intellectual property protection and business models that provide the foundation for their success. Differential Tuition: \$165.

**BME 6593. Biomaterials for Drug Delivery/Pharmacology. (3-0) 3 Credit Hours.**

Provides a 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. Differential Tuition \$165.

**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 UT Health San Antonio.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.") Differential Tuition: \$165.

**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.") Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**BME 6953. Biomaterials for Drug Delivery/Pharmacology. (3-0) 3 Credit Hours.**

Prerequisite: Completion of or concurrent enrollment in BME 6403. Provides a 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. Differential Tuition: \$165.

**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.) Differential Tuition: \$55.

**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. Differential Tuition: \$165.

**BME 6981. Master's Thesis Research. (0-0) 1 Credit Hour.**

Prerequisites: Master's student standing, and 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 UT Health San Antonio.) Differential Tuition: \$55.

**BME 6982. Master's Thesis Research. (0-0) 2 Credit Hours.**

Prerequisites: Master's student standing, and 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 UT Health San Antonio.) Differential Tuition: \$110.

**BME 6983. Master's Thesis Research. (0-0) 3 Credit Hours.**

Prerequisites: Master's student standing, and 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 UT Health San Antonio.) Differential Tuition: \$165.

**BME 6986. Master's Thesis Research. (0-0) 6 Credit Hours.**

Prerequisites: Master's student standing, and 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 UT Health San Antonio.) Differential Tuition: \$330.

**BME 7951. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral student standing, and 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 UT Health San Antonio.) Differential Tuition: \$55.

**BME 7952. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisites: Doctoral student standing, and 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 UT Health San Antonio.) Differential Tuition: \$110.

**BME 7953. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral student standing, and 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 UT Health San Antonio.) Differential Tuition: \$165.

**BME 7956. Doctoral Research. (0-0) 6 Credit Hours.**

Prerequisites: Doctoral student standing, and 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 UT Health San Antonio.) Differential Tuition: \$330.

**BME 7991. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: Admission to Doctoral candidacy, and 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 UT Health San Antonio.) Differential Tuition: \$55.

**BME 7992. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisites: Admission to Doctoral candidacy, and 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 UT Health San Antonio.) Differential Tuition: \$110.

**BME 7993. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: Admission to Doctoral candidacy, and 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 UT Health San Antonio.) Differential Tuition: \$165.

**BME 7996. Doctoral Dissertation. (0-0) 6 Credit Hours.**

Prerequisites: Admission to Doctoral candidacy, and 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 UT Health San Antonio.) Differential Tuition: \$330.

# Department of Electrical and Computer Engineering

The Department of Electrical and Computer Engineering offers a Doctor of Philosophy degree in Electrical Engineering, a Master of Science degree in Electrical Engineering, a Master of Science degree in Computer Engineering, and administers a Master of Science degree in Advanced Materials Engineering.

- M.S. in Electrical Engineering (p. 150)
- M.S. in Computer Engineering (p. 151)
- M.S. in Advanced Materials Engineering (p. 153)
- Ph.D. in Electrical Engineering (p. 156)
- Integrated Bachelor's/Master's Program (p. 158)

## 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 non-thesis 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 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 60 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).

Submission of the Graduate Record Examination (GRE) is optional but recommended for consideration of competitive scholarships. 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 non-thesis 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.

Code	Title	Credit Hours
<b>A. Core course based on student's area of concentration from the list below:</b>		
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>B. At least one course from student's selected concentration</b>		<b>3</b>
<b>C. At least one core course from outside the concentration</b>		<b>3</b>
<b>D. Additional graduate electrical engineering courses<sup>1</sup></b>		<b>9</b>
Must include 1 semester credit hour of EE 6991 Research Seminar		
<b>E. Other Electives (may be courses from outside electrical engineering)<sup>1</sup></b>		<b>6</b>
<b>F. Master's Thesis (a minimum of 6 semester credit hours are required)</b>		<b>6</b>
EE 6983	Master's Thesis	
<b>Total Credit Hours</b>		<b>30</b>

<sup>1</sup> Chosen with approval of the Electrical Engineering Graduate Program Committee.

#### Non-Thesis 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.

Code	Title	Credit Hours
<b>A. Core course based on student's area of concentration from the list below:</b> 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>B. At least two courses from student's selected concentration</b>		<b>6</b>
<b>C. At least two core courses from outside the concentration</b>		<b>6</b>
<b>D. Additional graduate electrical engineering courses <sup>1</sup></b>		<b>9</b>
Must include 1 semester credit hour of EE 6991 Research Seminar		
<b>E. Other Electives (may be courses from outside electrical engineering) <sup>1</sup></b>		<b>6</b>
<b>F. Master's Project (a minimum of 3 semester credit hours are required)</b>		<b>3</b>
EE 6943	Graduate Project	
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> 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

Code	Title	Credit Hours
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

Code	Title	Credit Hours
EE 5143	Linear Systems and Control	3
EE 5243	Special Topics in Control	3
EE 5343	Intelligent Control and Robotics	3
EE 5443	Discrete-Time Control Theory and Design	3
EE 5543	Nonlinear System control	3
EE 5643	Advanced Robotics and Artificial Intelligence	3
EE 5743	Network Multi-agent Systems	3

EE 5843	Optimization and Control of Cyber-Physical Systems	3
EE 5943	Adaptive Estimation and Control	3
EE 6243	Modeling and Control of Three-Phase PWM Converters	3
EE 6343	Advanced Topics in Systems and Control	3
EE 7443	Nonlinear Control Systems	3

### Digital Signal Processing

Code	Title	Credit Hours
EE 5153	Random Signals and Noise	3
EE 5163	Digital Signal 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

Code	Title	Credit Hours
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

Code	Title	Credit Hours
EE 5293	Topics in Microelectronics	3
EE 5403	Advanced Dielectric and Optoelectronic Engineering Laboratory	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

Non-thesis degree candidates are required to submit a written report upon the completion of their Graduate Project to the student's advisory committee, chaired by a tenured or tenure-track graduate faculty member. In addition, an oral presentation of the project may be mandated by the advisory committee. Thesis degree candidates are required to pass an oral comprehensive examination that is administered in the form of a presentation of the thesis research 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) Non-Thesis 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 non-thesis 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 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 60 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).

Submission of the Graduate Record Examination (GRE) is optional but recommended for consideration of competitive scholarships. 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 non-thesis option.

The courses are divided into three groups as follows:

#### Thesis Option

Code	Title	Credit Hours
<b>A. Select any two core courses from Group A</b> <span style="float: right;"><b>6</b></span>		
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>B. Additional computer engineering courses from Group A or B (must include 1 semester credit hour of EE 6991 Research Seminar)</b> <sup>1</sup> <span style="float: right;"><b>12</b></span>		
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 5523	Introduction to Cloud Computing	
EE 6991	Research Seminar	
CPE 6953	Independent Study	
	or CPE 6952 Independent Study	
	or CPE 6951 Independent Study	
<b>C. Elective courses from Group A or B or C</b> <sup>1</sup>		<b>6</b>
Group C. Free elective courses: any graduate-level electrical engineering course and the following courses		
CS 5113	Computer Graphics	
CS 5233	Artificial Intelligence	
CS 5363	Programming Languages and Compilers	
CS 5523	Operating Systems	
<b>D. Master's Thesis (a minimum of 6 semester credit hours)</b>		<b>6</b>
CPE 6983	Master's Thesis	
<b>Total Credit Hours</b>		<b>30</b>

<sup>1</sup> Chosen with approval of the Computer Engineering Graduate Program Committee.

#### Non-Thesis Option

Code	Title	Credit Hours
<b>A. Select any two core courses from Group A</b>		<b>6</b>
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>B. Additional computer engineering courses from Group A or B (must include 1 semester credit hour of EE 6991 Research Seminar)</b> <sup>1</sup>		<b>15</b>
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 5523	Introduction to Cloud Computing	
EE 6991	Research Seminar	
CPE 6953	Independent Study or CPE 6952 Independent Study or CPE 6951 Independent Study	
<b>C. Elective courses from Group A or B or C<sup>1</sup></b>		<b>9</b>
Group C. Free elective courses: any graduate-level electrical engineering course and the following courses		
CS 5113	Computer Graphics	
CS 5233	Artificial Intelligence	
CS 5363	Programming Languages and Compilers	
CS 5523	Operating Systems	
<b>D. Master's Project (a minimum of 3 semester credit hours)</b>		<b>3</b>
CPE 6943	Graduate Project	
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> 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 non-thesis 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

Non-thesis degree candidates are required to submit a written report upon the completion of their Graduate Project to the student's advisory committee, chaired by a tenured or tenure-track graduate faculty member. In addition, an oral presentation of the project may be mandated by the advisory committee. Thesis degree candidates are required to pass an oral comprehensive examination that is administered in the form of a presentation of the thesis research 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 and Integrated Design. The M.S. in MatE degree program is directed by the Advanced Materials Engineering Graduate Program Committee and is currently administered by the Department of Electrical and Computer Engineering.

The Master of Science degree in Advanced Materials Engineering is designed to offer training opportunities for graduate students to gain 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 Integrated Design and other colleges at UTSA to enhance students' interdisciplinary research potentials as well as their technical leadership and entrepreneurship skills. The affiliated program faculty consists of UTSA graduate faculty who offers MatE core/concentration courses or serves on MatE Program/Supervising Committees during the current or previous catalog period. Each MatE program faculty is actively engaged in interdisciplinary research/education and brings to this program extensive and a wide range of expertise.

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 multifunctional properties; and
3. Design and fabrication of advanced materials and devices that address current and future technological challenges in a wide range of applications including energy, communications, control and automation, health and medicine, nanotechnology, structural and environmental, and transportation.

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

Upon recommendation of the student's Supervising Professor and with the approval of the Program Director, 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 the student for jobs in research and in the industry.

Both thesis and non-thesis 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 or sciences especially from 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
- 1 to 2 letter(s) of recommendation

- Students whose native language is not English must achieve a minimum score of 60 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).
- Submission of the Graduate Record Examination (GRE) is optional but recommended for consideration of competitive scholarships.

## 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 non-thesis 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 9 credits courses (at least 6 credits from the chosen concentration) in Group B, must be taken to satisfy the depth and the breadth requirement. Up to 6 credits may be taken from courses in Group C, including courses from outside of 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. No more than a total of 3 semester credit hours of MATE 6951, MATE 6952, or MATE 6953 Directed Research in Advanced Materials Engineering Directed Research in Advanced Materials Engineering, MOT 6971 or MOT 6973 Special Problems Special Problems, and Research Seminar (BME 6011 or EE 6991) may be included.

Course listings of Group A, B, and C are common for both Thesis and Non-Thesis options.

Code	Title	Credit Hours
<b>A. Required Core Courses from Group A</b>		<b>9</b>
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>B. Concentration specific courses from Group B</b>		<b>9</b>
Group B. Concentration specific courses- at least 6 credits must be from the chosen concentrations:		
<b>Concentration I: Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials</b>		
EE 5403	Advanced Dielectric and Optoelectronic Engineering Laboratory	
EE 5503	Introduction to Micro and Nanotechnology	
EE 5693	Dielectric and Optoelectronic Devices	
EE 6493	Advanced Topics in Electronic Materials and Devices	
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	

MATE 5493	Topics in Materials Engineering and Application	
<b>Concentration II: Multifunctional Biomedical Materials</b>		
BME 6093	Topics in Biomedical Engineering	
BME 6743	Biophotonics	
BME 6903	Biomaterials	
BME 6933	Tissue-Biomaterials Interactions	
BME 6963	Fundamentals to Polymer Science with Select Biomedical Applications	
MATE 5513	Fundamentals of Microfabrication and Application or BME 6733 Microfabrication and Application	
MATE 5523	Biosensors: Fundamentals and Applications or BME 6753 Biosensors: Fundamentals and Applications	
BME 6803	Experimental Biomechanics	
MATE 5543	Current Analytical Tools for Biomaterials Characterizations	
MATE 5393	Topics in Advanced Materials Engineering	
MATE 5493	Topics in Materials Engineering and Application	
<b>C. Prescribed Electives from Group C</b>		<b>6</b>
Group C. Prescribed elective courses. Additional elective courses may be added with approval of the Advanced Materials Engineering Graduate Program Committee.		
CHE 5263	Advanced Analytical Chemistry	
BME 6011	Research Seminar	
BME 6723	Bioinstrumentations	
BME 6943	Biomaterials and Cell Signaling	
EE 5293	Topics in Microelectronics	
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	
ME 5483	Finite Element Methods	
ME 5713	Mechanical Behavior of Materials	
ME 5743	Composite Materials	
ME 6013	Advanced Engineering Mathematics I	
MOT 5243	Essentials of Project and Program Management	
MOT 5253	Starting the High-Tech Firm	
MOT 5313	Emerging Technologies	
MOT 5333	Technological Drivers of Globalization	
PHY 5303	Statistical Mechanics	
PHY 7503	Topics in Experimental Physics	
<b>D. Master's Thesis (a minimum of 6 semester credit hours)</b>		<b>6</b>
MATE 6983	Master's Thesis Research	
<b>Total Credit Hours</b>		<b>30</b>

### Non-Thesis 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 12 credits courses (at least 9 credits from the chosen concentration) in Group B must be taken to satisfy the depth and the breadth requirement. Up to 9 credits may be taken from courses in Group C, including courses from out of 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. No more than a total of 3 semester credit hours of MATE 6951, MATE 6952, or MATE 6953 Directed Research in Advanced Materials Engineering Directed Research in Advanced Materials Engineering, MOT 6971 or MOT 6973 Special Problems Special Problems, and Research Seminar (BME 6011 or EE 6991) may be included.

Course listings of Group A, B, and C are common for both Thesis and Non-Thesis options.

Code	Title	Credit Hours
<b>A. Required Core Courses from Group A</b>		<b>9</b>
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>B. Concentration specific courses from Group B</b>		<b>12</b>
Group B. Concentration specific courses - at least 9 credits must be from the chosen concentration		
<b>Concentration I: Multifunctional Electronic, Dielectric, Photonic and Magnetic Materials</b>		
EE 5403	Advanced Dielectric and Optoelectronic Engineering Laboratory	
EE 5503	Introduction to Micro and Nanotechnology	
EE 5693	Dielectric and Optoelectronic Devices	
EE 6493	Advanced Topics in Electronic Materials and Devices	
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	
MATE 5493	Topics in Materials Engineering and Application	
<b>Concentration II: Multifunctional Biomedical Materials</b>		
BME 6093	Topics in Biomedical Engineering	
BME 6743	Biophotonics	
BME 6903	Biomaterials	
BME 6933	Tissue-Biomaterials Interactions	
BME 6963	Fundamentals to Polymer Science with Select Biomedical Applications	
BME 6803	Experimental Biomechanics	
MATE 5513	Fundamentals of Microfabrication and Application or BME 6733 Microfabrication and Application	
MATE 5523	Biosensors: Fundamentals and Applications or BME 6753 Biosensors: Fundamentals and Applications	
MATE 5543	Current Analytical Tools for Biomaterials Characterizations	
MATE 5393	Topics in Advanced Materials Engineering	

MATE 5493 Topics in Materials Engineering and Application

<b>C. Prescribed Electives from Group C</b>		<b>9</b>
Group C. Prescribed elective courses. Additional elective courses may be added with approval of the Advanced Materials Engineering Graduate Program Committee.		
CHE 5263	Advanced Analytical Chemistry	
BME 6011	Research Seminar	
BME 6723	Bioinstrumentations	
BME 6943	Biomaterials and Cell Signaling	
EE 5293	Topics in Microelectronics	
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	
ME 5483	Finite Element Methods	
ME 5713	Mechanical Behavior of Materials	
ME 5743	Composite Materials	
ME 6013	Advanced Engineering Mathematics I	
MOT 5243	Essentials of Project and Program Management	
MOT 5253	Starting the High-Tech Firm	
MOT 5313	Emerging Technologies	
MOT 5333	Technological Drivers of Globalization	
PHY 7503	Topics in Experimental Physics	
PHY 7503	Topics in Experimental Physics	
<b>D. Master's Project (a minimum of 3 semester credit hours)</b>		<b>3</b>
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 B.S./M.S. program should consult the Graduate Advisor or Record for details on fulfilling the integrated degree requirement.

## Comprehensive Examination

All degree candidates are required to submit a written report upon the completion of their graduate project to the student's supervising committee. Additionally, thesis degree candidates are required to pass an oral comprehensive examination. The examination is to be administered in the form of an oral presentation of the thesis or research project by the student's supervising committee. Non-thesis degree candidates have the option to be evaluated by research performance or holding an oral comprehensive exam with the supervising committee. The committee consists of minimum three (for thesis option) or two (for non-thesis option) graduate faculty members; two of the members including the committee chair must be graduate faculty members affiliated with the MatE Master's program. Students must register for 1 semester credit hour of Comprehensive Examination (MATE 6961) 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

### Admission Requirements

The minimum requirements for admission to the Doctor of Philosophy in Electrical Engineering degree program are as follows:

- 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.
- Students whose native language is not English must achieve a minimum score of 60 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, 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. Submission of the Graduate Record Examination (GRE) is optional but recommended for consideration of competitive scholarships. 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 a qualifying examination, 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:

Code	Title	Credit Hours
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

### 81 Semester Credit Hours beyond the Bachelor's Degree

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, EE 7992, and EE 7993 Doctoral Dissertation. At least two courses must be taken from the five core courses, including one related to the fundamentals of the student's doctoral research. At least one credit hour of EE 7931-3 Doctoral Research Seminar is required, and up to a total of 3 credit hours of EE 7931-3 Doctoral Research Seminar and EE 6951-3 Independent Study combined. Up to six credit hours may be taken from other graduate courses outside electrical engineering with approval of the Electrical Engineering Graduate Program Committee.

Code	Title	Credit Hours
<b>A. Two core courses, including one related to the fundamentals of the student's doctoral research, from the list below</b>		
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>B. Graduate elective courses</b>		<b>39</b>
At least one credit hour of EE 7931-3 Doctoral Research Seminar is required and up to 3 credit hours total are allowed including EE 7931-3 Doctoral Research Seminar and EE 6951-3 Independent Study combined		
Graduate electives chosen with approval of the Electrical Engineering Graduate Program Committee. A total of six credit hours may be chosen from outside electrical engineering.		
<b>C. Research credits identified as EE 7951, EE 7952, and EE 7953 Doctoral Research</b>		<b>18</b>
<b>D. Dissertation credits identified as EE 7991, EE 7992, and EE 7993 Doctoral Dissertation</b>		<b>18</b>
<b>Total Credit Hours</b>		<b>81</b>

### 54 Semester Credit Hours beyond the Master's Degree

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, EE 7992, and EE 7993 Doctoral Dissertation. At least two courses must be taken from the five core courses, including one related

to the fundamentals of the student's doctoral research. Up to six credit hours may be taken from other graduate courses 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. At least one credit hour of EE 7931-3 Doctoral Research Seminar is required, and up to a total of 3 credit hours of EE 7931-3 Doctoral Research Seminar and EE 6951-3 Independent Study combined are allowed, including those earned towards the Master's degree. A Master's degree with at least 30 semester credit hours received in a closely-related field is needed for this option.

Code	Title	Credit Hours
<b>A. Two core courses including one related to the fundamentals of the student's doctoral research, from the list below (Substitution is allowed if core courses were taken in the Master's program):</b>		<b>6</b>
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>B. Graduate elective courses</b>		<b>12</b>
At least one credit hour of EE 7931-3 Doctoral Research Seminar is required, and up to a total of 3 credit hours of EE 7931-3 Doctoral Research Seminar and EE 6951-3 Independent Study combined are allowed, including those earned towards the Master's degree.		
Graduate electives chosen with approval of the Electrical Engineering Graduate Program Committee. If not earned at the master's level, a total of six credit hours may be chosen from outside electrical engineering.		
<b>C. Research credits identified as EE 7951, EE 7952, and EE 7953 Doctoral Research</b>		<b>18</b>
<b>D. Dissertation credits identified as EE 7991, EE 7992, and EE 7993 Doctoral Dissertation</b>		<b>18</b>
<b>Total Credit Hours</b>		<b>54</b>

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. The courses are intended to focus and support the individual's mastery of his or her particular area of expertise.

## Advancement to Candidacy

All students seeking a doctoral degree at UTSA must be admitted to candidacy. One of the requirements for admission to candidacy is

passing a doctoral qualifying examination. Students should consult the University's Doctoral Degree Regulations in this catalog for other requirements.

## Qualifying Examination

The Ph.D. in Electrical Engineering qualifying examination ensures Knowledge Competencies through fulfillment of graduate coursework in both primary and secondary concentration areas. Successful completion of a candidacy examination is required for formal admission into the Electrical Engineering Doctoral program.

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 qualifying examination contains two parts: A written exam and doctoral dissertation proposal.

## Written Examination

The student must take and pass the concentration-specific written examination to demonstrate readiness to pursue a Ph.D. in the chosen field. Students may select a concentration with the approval of the faculty advisor. The exam is offered at the beginning of the Spring and Fall semesters. In order to take the written examination, students must have taken two core courses with a grade point average (GPA) of no less than 3.5. 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 courses requirement, if the student took the core (or equivalent) course for credit in a different degree program or at another institution. Students must take the written examination within three semesters of enrollment at the Ph.D. EE program. Students who fail their first attempt at the written examination are allowed to make a second attempt within one semester. No more than two attempts to pass the written exam are allowed.

## Dissertation Proposal Examination

Students should take the dissertation proposal exam after they have passed the written part of the Qualifying Examination (and have satisfied provisional conditions, if any). The Doctoral Dissertation Proposal should be held before a student is qualified to register for Doctoral Dissertation Courses and it must be taken during the time period after passing the written examination and prior to the student's completion of 18 credits of doctoral research. 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 Bachelor of Science/Master of Science Program

The integrated B.S./M.S. (Bachelor of Science and Master of Science) program administered by the Department of Electrical and Computer Engineering is designed to make possible 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 semester credit hours of coursework.

The B.S./M.S. program applicants must have a minimum of 3.3 for both cumulative and major grade point averages. 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

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 120 undergraduate credit hours and 6 graduate credit hours to replace two of the five undergraduate technical elective courses toward the B.S. degree. Undergraduate students wishing to voluntarily withdraw from the Integrated B.S./M.S. program, must use a combination of five undergraduate technical electives and graduate organized 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 receive their B.S. degrees once they have earned 120 undergraduate credit hours and 6 credit hours of graduate organized courses. The 6 graduate credit hours taken as an undergraduate will be counted toward the M.S. degree requirement.

#### M.S. Degree Requirement

A student enrolled in the Integrated B.S./M.S. program can graduate by completing requirements for a thesis or nonthesis (project) option.

(i) Thesis Option: Students must complete 30 credit hours including 6 hours of thesis work.

(ii) Non-Thesis Option: Students must complete 33 credit hours including 3 hours of project work.

### B.S./M.S. Classification

Once admitted to the Integrated B.S./M.S. 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. B.S./M.S. students can receive their B.S. degree upon completion of 126 semester credit hours, including two graduate courses, at which point the program will certify the student's eligibility to receive the B.S. degree and request the Graduate School to change the student status in the Student Information System.

## Graduate Certificate in Cloud Computing

The graduate certificate in Cloud Computing is a 12-semester-credit-hour program designed to equip technical professionals with the knowledge and technical skills necessary for a career in an organization that leverages cloud computing. The wide-range of use of cloud computing in today's business, government and academic environments requires a broad range of competencies and understanding of how cloud computing influences a particular area. This certificate is designed to give a common framework of understanding cloud computing, as well as allow for specialization in specific areas, such as, cyber-security, cloud-infrastructure, and applications in cloud.

The certificate is administered by the College of Engineering in conjunction with the College of Business and the College of Sciences. The course requirements for each program focus may be found under the College of Engineering, the Department of Computer Science (p. 313), and the Department of Information Systems and Cyber Security (p. 44).

### Certificate Requirements

To satisfy the requirements for the Graduate Certificate in Cloud Computing, students must complete 12 semester credit hours as follows:

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
Select one entry course:		
EE 5523	Introduction to Cloud Computing	
Or a cross-listed course in CS and IS. The entry course is taught through team teaching in which instructor from each college contributes to the subjects outlined in the course syllabus.		
<b>B. Track Electives</b>		<b>6</b>
Select two courses from any of the following tracks:		
<b>Applications Track</b>		
CS 5233	Artificial Intelligence	
CS 5263	Bioinformatics	
CS 5443	Database Management Systems	
CS 5463	Topics in Computer Science	
CS 5473	Data Mining	
CS 5493	Large-Scale Data Management	
CS 5573	Cloud Computing	

CS 6243	Machine Learning
EE 5243	Special Topics in Control (Topic: Data Analytics with Cloud Computing)
EE 5243	Special Topics in Control (Topic: Programming Techniques for the Cloud)
EE 6973	Special Problems (Topic: Internet of Things)
IS 6703	Introduction to Data Mining
ME 5013	Topics in Mechanical Engineering (Topic: High Performance Computing)

**Security Track**

CS 6353	Unix and Network Security
CS 6393	Advanced Topics in Computer Security
IS 5513	Fundamentals of Information Assurance
IS 6363	Digital Forensics

**Infrastructure Track**

CS 5103	Software Engineering
CS 5123	Software Testing and Quality Assurance
CS 6463	Advanced Topics in Computer Science
CS 6463	Advanced Topics in Computer Science (Topic: Parallel and Distribute Systems Software)
CS 6543	Networks
CS 6553	Performance Evaluation
CS 6643	Parallel Processing
EE 5103	Engineering Programming
EE 5453	Topics in Software Engineering (Topic: Advanced Data Structures and Algorithms)

**C. Capstone Project** **3**

Select one course from the following (topics should be in the field of Cloud Computing):

CS 5933	Internship in Computer Science
CS 6953	Independent Study
CS 6983	Master's Thesis
CS 7313	Doctoral Dissertation
CPE 6943	Graduate Project
CPE 6953	Independent Study
CPE 6983	Master's Thesis
EE 6943	Graduate Project
EE 6953	Independent Study
EE 7933	Doctoral Research Seminar
IS 6933	Internship in Information Technology
IS 6943	Internship in Cyber Security
IS 6953	Independent Study
IS 6983	Master's Thesis
IS 7313	Doctoral Dissertation

**Total Credit Hours** **12**

Student may take cloud course(s) not listed above for credit with prior approval from Certificate Program Director.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.



**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. Differential Tuition: \$165.

**MATE 5493. Topics in Materials Engineering and Application. (2-3) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. Topic 1: Advanced technology in materials/devices fabrication and property evaluation Topic 2: Micro- and nano-structure imaging and characterization Topic 3: Thermodynamic phenomenological modeling of crystalline system, computational materials simulation and finite element Multiphysics analysis Topic 4: Critical analysis of current development and literature in relevant materials research subject. Concentration I aims at sensor, actuator, energy conversion and storage applications, while Concentration II aims at biocompatible materials and biomedical applications. Instructor may specify which concentration a given topic serves in a given semester or the course serves both concentrations. May be repeated for credit as topics vary. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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). Differential Tuition: \$55.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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. 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. Differential Tuition: \$55.

**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. 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. Differential Tuition: \$110.

**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. 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. Differential Tuition: \$165.

**CPE 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$55.

**CPE 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$110.

**CPE 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**EE 5243. Special Topics in Control. (3-0) 3 Credit Hours.**

Prerequisite: EE 5143. Topics may include the following: Topic 1: Optimal Control. Optimal and suboptimal techniques for controller design using the principle of optimality, min-max principles, and induced norm minimization. Topic 2: 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 3: 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 4: Advanced Topics of Embedded Control Systems. Study control techniques for embedded systems. Emphasis on hybrid system configuration, data acquisition, and sensing and fundamentals for motion control system. Control schemes include NI DAQ based control and FPGA based control.5: Power Electronics. Switching power converter operation and design; modeling of power converters; power components including power semiconductor devices, inductors, and transformers; control of power converters; select power converter topology for applications such as renewable energy, electric transportation, and telecommunications. Learning objectives: Analyze basic operation of switching power converters; simulate detailed, average, and small-signal operation of power converters; use steady-state, average, and small-signal models of pulse width modulation switch in power converter analysis and design; design of converter power stage for steady-state specifications; and design feedback controller of converters for dynamic specifications. May be repeated for credit as topics vary. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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: 5G Wireless Communications. Concepts, theory, and object oriented modeling of 5G cellular systems in Matlab from the perspective of 3GPP 5G Core Networks (LTE). Coverage includes multi-carrier modulation, OFDMA, fading, multiple antenna systems, diversity, Massive MIMO, millimeter wave communications, adaptive modulation and coding, H-ARQ and system ergodic and outage capacity. 5G Core Networks, Service Based Architectures (SBA), Network Function Virtualization (NFV), Virtualized RAN, Physical Layer Systems. . Topic 5: Communication Networks. Introduction and layered network architecture. Point-to-point communication and datalink control (error detection, automatic repeat request protocols, link initialization and disconnect protocols). Delay models in database 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), Iterative Codes, 5G Error correction Codes, Low Density Parity Check Codes (LDPC), Erasure Codes in data base systems. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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 extraction, image enhancement, shape from shading, image segmentation by textural perception in humans, chain codes, B-splines, classification (SVM and others). Topic 3: Biomedical Image Processing. This course will examine the fundamental and mathematical aspects of imaging; new algorithms and mathematical tools for the advanced processing of medical and biological images, which include fundamental methods of image reconstruction from their projections, multi-modal imaging, image analysis and visualization, image enhancement, image segmentation and gene-expression calculation, image parameter estimation and measurements, target location, texture synthesis and analysis, morphological image processing, processing of microarray images, processing of FISH stacked images, automated analysis of gene copy numbers by fluorescence in situ hybridization, image acquisition and processing in major imaging techniques, including magnetic resonance, 2-D and 3-D computed tomography, positron emission tomography, and others. Topic 4: Development of Multimedia Applications for Wireless Devices. Programming on wireless systems. Multimedia (image, audio and video) formats. Multimedia processing. Development of sample applications. May be repeated for credit as topics vary. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**EE 5413. Principles of Microfabrication. (2-3) 3 Credit Hours.**

Prerequisite: Graduate standing or completion of EE 3323. Fundamentals of microfabrication techniques, including photolithography, thin film deposition (physical vapor deposition and chemical vapor deposition), etching, thermal oxidation, diffusion, ion implantation, chemical and mechanical polishing, and epitaxy. Nanofabrication techniques that enable sub-micron feature sizes will also be discussed (electron beam or x-ray lithography, focused ion beam, and other bottom-up approaches). Students will visit nearby research institutes and foundry companies as part of this course. (Credit cannot be earned for both EE 4533 and EE 5413. Same as ME 5803. Credit cannot be earned for both EE 5413 and ME 5803.) Generally offered: Fall. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**EE 5503. Introduction to Nanoelectronics. (2-3) 3 Credit Hours.**

Prerequisite: Graduate standing or completion of EE 3323. Fundamentals of semiconductor device physics. State-of-the-art CMOS and beyond-CMOS device technologies. Quantum transport theories of electron, phonon, and spin in nanoscale solids. Nanofabrication techniques. Low-dimensional nanomaterials for future electronics. Practical application of nanotechnology in mechanical, optical, and biological heterogeneous systems. Students will study a quantum phenomenon using a device simulation software. (Credit cannot be earned for both EE 4523 and EE 5503. Same as ME 5883. Credit cannot be earned for both EE 5503 and ME 5883.) Generally offered: Spring. Differential Tuition: \$165.

**EE 5523. Introduction to Cloud Computing. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. Study in concepts related to cloud computing including key components of cloud computing, networking fundamentals, Python programming, resource allocation using cloud APIs, introduction to parallel programming with Python using MPI, data analytics fundamentals such as relational database theory, SQL/noSQL, and Map/Reduce. Differential Tuition: \$165.

**EE 5543. Nonlinear System and Control. (3-0) 3 Credit Hours.**

Prerequisite: EE 5143. Nonlinear systems modeling, existence and uniqueness of solutions, phase plane analysis, Lyapunov stability analysis, Lyapunov based nonlinear control techniques. Differential Tuition: \$165.

**EE 5553. Deep Learning. (3-0) 3 Credit Hours.**

Prerequisite: EE 5153. This course will introduce the basic concept of deep learning and cover most important deep learning models including deep neural networks, convolutional networks, and recurrent neural networks. The course will also cover applications of deep learning in computer vision, natural language processing, computational biology, and other areas. Differential Tuition: \$165.

**EE 5563. Statistical Inference. (3-0) 3 Credit Hours.**

Prerequisite: EE 5153. Fundamentals of hypothesis testing and parameter estimation including likelihood ratio test, unbiased estimation, and minimax estimation. Parametric and nonparametric inference with elements of large sample theory. Graphical models with exact and approximate inference methods including Markov chain Monte Carlo methods and variational inference. Elements of sequential inference including change point detection, hidden-Markov models, and time-series analysis. Differential Tuition: \$165.

**EE 5573. Machine Learning. (3-0) 3 Credit Hours.**

Prerequisite: EE 5153. Introduction to concepts of training, testing, and cross-validation. Probability and statistical inference: conditional probability and expectation, maximum likelihood estimation and MAP estimation. Linear and nonlinear supervised methods in regression and classification including linear discriminant analysis, logistic regression, support vector machines, ridge regression, LASSO, elastic net, and neural networks. Unsupervised methods including clustering and dimensionality reduction. Mathematics of machine learning: vector spaces, linear algebra, convex optimization, and stochastic gradient descent. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**EE 5643. Advanced Robotics and Artificial Intelligence. (3-0) 3 Credit Hours.**

Introduction and review of manipulator robots, mobile robotics navigation, localization, sensing and control. Drones modeling and control, AI and machine Learning, clustering, PCA, regression, evolutionary computing, fuzzy systems, deep learning, deep neural networks, and projects. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**EE 5743. Network Multi-agent Systems. (3-0) 3 Credit Hours.**

Prerequisite: EE 5143. This course will cover basic network sciences, graph theories, multi-agent system modeling and control, swarms, and social networks. The course will prepare students with fundamental tools to analyze and design network systems with applications in robotics, power systems, social networks, biological networks, and distributed computing and optimization. Differential Tuition: \$165.

**EE 5843. Optimization and Control of Cyber-Physical Systems. (3-0) 3 Credit Hours.**

Prerequisite: EE 5143. Modeling of cyber-physical systems; applications in complex urban infrastructure; mathematical optimization; semidefinite programming; dynamic state estimation; robust feedback control; networked control systems; modeling time-delays and cyber-attacks within CPSs; model predictive control. Differential Tuition: \$165.

**EE 5943. Adaptive Estimation and Control. (3-0) 3 Credit Hours.**

Prerequisite: EE 5143. Current methods in adaptive systems and control including stability analysis, convergence, robustness, system identification, recursive parameter estimation, and design of parameterized controllers. Differential Tuition: \$165.

**EE 6243. Modeling and Control of Three-Phase PWM Converters. (3-0) 3 Credit Hours.**

Develop understanding of power conversion principles in three-phase PWM converters and learn to design the control for the converters used in most applications through: use of switching state vectors and different modulation schemes, development of averaged models of rectifiers and inverters in stationary and rotating coordinates, small-signal modeling in rotating coordinates, and closed loop control design. Different Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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). Differential Tuition: \$55.

**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). Differential Tuition: \$110.

**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). Differential Tuition: \$165.

**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. 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.) Differential Tuition: \$55.

**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. 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.) Differential Tuition: \$110.

**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. 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.) Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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). Differential Tuition: \$55.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**EE 7443. Nonlinear Control Systems. (3-0) 3 Credit Hours.**

Prerequisite: EE 5143. Principles of nonlinear systems analysis: Lyapunov stability, input-output stability, and homogeneous system theory. Control of nonlinear systems: integrator backstepping, feedback domination, Lyapunov-based design, small control technique, output feedback design, and applications to physical systems. Differential Tuition: \$165.



**EE 7931. Doctoral Research Seminar. (1-0) 1 Credit Hour.**

Organized research lectures and seminar presentations. This course may include a written component. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). May be repeated for credit, but not more than 3 hours will apply to the doctoral degree. Differential Tuition: \$55.

**EE 7932. Doctoral Research Seminar. (2-0) 2 Credit Hours.**

Organized research lectures and seminar presentations. This course may include a written component. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). May be repeated for credit, but not more than 3 hours will apply to the doctoral degree. Differential Tuition: \$110.

**EE 7933. Doctoral Research Seminar. (3-0) 3 Credit Hours.**

Organized research lectures and seminar presentations. This course may include a written component. The grade report for this course is either "CR" (satisfactory participation in the seminar) or "NC" (unsatisfactory participation in the seminar). May be repeated for credit, but not more than 3 hours will apply to the doctoral degree. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

## Department of Mechanical Engineering

The Department of Mechanical Engineering offers a Master of Science degree in Advanced Manufacturing and Enterprise Engineering, a Master of Science in Aerospace Engineering, and Master of Science and Doctor of Philosophy degrees in Mechanical Engineering.

- M.S. in Advanced Manufacturing and Enterprise Engineering (p. 168)
- M.S. in Aerospace Engineering (p. 169)
- M.S. in Mechanical Engineering (p. 171)
- Ph.D. in Mechanical Engineering (p. 172)

## 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

A complete application package consists of the following:

- Students must meet the University-Wide Admission Requirements as outlined in the graduate catalog
- Official transcripts of all undergraduate and graduate coursework
- Official Graduate Record Examination (GRE) scores. (GRE scores waived for current UTSA students and UTSA alumni of the B.S. in Mechanical Engineering and closely related engineering programs (BME, CE, EE), who have an overall GPA above 3.0)
- A statement of purpose/research experience
- Two professional and/or academic letters of recommendation
- Résumé or Curriculum Vitae (CV)

Due to the multidisciplinary nature of the program, the Graduate Advisor of Record (GAR), in consultation with the Mechanical Engineering Graduate Studies Committee and the Department Chair, will evaluate each student's transcript and determine course deficiencies, if any, on a case-by-case basis. Applicants who have insufficient preparation for the program may be admitted on a conditional basis. Students admitted with course deficiencies will be required to take additional remedial courses. Courses taken to make up deficiencies may not be counted toward the graduate degree requirements. Other applicants who wish to continue their education in the area of Advanced Manufacturing and Enterprise

Engineering, but do not intend to pursue a Master of Science degree, may seek admission as a special graduate student.

## Degree Requirements

### Thesis Option

The minimum number of semester credit hours required for the degree is 30 for the thesis option.

Code	Title	Credit Hours
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#### A. 15 semester credit hours of required topical courses selected from 15 the following:

ME 5213	Topics in Systems Modeling	
ME 5233	Advanced Quality Control	
ME 5503	Lean Manufacturing and Lean Enterprises	
ME 5563	Computer Integrated Manufacturing	
ME 5583	Process Improvement and Variability Reduction	
ME 5603	Advanced Manufacturing Systems Engineering	
ME 5643	Green and Sustainable Manufacturing and Enterprise Systems	
ME 5703	Lean Product Development and Service Systems	
ME 6033	Linear and Mixed Integer Optimization	
ME 6543	Machine Learning and Data Analytics	

#### B. 9 semester credit hours of Prescribed Electives approved by student's advisor: 9

Electives are approved in consultation with either the student's advisory committee or the Graduate Advisor of Record. See Mechanical Engineering Department's Handbook of Master's Programs for recommended courses.

#### C. Degree candidates must complete a minimum of 6 credit hours of the following course requirements for the thesis option: 6

ME 6983	Master's Thesis (repeated)	
<b>Total Credit Hours</b>		<b>30</b>

### Non-Thesis Option

The minimum number of semester credit hours required for the degree is 33 for the non-thesis option.

Code	Title	Credit Hours
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#### A. 15 semester credit hours of required topical courses selected from 15 the following:

ME 5213	Topics in Systems Modeling	
ME 5233	Advanced Quality Control	
ME 5503	Lean Manufacturing and Lean Enterprises	
ME 5563	Computer Integrated Manufacturing	
ME 5583	Process Improvement and Variability Reduction	
ME 5603	Advanced Manufacturing Systems Engineering	
ME 5643	Green and Sustainable Manufacturing and Enterprise Systems	
ME 5703	Lean Product Development and Service Systems	
ME 6033	Linear and Mixed Integer Optimization	
ME 6543	Machine Learning and Data Analytics	

#### B. 15 semester credit hours of Prescribed Electives approved by student's advisor: 15

Electives are approved in consultation with either the student's advisory committee or the Graduate Advisor of Record. See Mechanical Engineering Department's Handbook of Master's Programs for recommended courses.

#### C. Degree candidates must complete a minimum of 3 semester credit hours of the following course requirement for the non-thesis option: 3

ME 5973	Special Project	
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> Special Project, by definition, requires an oral presentation of the non-thesis project work to the student's advisory committee (chaired by a tenured or tenure-track graduate faculty member) at the end of the semester.

## Thesis and Special Project Requirement (Advisory Committee and Oral Defense)

In addition to the coursework and other university-wide requirements for the master's degree, candidates must pass a thesis/special project defense administered by the student's advisory committee chaired by a full-time graduate faculty member affiliated with the AMEE program. The majority of the advisory committee members must be affiliated with the Department of Mechanical Engineering. The oral defense is in the form of a presentation of the thesis or special project. Students must register for at least one credit hour of master's thesis or special project during the semester in which the defense is to be scheduled.

Students pursuing either thesis or special project must select an Advisor within the first 9 credit hours of coursework and form a Committee with a minimum of three faculty members (including Advisor) within the first 18 credit hours of coursework. Within the first 9 credit hours of coursework, students must meet with the Advisor to develop their program of study. The Graduate Advisor of Record will advise new students until an Advisor has been selected.

## Academic Probation and Dismissal

To receive the master's degree, students must follow the University-Wide Requirements of Master's Degree Regulations in the UTSA Graduate Catalog. The regulations of academic probation and dismissal are defined in the Academic Standing section of the General Academic Regulations in Student Policies.

## Master of Science Degree in Aerospace Engineering

The Master of Science in Aerospace Engineering program is designed to prepare degree-seeking students or degree holders in mechanical engineering or a related field with the fundamental engineering knowledge necessary for a successful career in the aerospace industry.

### Program Admission Requirements

The minimum requirements for admission to the Master's in Aerospace Engineering degree program are as follows:

- Students must meet the University-Wide Admission Requirements as outlined in the graduate catalog
- Official transcripts of all undergraduate and graduate coursework
- Official Graduate Record Examination (GRE) scores. (GRE scores waived for current UTSA students and UTSA alumni of the B.S. in Mechanical Engineering and closely related engineering programs (BME, CE, EE), who have an overall GPA above 3.0)

- A statement of purpose/research experience
- Two professional and/or academic letters of recommendation
- Résumé or Curriculum Vitae (CV)

Due to the multidisciplinary nature of the program, the Graduate Advisor of Record (GAR), in consultation with the Mechanical Engineering Graduate Studies Committee and the Department Chair, will evaluate each student's transcript and determine course deficiencies, if any, on a case-by-case basis. Applicants who have insufficient preparation for the program, may be admitted on a conditional basis. Students admitted with course deficiencies will be required to take additional remedial courses. Courses taken to make up deficiencies may not be counted toward the graduate degree requirements. Other applicants who wish to continue their education in an area of Aerospace Engineering but do not intend to pursue a Master of Science degree, may seek admission as special graduate students.

## Degree Requirements

### Thesis Option

The minimum number of semester credit hours required for the degree is 30 for the thesis option.

#### A. Required Core Courses 9

ME 5243	Advanced Thermodynamics
ME 6013	Advanced Engineering Mathematics I
ME 6613	Advanced Fluid Mechanics

#### B. Designated Electives: 15

Select 15 credits from the courses below. Selected courses must be approved by student's advisor.

ME 5013	Topics in Mechanical Engineering (Topic: Propulsion)
ME 5013	Topics in Mechanical Engineering (Topic: Big Data in Extreme Environments)
ME 5013	Topics in Mechanical Engineering (Topic: Engineering Optics)
ME 5013	Topics in Mechanical Engineering (Topic: Hypersonics)
ME 5013	Topics in Mechanical Engineering (Topic: Orbital Mechanics)
ME 5263	Combustion
ME 5463	Fracture Mechanics
ME 5483	Finite Element Methods
ME 5633	Advanced Compressible Flow
ME 5653	Computational Fluid Dynamics
ME 5753	Introduction to Turbulence
ME 6043	Continuum Mechanics
ME 6113	Experimental Techniques in Engineering
ME 6123	Advanced Systems Dynamics and Control
ME 6663	Advanced Fatigue and Fracture
ME 6853	Advanced CFD and Heat Transfer
ME 6951	Independent Study (No more than 3 credit hours of Independent Study may count towards the degree)
	or ME 6953 Independent Study

#### C. Thesis 6

Degree candidates must complete a minimum of 6 credit hours of thesis coursework to complete the thesis option.

ME 6981	Master's Thesis
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ME 6983 Master's Thesis

**Total Credit Hours 30**

### Non-Thesis Option

The minimum number of semester credit hours required for the degree is 30 for the non-thesis option.

#### A. Required Core Courses 9

ME 5243	Advanced Thermodynamics
ME 6013	Advanced Engineering Mathematics I
ME 6613	Advanced Fluid Mechanics

#### B. Designated Electives 21

Select 21 credits from the courses below. Selected courses must be approved by student's advisor.

ME 5013	Topics in Mechanical Engineering (Topic: Propulsion)
ME 5013	Topics in Mechanical Engineering (Topic: Big Data in Extreme Environments)
ME 5013	Topics in Mechanical Engineering (Topic: Engineering Optics)
ME 5013	Topics in Mechanical Engineering (Topic: Hypersonics)
ME 5013	Topics in Mechanical Engineering (Topic: Orbital Mechanics)
ME 5263	Combustion
ME 5463	Fracture Mechanics
ME 5483	Finite Element Methods
ME 5633	Advanced Compressible Flow
ME 5653	Computational Fluid Dynamics
ME 5753	Introduction to Turbulence
ME 6043	Continuum Mechanics
ME 6113	Experimental Techniques in Engineering
ME 6123	Advanced Systems Dynamics and Control
ME 6663	Advanced Fatigue and Fracture
ME 6853	Advanced CFD and Heat Transfer
ME 6951	Independent Study (No more than 3 credit hours of Independent Study may count towards the degree)
	or ME 6953 Independent Study

**Total Credit Hours 30**

### Thesis and Special Project Requirement (Advisory Committee and Oral Defense)

In addition to the coursework and other university-wide requirements for the master's degree, candidates must pass a thesis/special project defense administered by the student's advisory committee and chaired by a full-time graduate faculty member affiliated with the ME program. The majority of the advisory committee members must be affiliated with the Department of Mechanical Engineering. The oral defense is in the form of a presentation of the thesis or special project. Students must register for at least one credit hour of master's thesis or special project during the semester in which the defense is to be scheduled.

Students pursuing either thesis or special project must select an Advisor within the first 9 credit hours of coursework and form a Committee with a minimum of three faculty members (including Advisor) within the first 18 credit hours of coursework. Within the first 9 credit hours of coursework, students must meet with the Advisor to develop their program of study.

The Graduate Advisor of Record will advise new students until an Advisor has been selected.

## Academic Probation and Dismissal

To receive the master's degree, students must follow the University-Wide Requirements of Master's Degree Regulations in the UTSA Graduate Catalog. The regulations of academic probation and dismissal are defined in the Academic Standing section of the General Academic Regulations in Student Policies.

## 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 has three concentrations: Thermal and Fluid Systems, Mechanics and Materials, and Robotics and Control. The program offers thesis and non-thesis options.

### Program Admission Requirements

The minimum requirements for admission to the Master's in Mechanical Engineering degree program are as follows:

- Students must meet the University-Wide Admission Requirements as outlined in the graduate catalog
- Official transcripts of all undergraduate and graduate coursework
- Official Graduate Record Examination (GRE) scores. (GRE scores waived for current UTSA students and UTSA alumni of the B.S. in Mechanical Engineering and closely related engineering programs (BME, CE, EE), who have an overall GPA above 3.0)
- A statement of purpose/research experience, and ranking of the concentration areas based on preference
- Two professional and/or academic letters of recommendation
- Résumé or Curriculum Vitae (CV)

Due to the multidisciplinary nature of the program, the Graduate Advisor of Record (GAR), in consultation with the Mechanical Engineering Graduate Studies Committee and the Department Chair, will evaluate each student's transcript and determine course deficiencies, if any, on a case-by-case basis. Applicants who have insufficient preparation for the program, may be admitted on a conditional basis. Students admitted with course deficiencies will be required to take additional remedial courses. Courses taken to make up deficiencies may not be counted toward the graduate degree requirements. 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, may seek admission as special graduate students.

### Degree Requirements

#### Thesis Option

The minimum number of semester credit hours required for the degree is 30 for the thesis option.

Code	Title	Credit Hours
<b>A. Required mathematics course:</b>		<b>3</b>
ME 6013	Advanced Engineering Mathematics I	
<b>B. Degree candidates are required to choose a major area and take two courses (6 semester credit hours) in their major area of study listed below:</b>		<b>6</b>

<b>Thermal and Fluid Systems</b>	
ME 5243	Advanced Thermodynamics
ME 6613	Advanced Fluid Mechanics
<b>Robotics and Control</b>	
ME 5493	Fundamentals of Robotics
ME 6123	Advanced Systems Dynamics and Control
<b>Mechanics and Materials</b>	
ME 5713	Mechanical Behavior of Materials
ME 6413	Elasticity
<b>C. 15 semester credit hours of Designated electives (with approval of 15 the student's advisor):</b>	
See Mechanical Engineering Department's Handbook of Master's Programs for recommended courses.	
<b>D. Degree candidates must complete a minimum of 6 credit hours of the following course requirements for the thesis option:</b>	
ME 6983	Master's Thesis (repeated)
<b>Total Credit Hours</b>	<b>30</b>

#### Non-Thesis Option

The minimum number of semester credit hours required for the degree is 33 for the non-thesis option.

Code	Title	Credit Hours
<b>A. Required mathematics course:</b>		<b>3</b>
ME 6013	Advanced Engineering Mathematics I	
<b>B. Degree candidates are required to choose a major area and take two courses (6 semester credit hours) in their major area of study listed below:</b>		<b>6</b>
<b>Thermal and Fluid Systems</b>		
ME 5243	Advanced Thermodynamics	
ME 6613	Advanced Fluid Mechanics	
<b>Robotics and Control</b>		
ME 5493	Fundamentals of Robotics	
ME 6123	Advanced Systems Dynamics and Control	
<b>Mechanics and Materials</b>		
ME 5713	Mechanical Behavior of Materials	
ME 6413	Elasticity	
<b>C. 21 semester credit hours of Designated electives (with approval of 21 the student's advisor):</b>		
See Mechanical Engineering Department's Handbook of Master's Programs for recommended courses.		
<b>D. Degree candidates must complete a minimum of 3 semester credit hours of the following course requirement for the non-thesis option:</b>		
ME 5973	Special Project	
<b>Total Credit Hours</b>	<b>33</b>	

- <sup>1</sup> Special Project, by definition, requires an oral presentation of the non-thesis project work to the student's advisory committee (chaired by a tenured or tenure-track graduate faculty member) at the end of the semester.

## Thesis and Special Project Requirement (Advisory Committee and Oral Defense)

In addition to the coursework and other university-wide requirements for the master's degree, candidates must pass a thesis/special project defense administered by the student's advisory committee and chaired by a full-time graduate faculty member affiliated with the ME program. The majority of the advisory committee members must be affiliated with the Department of Mechanical Engineering. The oral defense is in the form of a presentation of the thesis or special project. Students must register for at least one credit hour of master's thesis or special project during the semester in which the defense is to be scheduled.

Students pursuing either thesis or special project must select an Advisor within the first 9 credit hours of coursework and form a Committee with a minimum of three faculty members (including Advisor) within the first 18 credit hours of coursework. Within the first 9 credit hours of coursework, students must meet with the Advisor to develop their program of study. The Graduate Advisor of Record will advise new students until an Advisor has been selected.

## Academic Probation and Dismissal

To receive the master's degree, students must follow the University-Wide Requirements of Master's Degree Regulations in the UTSA Graduate Catalog. The regulations of academic probation and dismissal are defined in the Academic Standing section of the General Academic Regulations in Student Policies.

## 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 four concentrations: Thermal and Fluid Systems, Design and Manufacturing Systems, Mechanics and Materials, and Robotics and Control. 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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-Wide Admission Requirements as outlined in the graduate catalog.
- Official transcripts of all undergraduate and graduate coursework. Transcripts must be submitted from a regionally accredited college or university in the United States or have proof of equivalent training at a foreign institution.
- Official Graduate Record Examination (GRE) scores. (GRE scores waived for (1) UTSA students and alumni of the M.S. in Mechanical Engineering and the M.S. in Advanced Manufacturing and Enterprise Engineering and (2) UTSA B.S. in Mechanical Engineering students with GPA above 3.5).
- Résumé or Curriculum Vitae (CV)
- A statement of research experience, interests and goals

- Three professional and/or academic letters of recommendation attesting to the applicant's readiness for doctoral study

## Degree Requirements

The degree requires 63 semester credit hours of course and research work beyond the bachelor's degree or 42 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 a prior Master of Science degree in engineering may, with the approval of the Graduate Studies Committee, have the option to follow the 42-semester-credit-hour program of study described as follows or may follow the 63-semester-credit-hour program of study, while transferring up to 21 credit hours into their PhD program. Students without the Master of Science degree in engineering are required to complete the 42-hour program of study as follows and an additional 21 semester credit hours of coursework, as determined in consultation with their Advisor and the Graduate Advisor of Record.

## Degree Curriculum for Students that have Obtained a Master's Degree

Students that have obtained a master's degree must complete the following required 42 semester credit hours:

Code	Title	Credit Hours
<b>A. Common Core Courses (6 semester credit hours):</b>		<b>6</b>
1. Required course:		
ME 6113	Experimental Techniques in Engineering (or equivalent course with prior approval by the department)	
2. Choose one of the following:		
ME 6013	Advanced Engineering Mathematics I	
ME 6033	Linear and Mixed Integer Optimization	
<b>B. Technical Core Courses:</b>		<b>6</b>
Among the three areas listed below, students are required to take two courses (6 semester credit hours) in their major area of study:		
<b>Thermal and Fluid Systems</b>		
ME 5243	Advanced Thermodynamics	
ME 6613	Advanced Fluid Mechanics	
<b>Design and Manufacturing Systems</b>		
ME 5603	Advanced Manufacturing Systems Engineering	
ME 6543	Machine Learning and Data Analytics (Student may substitute STA 6923: Advanced Statistical Learning/Data Mining. Credit cannot be earned for both courses.)	
<b>Mechanics and Materials</b>		
ME 5713	Mechanical Behavior of Materials	
ME 6413	Elasticity	
<b>Robotics and Control</b>		
ME 5493	Fundamentals of Robotics	
ME 6123	Advanced Systems Dynamics and Control	
<b>C. Technical Elective Courses (6 semester credit hours):</b>		<b>6</b>

Students are required to take at least two elective courses in consultation with their Ph.D. advisor.

**D. Doctoral Research and Dissertation (24 semester credit hours): 24**

1. Seminar

ME 7993 Research Seminar (3 credit hours)

2. Doctoral Research (minimum of 9 semester credit hours required):

ME 7951 Doctoral Research

ME 7952 Doctoral Research

ME 7953 Doctoral Research

3. Doctoral Dissertation (after admitted for candidacy) (minimum of 12 semester credit hours required):

ME 7981 Doctoral Dissertation

ME 7982 Doctoral Dissertation

ME 7983 Doctoral Dissertation

**Total Credit Hours 42**

**Degree Curriculum for Students that have Obtained a Bachelor's Degree**

Students that have obtained a bachelor's degree must complete the following required 63 semester credit hours:

Code	Title	Credit Hours
<b>A. Common Core Courses (6 semester credit hours):</b>		<b>6</b>
1. Required course:		
ME 6113	Experimental Techniques in Engineering (or equivalent course with prior approval by the department)	
2. Choose one of the following:		
ME 6013	Advanced Engineering Mathematics I	
ME 6033	Linear and Mixed Integer Optimization	
<b>B. Technical Core Courses (6 semester credit hours):</b>		<b>6</b>

Among the four areas listed below, students are required to take two courses (6 semester credit hours) in their major area of study:

**Thermal and Fluid Systems**

ME 5243 Advanced Thermodynamics

ME 6613 Advanced Fluid Mechanics

**Design and Manufacturing Systems**

ME 5603 Advanced Manufacturing Systems Engineering

ME 6543 Machine Learning and Data Analytics (Student allowed to substitute STA 6923: Advanced Statistical Learning/Data Mining. Credit cannot be earned for both courses.)

**Mechanics and Materials**

ME 5713 Mechanical Behavior of Materials

ME 6413 Elasticity

**Robotics and Control**

ME 5493 Fundamentals of Robotics

ME 6123 Advanced Systems Dynamics and Control

**C. Technical Elective Courses (27 semester credit hours): 27**

Students are required to take at least 9 elective courses in consultation with their Ph.D. advisor.

**D. Doctoral Research and Dissertation (24 semester credit hours): 24**

1. Seminar

ME 7993 Research Seminar (3 credit hours)

2. Doctoral Research (minimum of 9 semester credit hours required):

ME 7951 Doctoral Research

ME 7952 Doctoral Research

ME 7953 Doctoral Research

3. Doctoral Dissertation (after admitted for candidacy) (12 semester credit hours required):

ME 7981 Doctoral Dissertation

ME 7982 Doctoral Dissertation

ME 7983 Doctoral Dissertation

**Total Credit Hours 63**

**Progression and Milestones**

**Ph.D. Advisor and Dissertation Committee**

Students must select an advisor within the first 9 semester credit hours of coursework. The Ph.D. advisor must be a tenured or tenure-track faculty member of the Mechanical Engineering Department or have an adjunct affiliation with the Mechanical Engineering Department. The program of study, as well as the selection of core and elective courses, must be recommended by the student's Ph.D. advisor.

A Dissertation Committee must be created at least one month before dissertation proposal defense. The committee, with a minimum of four members, includes the Ph.D. advisor as the chair of the committee. At least 50 percent of the committee members must be Mechanical Engineering graduate faculty and one must be outside the Mechanical Engineering Department, whose suitability will be subject to approval of the Graduate School. Part-time faculty may serve as members of the dissertation committee, but not as chair.

**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 offered twice a year, generally in January and June. 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. Normally, students who have completed the coursework listed under sections A and B of the degree curriculum are able to take the examination. The written qualifying examination includes the Common Core and Technical Core based on their fields of study.

1. Common Core (select one):
  - a. Advanced Engineering Mathematics
  - b. Linear and Mixed Integer Optimization
2. Technical Core (select one area):
  - a. Thermal and Fluid Systems: Advanced Thermodynamics, Advanced Fluid Mechanics

- b. Design and Manufacturing Systems: Advanced Manufacturing Systems Engineering, Advanced Data Analytics
- c. Mechanics and Materials: Elasticity, Mechanical Behavior of Materials
- d. Robotics and Control: Fundamentals of Robotics, Advanced Systems Dynamics and Control

### Retaking the Written Qualifying Examination

A student who failed the first attempt may be allowed to take the examination a second 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 dismissed from the doctoral program. The dismissed student 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 Studies Committee of the department.

### Doctoral Dissertation Proposal

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. Students must pass the doctoral dissertation proposal defense before being permitted to register for doctoral dissertation.

For more information, please see the online Ph.D./ME Handbook (<http://engineering.utsa.edu/mechanical/joint-graduate-program/>).

### Final Dissertation Defense and Graduation

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. All coursework in the final program of study must have been taken within eight years to include successful completion and defense of the dissertation. The format of the dissertation must follow University regulations.

### Academic Probation and Dismissal

- To receive the doctoral degree, students must follow the University-wide Requirements of Doctoral Degree Regulations in the UTSA Graduate Catalog. University-wide regulations of academic probation and dismissal are defined in the Academic Standing section of the General Academic Regulations in Student Policies.
- Students who fail the qualifying exam for a second time will be dismissed from the doctoral program.

### 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. Differential Tuition: \$165.

#### ME 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. (Same as EGR 5023. Credit cannot be earned for both ME 5023 and EGR 5023.) Differential Tuition: \$165.

#### ME 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. (Same as CE 5013 and EGR 5213. Credit can only be earned for one course: ME 5213, EGR 5213 or CE 5013.) Differential Tuition: \$165.

#### ME 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. (Same as EGR 5233. Credit cannot be earned for both ME 5233 and EGR 5233.) Differential Tuition: \$165.

#### 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. Differential Tuition: \$165.

#### 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. Differential Tuition: \$165.

#### 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.) Differential Tuition: \$165.

#### 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. Differential Tuition: \$165.

#### 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. Differential Tuition: \$165.

#### 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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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 and CE 5193. Credit cannot be earned for more than one of the following: ME 5483, CE 5023 and CE 5193.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**ME 5583. Process Improvement and Variability Reduction. (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. (Formerly titled "Advanced Enterprise Process Engineering.") Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**ME 5633. Advanced Compressible Flow. (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. (Formerly titled "Gas Dynamics.") Differential Tuition: \$165.

**ME 5643. Green and Sustainable Manufacturing and Enterprise Systems. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing, ME 5503, or consent of instructor. Advanced concepts, tools and topics in eliminating wastes from the processes and operations of manufacturing firms via the perspective of the environment. Topics include identifying, measuring, and minimizing environmental wastes related to energy, water, materials, garbage, transportation, emissions, and biodiversity, as well as ways to totally eliminate these environmental wastes from green value stream mapping techniques. Readings and survey of contemporary technologies and tools enabling green and sustainable manufacturing and enterprise systems are also required. (Formerly titled "Advanced Topics in Manufacturing and Enterprise Engineering.") Differential Tuition: \$165.

**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. Differential Tuition: \$165.



**ME 5703. Lean Product Development and Service Systems. (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.) (Formerly titled "Advanced Enterprise Systems Engineering.") Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**ME 5733. Advanced Medical Device Design and Commercialization. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in engineering or consent of instructor. Topics include classification of medical devices, medical device design and design controls, IP protection, FDA approval processes, human factors in medical device design, and medical device employment by various clinical specialties. (Formerly titled "Advanced Medical Device Design.") Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**ME 5753. Introduction to Turbulence. (3-0) 3 Credit Hours.**

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 in diseased and normal coronary artery. Differential Tuition: \$165.

**ME 5763. 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. (Same as EGR 5703. Credit cannot be earned for both ME 5763 and EGR 5703.) Differential Tuition: \$165.

**ME 5773. 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. Same as EGR 5713. Credit cannot be earned for both EGR 5713 and ME 5773.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**ME 5971. Special Project. (0-0) 1 Credit Hour.**

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. Differential Tuition: \$55.

**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. Differential Tuition: \$165.

**ME 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 and EGR 6013. Credit can only be earned for one course: ME 6013, EGR 6013 or BME 6033.) (Formerly titled "Analytical Techniques in Engineering Analysis.") Differential Tuition: \$165.

**ME 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. (Same as EGR 6023. Credit cannot be earned for both ME 6023 and EGR 6023.) Differential Tuition: \$165.

**ME 6033. Linear and Mixed Integer Optimization. (3-0) 3 Credit Hours.**

Prerequisite: ME 2173 or equivalent. Graduate standing in engineering or consent of instructor. Introduction to the theory of linear programming and duality, algorithms for solving linear programs, network simplex, integer and mixed integer programming (e.g., simplex, branch and bound and branch and cut). This course provides an overview of optimization theory and algorithms as well as emphasizes its applications in different areas of Engineering. (Same as EGR 6033. Credit cannot be earned for both ME 6033 and EGR 6033.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**ME 6123. 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 ME 5113. Credit cannot be earned for both ME 6123 and ME 5113.) Differential Tuition: \$165.

**ME 6413. 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 ME 5413. Credit cannot be earned for both ME 6413 and ME 5413.) Differential Tuition: \$165.

**ME 6543. Machine Learning and Data Analytics. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in engineering or consent of instructor. Introduction to discovery and communication of meaningful patterns in data, including data description (descriptive/visualization techniques), prediction (predictive modeling using machine learning), improve performance (optimization/decision making). Differential Tuition: \$165.

**ME 6613. 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. (Formerly ME 5613. Credit cannot be earned for both ME 6613 and ME 5613.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**ME 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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 3 hours, regardless of discipline, will apply to the Master's degree. Differential Tuition: \$55.

**ME 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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 3 hours, regardless of discipline, will apply to the Master's degree. Differential Tuition: \$165.

**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). Differential Tuition: \$55.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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) from 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 3 hours, regardless of discipline, will apply to the Doctoral degree. Differential Tuition: \$55.

**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) from 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 3 hours, regardless of discipline, will apply to the Doctoral degree. Differential Tuition: \$165.

**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. Differential Tuition: \$55.

**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. Differential Tuition: \$110.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$330.

**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.) Differential Tuition: \$55.

**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.) Differential Tuition: \$110.

**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.) Differential Tuition: \$165.

**ME 7993. Research Seminar. (3-0) 3 Credit Hours.**

Organized lectures and seminar presentations to facilitate the development of doctoral students' research skills and knowledge of current and emerging research. Required for all Ph.D. students in Mechanical Engineering. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Differential Tuition: \$165.

## School of Architecture and Planning

The School of Architecture and Planning supports the education of future professionals in the practice of architecture and interior design. The graduate programs of the School of Architecture and Planning 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 School takes advantage of its unique location within downtown San Antonio, as well as South Texas and the borderlands of the western United States and Mexico.

- Master of Architecture - The Professional Program (p. 178)
- M.S. in Architecture - The Research Program (p. 180)
- M.S. in Urban and Regional Planning (p. 181)

## Master of Architecture Degree – The Professional Program

The School of Architecture and Planning offers the Master of Architecture (M.Arch.) as a STEM-designated, first professional degree (terminal degree) for those intending to enter the professional practice of architecture. The M.Arch. is currently 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 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 offered by institutions with U.S. regional accreditation, recognizes three types of degrees: the Bachelor of Architecture, the Master of Architecture, and the Doctor of Architecture. A program may be granted an eight-year, three-year, or two-year term of accreditation, depending on the extent of its conformance with established educational standards.

Doctor of Architecture and Master of Architecture degree programs may require a preprofessional undergraduate degree in architecture for admission. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

The University of Texas at San Antonio, School of Architecture and Planning 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) 40 preparatory graduate semester credit hours + 52 graduate semester credit hours = (up to) 92 graduate semester credit hours).

## The Master of Architecture 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.

## Master of Architecture 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 Engineering and Integrated Design website (<https://ceid.utsa.edu/graduate/>) for applicable dates when the review of applications will begin and for more information about the College and its programs.

### Master of Architecture 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. Students who earn a grade of "CR" in ARC 6931 Master's Project Preparation Master's Project Preparation will satisfy the comprehensive examination requirement. 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 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
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<b>Total Credit Hours</b>	<b>52</b>
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### The Master of Architecture 3 Program

The M.Arch. 3 program is designed for students with undergraduate degrees in fields other than architecture. This STEM-designated, professional program includes one year of preparatory studies (up to 40 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.

#### Master of Architecture 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 Engineering and Integrated Design website (<https://ceid.utsa.edu/graduate/>) for applicable dates when the review of applications will begin and for more information about the College and its programs.

#### Master of Architecture 3 Degree Requirements

The M.Arch. 3 program requires **up to** 40 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 Master of Architecture 3 program in architecture consists of Preparatory Studies, Performance Evaluation, and Master of Architecture 2 program.

A. Preparatory Studies

Up to 40 semester credit hours consisting of the following:	40
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ARC 5003	Architectural Principles
ARC 5011	Introduction to Architecture and Design
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

## Master of Science Degree in Architecture – The Research Program

The Master of Science in Architecture (M.S. Arch.) program is a STEM-designated, 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. The program offers thesis and non-thesis options. Non-thesis option is recommended for students who are interested in "research in practice" topics.

### M.S. Architecture 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 and/or portfolio for non-thesis option
- 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 website (<https://ceid.utsa.edu/graduate/>) for applicable dates when the review of applications will begin and for more information about the College and its programs.

### M.S. Architecture 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. Students may pursue a thesis or non-thesis option. 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:

**Thesis Option**

Code	Title	Credit Hours
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A. 9 semester credit hours of the following required courses, followed by Master's Thesis: 9

ARC 6323	Master's Research Preparation	
ARC 6433	Research Methods	
One of the required technology courses below:		
ARC 5543	Advanced Digital Design and Fabrication Technologies in Architecture	
or		
ARC 5733	Advanced Building Technology and Sustainability	
or		
ARC 6413	Sustainable Preservation Technology	

B. Candidates following the thesis option must complete 6 semester credit hours of ARC 6981, ARC 6982 or ARC 6983 Master's Thesis (includes thesis defense). 6

**C. Comprehensive Examination**

Degree candidates in the thesis option are required to pass a comprehensive examination. Enrollment in ARC 6961 Comprehensive Examination is required only if the student is not registered for any other courses in the semester in which the comprehensive exam will be taken. Comprehensive examinations are given with approval of the Graduate Advisor and the thesis committee chair to students who:

- have satisfied all admission conditions
- are in good academic standing
- have approved research topic

D. Electives: 18 credit hours, to be selected in consultation with the assigned faculty mentor (first semester) or thesis committee chair (subsequent semesters). 18

**Total Credit Hours** **33**

### Non-Thesis Option (recommended for "research in practice" topics)

Code	Title	Credit Hours
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A. 9 semester credit hours of the following required courses: 9

ARC 6323	Master's Research Preparation	
ARC 6433	Research Methods	
One of the required technology courses below:		
ARC 5543	Advanced Digital Design and Fabrication Technologies in Architecture	
or		
ARC 5733	Advanced Building Technology and Sustainability	
or		
ARC 6413	Sustainable Preservation Technology	

B. Candidates following the non-thesis option must complete 12 semester credit hours of the following course requirements:

ARC 6943	Professional Internship (repeated for a total of 9 semester credit hours)	12
ARC 6923	Professional Report	

C. Comprehensive Examination

Degree candidates are required to pass a comprehensive examination. Enrollment in ARC 6961 Comprehensive Examination is required only if the student is not registered for any other courses in the semester in which the comprehensive exam will be taken. Comprehensive examinations are given with approval of the Graduate Advisor and the report committee chair to students who:

- have satisfied all admission conditions
- are in good academic standing
- have approved research topic

D. Electives: 12 semester credit hours, to be selected in consultation with the assigned faculty mentor (first semester) or report committee chair (subsequent semesters). 12

**Total Credit Hours 33**

### M.S. Architecture Degree Concentrations

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

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

ARC 6323	Master's Research Preparation
ARC 6433	Research Methods
ARC 6983	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. Architecture Degree - Concentration in Historic Preservation

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

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

B. Comprehensive Examination

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

ARC 5203	History and Theory of Preservation
ARC 5423	Preservation Laws and Environmental Policy

ARC 6413	Sustainable Preservation Technology
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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**

## 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 planning and designing communities and regions. The degree is in collaboration with the School of Architecture and Planning in the College of Engineering and Integrated Design, and the Department of Public Administration in the College for Health, Community and Policy. The program offers two specializations—Urban Policy, and Urban Design—though students may graduate as generalist planners with no prescribed specialization. The program's primary focus is to prepare students to become practitioners in the planning profession and takes an interdisciplinary perspective on understanding modern urban challenges, including growth management, equitable development, healthy cities, placemaking, transportation, and community development. Emphasis is placed upon developing research and analytic communication skills in the classroom, with professional practice skills developed through engaged learning experiences.

### 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 required if undergraduate GPA is below 3.00 out of 4.00
- 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 special graduate students. Admission as a special graduate (non-degree-seeking) student 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 Engineering and Integrated Design website (<https://ceid.utsa.edu/>) 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 non-thesis option.

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

Code	Title	Credit Hours
A. 27 semester credit hours of the following required courses:		
1. 21 semester credit hours of the following required courses: 21		
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	
or URP 5513 Public Participation and Qualitative Analysis		
URP 5413	Planning Practice and Ethics	
URP 5453	Urban and Regional Sustainability	
URP 5483	Planning Workshop	
2. 6 semester credit hours of public administration courses in the College for Health, Community and Policy: 6		
PAD 5103	Planning and Land Use Law	
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: Urban Policy, and Urban Design. 15		
To satisfy the major area coursework for the urban policy specialization, a student must complete 12 semester credit hours from the following public administration courses from the Department of Public Administration in the College for Health, Community and Policy:		
PAD 5003	Introduction to Public Service Leadership and Management	
PAD 5223	Urban Management	
PAD 5313	Public Policy Analysis	
PAD 5323	Public Policy Process	
PAD 5473	Land Use Policy	
To satisfy the major area coursework for the urban design specialization, a student must complete 12 semester credit hours from the following courses:		
URP 5233	GIS for Urban Studies	
URP 5373	Site Planning and Design	
URP 5423	Graphic Communication for Planners	

URP 6976	Special Topics (Urban Design Studio)
ARC 5163	Current Issues and Topics in Contemporary Architecture (content approved by GAR)
ARC 5713	Environmental Architecture and Sustainability
ARC 6453	Cultural Landscapes and Urban Conservation
ARC 6513	Sustainable Tourism Development
ARC 6973	Special Topics (content approved by GAR)

C. 6 semester credit hours of the following "capstone" coursework consisting of either the Thesis or Non-Thesis 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).

Non-Thesis Option Requirements: All candidates for the Master of Science degree in Urban and Regional Planning with a non-thesis option must complete 6 semester credit hours from the following: URP 6933 Planning Professional Report, and either URP 6943 Professional Internship, or an additional 3 hours of URP 5483 Planning Workshop.

D. Degree candidates in the thesis option and non-thesis 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 High-Performance Design and Sustainability (p. 182)
- Graduate Certificate in Historic Preservation (p. 183)
- Graduate Certificate in Urban and Regional Planning (p. 184)

## Graduate Certificate in High-Performance Design and Sustainability

The negative impacts of human activities on the environment are a major challenge threatening the survival of humans and other species, and the built environment are a key contributor to environmental impacts. A certificate in High-Performance Design and Sustainability provides students with the theoretical knowledge and applied skills to understand how buildings impact the environment and how building performance, in terms of operational energy, daylighting, occupant comfort/health, embodied energy, water conservation and reuse, and other relevant and emerging issues (such as biophilia) can be predicted, analyzed and used to improve buildings.

The Certificate in High-Performance Design and Sustainability enables students the opportunity to gain understanding and skills in various aspects of sustainability and high environmental performance in the built environment. The certificate provides students with an understanding of the theoretical underpinnings of high-performance design and sustainability and prepares them for further graduate studies in this area. It also provides skills and knowledge complimentary to the pursuit of a professional career in the design and analysis of high-performance buildings and sustainability. The program is located within the Department of Architecture, and may be most effective for students with skills commensurate with a degree or experience in architecture for the most effective educational experience. However, other skills may be considered as relevant to the certificate (to be determined in consultation with the certificate coordinator/GAR) and it remains open to students from a variety of backgrounds. Students from different backgrounds may be required to take preparatory courses to provide them with the level

of knowledge and expertise needed for the certificate. The certificate will not be subject to licensure and/or accreditation standards, but will remain current to expected standards of knowledge and skill expected in the profession.

### 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. 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 with an additional 9 semester credit hours of coursework to be 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 High-performance Design and Sustainability can be applied toward other graduate degree programs such as the Master of Architecture and the Master of Science in Architecture degrees. Students will be advised by the High-Performance Design and Sustainability Certificate Program Coordinator.

Code	Title	Credit Hours
A. 6 semester credit hours of required courses:		6
ARC 5713	Environmental Architecture and Sustainability	
ARC 5733	Advanced Building Technology and Sustainability	
B. 6 to 9 semester credit hours of elective courses selected from the following list (any additional elective, and ARC 5163, ARC 6136 and ARC 6973 are subject to review and approval by the Certificate Program Coordinator):		6-9
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	
ARC 5163	Current Issues and Topics in Contemporary Architecture	
ARC 6136	Advanced Topics Studio	
ARC 6973	Special Topics	
C. 0 to 3 semester credit hours of approved elective courses selected from the following list (or any additional elective approved in consultation with the Certificate Program Coordinator):		0-3
ARC 6413	Sustainable Preservation Technology	
ARC 6513	Sustainable Tourism Development	
CE 5643	Sustainable Energy Systems	
CSM 5243	Sustainable Construction and Delivery	
ES 5153	Urban Environmental Planning and Sustainability	
ES 6053	Sustainability and Renewable Energy	
GRG 5563	Applied Sustainability	

URP 5453 Urban and Regional Sustainability

Total Credit Hours

15

## 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 with an additional 9 semester credit hours of coursework to be 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 other graduate degree programs such as the Master of Architecture and the Master of Science in Architecture degrees. Students will be advised by the Historic Preservation Certificate Program Coordinator/Advisor.

Code	Title	Credit Hours
A. 6 semester credit hours of required courses:		6
ARC 5203	History and Theory of Preservation	



ARC 6413	Sustainable Preservation Technology or ARC 6443 World Heritage Management	
B. 3 to 6 semester credit hours of approved elective courses selected from the following list (or any additional elective approved in consultation with the Certificate Program Coordinator):		3-6
ARC 5403	Historic Preservation Seminar	
ARC 5423	Preservation Laws and Environmental Policy	
ARC 5463	Heritage Resilience, Adaptation and Mitigation	
ARC 5813	History and Theory of Urban Form	
ARC 6003	Morphology of the Architecture of the Southwest	
ARC 6413	Sustainable Preservation Technology (if not taken to meet requirement in section A)	
ARC 6013	Theories and Philosophies of Regionalism	
ARC 6423	Architectural Conservation Theory	
ARC 6433	Research Methods	
ARC 6443	World Heritage Management (if not taken to meet requirement in section A)	
ARC 6453	Cultural Landscapes and Urban Conservation	
ARC 6463	Heritage Tourism Planning and Design	
ARC 6473	Material Assessment and Conservation	
ARC 6493	Architectural Transformations	
ARC 6513	Sustainable Tourism Development	
C. 3 to 6 semester credit hours (consisting of either the studio or the nonstudio option) of approved elective courses selected from the following list (or any additional elective approved in consultation with the Certificate Program Coordinator). "Skills courses":		3-6
ARC 5233	Architectural Surveys and Measured Drawings	
ARC 5483	GIS for Heritage Planning	
ARC 6136	Advanced Topics Studio (studio option)	
<b>Total Credit Hours</b>		<b>15</b>

## 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 or special graduate 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 Certificate Program Regulations 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. A minimum of one-half of all credits counted towards the certificate must be taken in Urban and Regional Planning. 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.

Code	Title	Credit Hours
A. 6 semester credit hours of the following required courses:		6
URP 5333	Introduction to Urban and Regional Planning	
URP 5343	History and Theory of Urban and Regional Planning	
	or PAD 5103 Planning and Land Use Law	
B. 9 semester credit hours of graduate elective courses approved by the Urban and Regional Planning Graduate Advisor		9
<b>Total Credit Hours</b>		<b>15</b>

## Architecture (ARC) Courses

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

Prerequisite: Enrollment in the Master of Architecture 3 program. An introduction to the basic principles and skills associated with architectural design. Differential Tuition: \$165.

### ARC 5011. Introduction to Architecture and Design. (1-0) 1 Credit Hour.

Prerequisite: Enrollment in the Master of Architecture Degree 3 program. A lecture course introducing ideas and concepts associated with architecture and design. Differential Tuition: \$55.

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

Prerequisite: ARC 6146. 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.") Differential Tuition: \$165.

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

Prerequisite: Enrollment in the Master of Architecture 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.) Differential Tuition: \$330.

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

A critical survey of the leading issues, theories, writings, projects, and built works of architecture over the past 20 years. May be repeated for credit once when topics vary. Differential Tuition: \$165.

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

Prerequisites: ARC 5156, ARC 5913, ARC 5923, ARC 5943, and enrollment in the Master of Architecture Degree 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. Differential Tuition: \$330.

**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.) Differential Tuition: \$165.

**ARC 5176. Introductory Design Studio III. (0-12) 6 Credit Hours.**

Prerequisites: ARC 5166, ARC 5623, and enrollment in the Master of Architecture 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. Differential Tuition: \$330.

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

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. Differential Tuition: \$165.

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

An introduction to the history, philosophy, methodologies, and practices of historic preservation and restoration. Differential Tuition: \$165.

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

A survey of documentation and interpretation of sites and buildings and graphic recording techniques. Differential Tuition: \$165.

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

An advanced study of selected topics in architecture, design, preservation, and planning. May be repeated once for credit when topics vary. Differential Tuition: \$165.

**ARC 5423. Preservation Laws and Environmental Policy. (3-0) 3 Credit Hours.**

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. (Formerly titled Legal and Economic Aspects of Preservation.) Differential Tuition: \$165.

**ARC 5443. Structural Analysis of Historical Buildings. (3-0) 3 Credit Hours.**

Online studies on visual inspection methodology of historic structures. Diagnostic methods of investigation of material deterioration due to external causes and its effects on the overall structure. Analysis criteria and data collection on historic structural shapes. Differential Tuition: \$165.

**ARC 5463. Heritage Resilience, Adaptation and Mitigation. (3-0) 3 Credit Hours.**

Advanced study and critical analysis of risk management planning tools for heritage sites including best practices for mitigation, adaptation, and preparedness in the face of climate change and disaster risks. The course also addresses the role of heritage in sustainable development. Differential Tuition: \$165.

**ARC 5483. GIS for Heritage Planning. (3-0) 3 Credit Hours.**

Course provides the opportunity to acquire an understanding of the principles of spatial analysis using geographic information systems (GIS). Emphasis is placed on analyzing cultural resources and urban and cultural landscapes with GIS tools. Topics may include mapping density and changes over time, cultural mapping, etc. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

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

An in-depth examination of contemporary digital design and fabrication technologies in architecture and other design disciplines. Differential Tuition: \$165.

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

An in-depth study or survey investigating selected topics in architectural history. May be repeated once for credit, when topics vary. Differential Tuition: \$165.

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

A survey of the development of the architecture of the United States from the earliest human settlements to the present. Differential Tuition: \$165.

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

Prerequisite: Enrollment in the Master of Architecture 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. Differential Tuition: \$165.

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

A survey of the architecture and urbanism of Mexico from Independence in 1821 to the present. Differential Tuition: \$165.

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

A survey of the architecture and urbanism of Mexico during the pre-Columbian and Colonial eras. Differential Tuition: \$165.

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

A detailed survey of the architecture and urbanism of the border states of Northern Mexico, focusing on the modern era from 1821 to the present. Differential Tuition: \$165.

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

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.) Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

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

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.) Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

**ARC 5783. Architectural Lighting Design. (3-0) 3 Credit Hours.**

Provides students with the opportunity to obtain in-depth knowledge of architectural lighting systems, fundamental scientific principles governing light in the built environment, the technologies, materials, and strategies for control of light in buildings, and basic methods of analysis. Differential Tuition: \$165.

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

Considers the origins and characteristics of cities, their current condition, and emerging theories of urban design. Differential Tuition: \$165.

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

Prerequisite: Enrollment in the Master of Architecture 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. Differential Tuition: \$165.

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

Prerequisite: Enrollment in the Master of Architecture 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.") Course Differential Tuition: \$165.

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

Prerequisites: ARC 5923 and enrollment in the Master of Architecture 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.") Differential Tuition: \$165.

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

Prerequisite: Enrollment in the Master of Architecture 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.") Differential Tuition: \$165.

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

Prerequisites: ARC 5943 and enrollment in the Master of Architecture 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.") Differential Tuition: \$165.

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

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.) Differential Tuition: \$165.

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

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.) Differential Tuition: \$165.

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

Prerequisites: Completion of, or concurrent enrollment in, ARC 5173 and ARC 5733. An introduction to advanced architectural design, including the role of research, program preparation, and technological integration in architectural design. Differential Tuition: \$330.

**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.") Differential Tuition: \$330.

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

Prerequisites: ARC 6136, 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.") Differential Tuition: \$330.

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

Advanced exploration of graphic processes and techniques utilized in the design of the built environment. Differential Tuition: \$165.

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

Prerequisite: Consent of instructor. An advanced study aimed at supporting the development of a Master's Thesis or Professional Report for the Master of Science in Architecture degree. This course builds on scholarly documentation, research analysis and contemporary research practice issues. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

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

An advanced study and critical analysis of current design theory and techniques for conservation of historic sites. Differential Tuition: \$165.

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

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.) Differential Tuition: \$165.

**ARC 6443. World Heritage Management. (3-0) 3 Credit Hours.**

Principles and practices for managing cultural properties with a focus on World Heritage properties. Includes surveys of international documents applicable to the management of cultural heritage sites globally and study of documentation, planning, community engagement, public interpretation, design/conservation treatments, and universal values, as well as UNESCO World Heritage process and purpose. Differential Tuition: \$165.

**ARC 6453. Cultural Landscapes and Urban Conservation. (3-0) 3 Credit Hours.**

Advanced study and critical analysis of contemporary design theory, methods and approaches for conservation of cultural landscapes, of historic cities and historic urban landscapes. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

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

Prerequisite: Consent of instructor. An in-depth study of sustainable preservation technology to include 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. Differential Tuition: \$165.

**ARC 6493. Architectural Transformations. (3-0) 3 Credit Hours.**

Seminar course that considers design strategies and approaches in the redevelopment and redesign of existing buildings and landscapes. Covers topics such as adaptive use, and new design within historic contexts. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

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

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. Differential Tuition: \$165.

**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. Differential Tuition: \$330.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**ARC 6921. Professional Report. (0-0) 1 Credit Hour.**

Prerequisites: ARC 6943 and the approval of Graduate Advisor of Record. The directed architectural research course is offered only for the Master of Science in Architecture students who have completed 9 semester credit hours of ARC 6943 Professional Internship. Credit will be awarded upon completion of the report. Enrollment is required each term in which the report is in progress. Differential Tuition: \$55.

**ARC 6923. Professional Report. (0-0) 3 Credit Hours.**

Prerequisites: ARC 6943 and the approval of Graduate Advisor of Record. The directed architectural research course is offered only for the Master of Science in Architecture students who have completed 9 semester credit hours of ARC 6943 Professional Internship. Credit will be awarded upon completion of the report. Enrollment is required each term in which the report is in progress. Differential Tuition: \$165.

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

Prerequisites: ARC 5173 and ARC 6126. 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.) Differential Tuition: \$55.

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

Prerequisites: 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 3 credit hours will apply to the Master of Architecture degree. With the approval of Graduate Advisor of Record, up to 9 credit hours may be applied to the Master of Science in Architecture degree. Differential Tuition: \$165.

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

Prerequisites: Permission in writing (form available) from 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 in Architecture degree. Differential Tuition: \$55.

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

Prerequisites: Permission in writing (form available) from 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 in Architecture degree. Differential Tuition: \$165.

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

Prerequisites: Permission of the architecture Graduate Advisor of Record. 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 in Architecture degree. May be repeated once. Differential Tuition: \$55.

**ARC 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. 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 in Architecture degree. Differential Tuition: \$165.

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

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 in Architecture degree. Differential Tuition: \$330.

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

Prerequisites: ARC 6983 and consent of instructor. May be repeated for credit, but not more than 6 hours will apply to the Master of Science in Architecture 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.) Differential Tuition: \$55.

**ARC 6982. Master's Thesis. (0-0) 2 Credit Hours.**

Prerequisites: ARC 6323 and consent of instructor. May be repeated for credit, but not more than 6 hours will apply to the Master of Science in Architecture degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Differential Tuition: \$110.

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

Prerequisites: ARC 6323 and consent of instructor. May be repeated for credit, but not more than 6 hours will apply to the Master of Science in Architecture 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.) Differential Tuition: \$165.

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

Prerequisites: ARC 6996 and consent of instructor. A comprehensive study focusing on an independent design proposal and the complete representation of the project. May be repeated, but not more than 6 hours will apply to the Master of Architecture degree. Credit will be awarded upon completion of the project. Enrollment is required each term in which the project is in progress. Differential Tuition: \$55.

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

Prerequisite: ARC 6931. A comprehensive study focusing on an independent design proposal and the complete representation of the project. Credit will be awarded upon completion of the project. Enrollment is required each term in which the project is in progress. Differential Tuition: \$330.

**ARC 7011. Doctoral Seminar in Architecture. (1-0) 1 Credit Hour.**

Organized lectures and seminar presentations to facilitate the development of doctoral students' research skills and knowledge of current and emerging research. Will include presentations of current research by faculty and invited guests who are experts in various aspects of research in building performance, and advanced graduate students who are about to complete their dissertation research. May be repeated for credit. Differential Tuition: \$55.

**ARC 7211. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisites: Doctoral student standing and consent of the student's Dissertation Committee. Research work carried out by the student under the supervision of their Dissertation Committee. May be repeated for credit, but not more than 15 hours may be applied to the Doctoral degree. Differential Tuition: \$55.

**ARC 7212. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisites: Doctoral student standing and consent of the student's Dissertation Committee. Research work carried out by the student under the supervision of their Dissertation Committee. May be repeated for credit, but not more than 15 hours may be applied to the Doctoral degree. Differential Tuition: \$110.

**ARC 7213. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisites: Doctoral student standing and consent of the student's Dissertation Committee. Research work carried out by the student under the supervision of their Dissertation Committee. May be repeated for credit, but not more than 15 hours may be applied to the Doctoral degree. Differential Tuition: \$165.

**ARC 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: Successful defense of comprehensive exam and consent of the student's Dissertation Committee. Dissertation work carried out by the student under the supervision of their Dissertation Committee. May be repeated for credit, but not more than 15 hours may be applied to the Doctoral degree. Differential Tuition: \$55.

**ARC 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisites: Successful defense of comprehensive exam and consent of the student's Dissertation Committee. Dissertation work carried out by the student under the supervision of their Dissertation Committee. May be repeated for credit, but not more than 15 hours may be applied to the Doctoral degree. Differential Tuition: \$110.

**ARC 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: Successful defense of comprehensive exam and consent of the student's Dissertation Committee. Dissertation work carried out by the student under the supervision of their Dissertation Committee. May be repeated for credit, but not more than 15 hours may be applied to the Doctoral degree. Differential Tuition: \$165.

**Urban and Regional Planning (URP) Courses****URP 5213. Social Justice in the City. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. Examines spatial inequality particularly in distressed communities. Emphasis is placed on residential segregation, the deconcentration of poverty, and policies and programs that perpetuate spatial inequalities and promote the geographies of opportunity. Differential Tuition: \$165.

**URP 5223. Community Development Finance. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. Provides a general understanding of economic development and real estate finance. Students learn about a developer's pro forma income and expense statement, calculating debt service and the return on investment, discounted cash flow analysis, underwriting practices, deal structuring, and financing project gaps. Programs such as CDBG, new market tax credits, the low-income housing tax credit program, and historic rehabilitation tax credits are introduced. Real world case studies are explored throughout the course to understand how federal, state, and local government funding sources can be used with private sector resources to finance community-based projects. Differential Tuition: \$165.

**URP 5233. GIS for Urban Studies. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. Provides a basic understanding of spatial analysis using geographic information systems. Emphasis is placed on analyzing urban issues with GIS tools. Topics include mapping density and change, measuring geographic distributions, and analyzing patterns and clusters. Differential Tuition: \$165.

**URP 5313. Urban Housing Policy and Analysis. (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. Formerly titled "Housing Design and Neighborhood Planning.") Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. This course explores the theory and practice of land use planning in local, regional, and state-level planning in the United States. This course deals with the institutional environment in which planning occurs, and the methods planners must know to create and implement a comprehensive plan. It will cover the topics of zoning and subdivision regulations, long-range comprehensive plan, and basic principles of functional plans, area plans, site plans, and form-based codes. (Formerly ARC 5333. Credit cannot be earned for both URP 5333 and ARC 5333.) Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. This course reviews the origins and evolution of thought and action in planning, including post-colonial perspectives. Students have the opportunity to explore theory in planning contexts for practical application and research. (Formerly ARC 5343. Credit cannot be earned for both URP 5343 and ARC 5343.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. Introduction to research design in urban planning and basic exploratory analytic tools. Topics include: data gathering and management, demographic and employment analysis and forecasting, literature gathering and synthesis, visualization, database graphics, and GIS for applications in urban and regional planning with an emphasis on how these inform question formation. (Formerly ARC 5363. Credit cannot be earned for both URP 5363 and ARC 5363. Formerly titled "Intermediate Urban Planning Methods.") Differential Tuition: \$165.

**URP 5373. Site Planning and Design. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. This course will introduce students to site planning as both a design activity and also as a nexus of principles and issues that are central to the profession of urban planning. Through this course, students will have an opportunity to learn how to use various planning software to conduct land suitability and site analysis, and build-out analysis. For the final project, students will develop a site plan visualizing the arrangements of buildings, structure, infrastructure, and landscape based on local zoning, subdivision, and land development ordinances. (Formerly ARC 5373. Credit cannot be earned for both URP 5373 and ARC 5373.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. Design and implementation of quantitative models in urban planning to answer relevant research questions. Emphasis on connecting method to question. Topics include descriptive statistics, difference of means testing, correlation, basic spatial statistics, regression analysis, and effectively communicating analytic results. (Formerly titled "Advanced Urban Planning Methods.") Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. This course explores how planners work, including legal foundations, ethical challenges, and practical issues. Students also have the opportunity to practice project management and organizational communication. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. This survey of transportation planning includes foundations, practical techniques, and disruptions, emphasizing emerging and sustainable transportation modes. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. Through this course, students will have the opportunity to acquire background knowledge necessary for developing plans and policies to promote sustainable urban and regional growth and preserve natural areas. This course will cover a wide range of state, regional, and local-level growth management techniques and land preservation policies. Differential Tuition: \$165.

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

Prerequisite: Graduate standing or consent of instructor. This course will examine important parts of the legal basis of environmental planning and policy in the US. Then it will examine the causes and effects of air, water, and land pollution, and evaluate the planning and policy responses. In addition, it will survey and evaluate the application of planning tools and strategies to protect the natural environment, conserve natural resources, and mitigate climate change to create sustainable green communities. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**URP 5513. Public Participation and Qualitative Analysis. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing or consent of instructor. This course involves methods of facilitating public input and analyzing textual data. Topics include: Online and in-person involvement, integrating input to plans, co-production, and evaluation with case study, observational, and content analysis techniques. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$55.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$165.

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

Prerequisites: Graduate standing and permission from 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. Differential Tuition: \$55.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$330.

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

Prerequisites: Graduate standing and permission from 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. Differential Tuition: \$55.

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

Prerequisites: Graduate standing and permission from 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. Differential Tuition: \$165.

## School of Civil and Environmental Engineering, and Construction Management

The School of Civil and Environmental Engineering, and Construction Management offers the Master of Civil Engineering degree, the Master of Science degree in Civil Engineering, the Master of Science degree in Facility Management, the Doctor of Philosophy degree in Civil Engineering, and the Doctor of Philosophy degree in Environmental Science and Engineering. The School also offers a Graduate Certificate in Construction Engineering, Science and Management and a Graduate Certificate in Facility Management.

- M.S. in Civil Engineering (p. 191)
- Master of Civil Engineering (p. 192)
- M.S. in Facility Management (p. 192)
- Ph.D. in Civil Engineering (p. 193)
- Ph.D. in Environmental Science and Engineering (p. 197)

### 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 Student Policies, Admission Policies):

- 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
- Official Graduate Record Examination (GRE) scores. (GRE scores waived for current UTSA students and UTSA alumni of the B.S. in Civil Engineering and closely related engineering programs, who have an overall GPA above 3.0)
- Test of English as a Foreign Language (TOEFL) minimum scores of 79 or 60 for Internet or paper versions, respectively
- A statement of research/specialization interest
- 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 5000-7000 level courses offered in Civil and Environmental Engineering (CEE) or outside the department, with approval from the Graduate Advisor of Record. Any grade lower than "B" in a graduate course 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

Code	Title	Credit Hours
<b>A. Electives (24 semester credit hours):</b>		<b>24</b>
These can be selected from 5000–7000 level courses offered in Civil and Environmental Engineering, or other departments with the approval of the Graduate Research Advisor. The objective of these courses is to provide advanced training in areas considered to form the foundation for the disciplines of Civil Engineering, namely structures, geotechnical, transportation and water resources. Students in consultation with a faculty advisor will develop a plan of study based on their career goals.		
<b>B. Master’s Thesis (6 semester credit hours):</b>		<b>6</b>
Includes comprehensive examination/thesis defense/seminar presentation		
CE 5981	Master’s Thesis	
or CE 5982	Master’s Thesis	
or CE 5983	Master’s Thesis	
<b>Total Credit Hours</b>		<b>30</b>

## 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 Student Policies, Admission Policies):

- 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
- Test of English as a Foreign Language (TOEFL) minimum scores of 79 or 60 for Internet or paper versions, respectively
- A statement of specialization interest
- 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 School of Civil and Environmental Engineering, and Construction Management (CEE) or outside the

department, with approval from the CEE Graduate Studies Committee. Any grade lower than “B” in a graduate course cannot be counted toward the coursework requirement.

Students will be assigned an advisor and develop a degree plan that must be approved by the student’s advisor/or the Graduate Advisor of Record by the end of the first semester.

### Program of Study

Code	Title	Credit Hours
<b>A. Electives (33 semester credit hours):</b>		<b>33</b>
These can be selected from 5000–7000 level courses offered in Civil and Environmental Engineering, or other departments with the approval of the Graduate Research Advisor. The objective of these courses is to provide advanced training in areas considered to form the foundation for the disciplines of Civil Engineering, namely structures, geotechnical, transportation and water resources. Students in consultation with a faculty advisor will develop a plan of study based on their career goals.		
<b>B. Seminars (1 semester credit hour):</b>		
CE 5991	Graduate Seminar	1
or CE 6991	Graduate Seminar in Civil Engineering	
or CE 6621	Graduate Seminar in Environmental Science and Engineering	
or ES 5981	Graduate Seminar in Environmental Science and Engineering	
<b>C. Comprehensive Examination</b>		
<b>Total Credit Hours</b>		<b>34</b>

## Master of Science Degree in Facility Management

The Master of Science degree in Facility Management is a 100% online program, designed to educate and equip graduate-level facility management students with advanced facilities management knowledge and skills to enhance their performance, capabilities, and increase their professional qualifications. Students who complete the M.S. degree in Facility Management will be prepared to make an immediate positive impact that supports and advances the 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
- Resume detailing your facilities management experience
- Two Letters of Recommendation (recommended)
- Test of English as a Foreign Language (TOEFL) scores for international applicants whose first language is not English

Applicants for this program must have a bachelor’s or master’s degree in engineering, architecture, sciences, business, or other facility management related field or discipline. Practicing facility managers with at least two years of experience in facility management and a bachelor’s degree in other fields will also be admitted to the program, with approval of the program coordinator.

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

## Degree Requirements

The minimum number of semester credit hours required for the Master of Science degree in Facility Management, exclusive of coursework or other study required to remove deficiencies is 30. The program is offered in a non-thesis option only.

Degree candidates must complete the following 30 semester credit hours of coursework:

Code	Title	Credit Hours
<b>Required courses:</b>		
FM 5003	Facilities Management Professional Trends	3
FM 5113	Operations and Maintenance: Management of Built Assets	3
FM 5213	Project Management: Planning and Execution of Projects	3
FM 5313	Finance and Business: Financial Aspects of Facilities Management	3
FM 5413	Leadership and Strategy: Facilities Management Leadership and Excellence	3
FM 5513	Energy, Utilities and Environmental Stewardship: Energy Management and Sustainable Facilities	3
FM 5613	Human Factors and Resources in Facilities Management	3
FM 5713	Quality, Productivity and Technology in Facility Management	3
FM 5813	Environmental Health, Safety, Risk Management, and Business Continuity in Facility Management	3
FM 5903	Graduate Capstone Project – Solving Problems in Facilities Management	3
<b>Total Credit Hours</b>		<b>30</b>

## Doctor of Philosophy Degree in Civil Engineering

The School of Civil and Environmental Engineering, and Construction Management (CEE) offers the opportunity for advanced study and research leading to the Doctor of Philosophy degree in Civil 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. The program has six separate tracks: 1) Geotechnical Engineering, 2) Structural Engineering, 3) Transportation Engineering, 4) Water Resources, 5) Building Performance, and 6) Construction Science and Management. The Ph.D. degree in Civil 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 civil engineering, Architecture, Construction Science and Management, or other related disciplines. 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. (GRE scores waived for UTSA students and alumni of the B.S. or M.S. in Civil Engineering and from closely related engineering programs, who have an overall GPA above 3.0);
- 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 determined by the Department Graduate Studies Committee (GSC) contingent upon available funding. Full-time students accepted to the program are eligible for financial support in the form of competitive teaching assistantships, research assistantships, or research fellowships.

## Degree Requirements

The Doctoral program in Civil 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 Civil Engineering, Architecture, and Construction Science. 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. Additional degree requirements include both passing a written and/or oral qualifying examinations, writing a doctoral dissertation, and passing a final examination/dissertation defense.

A minimum of twenty-eight semester credit hours of required 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 student's Dissertation Committee. These elective courses may be offered by departments in the College of Engineering and Integrated Design, the College of Sciences or by other departments at UTSA.

### Geotechnical Engineering, Structural Engineering, Transportation Engineering and Water Resources Track Degree Requirements

Students are required to complete the following courses based on the completion of a Master's degree or Bachelor's degree. Faculty advisors will develop a plan of study based on the career goals and dissertation objectives of the students. The plan of study will include

courses that build the fundamental knowledge required to complete the dissertation, and courses outside of traditional areas for students involved in multidisciplinary research.

**Students that have obtained a Master's degree are required to complete the following courses:**

Code	Title	Credit Hours
<b>A. Electives (28 semester credit hours)</b>		<b>28</b>

These can be selected from 5000–7000 level courses offered in Civil and Environmental Engineering or other departments, with the approval of the Dissertation Committee. The objective of these courses is to provide advanced training in areas considered to form the foundation for the disciplines of Civil Engineering, namely structures, geotechnical, transportation, and water resources. Faculty advisors will develop a plan of study based on the career goals, chosen track, and dissertation objectives of the students. The plan of study will include courses that build the fundamental knowledge required to complete the dissertation, and courses outside of traditional areas for students involved in multidisciplinary research.

<b>B. Seminars (2 semester credit hours)</b>		<b>2</b>
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CE 6991	Graduate Seminar in Civil Engineering (repeated)
or CE 5991	Graduate Seminar
or CE 6621	Graduate Seminar in Environmental Science and Engineering
or ES 5981	Graduate Seminar in Environmental Science and Engineering

<b>C. Doctoral Research and Dissertation (30 semester credit hours)</b>		<b>30</b>
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15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation:

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

<b>Total Credit Hours</b>	<b>60</b>
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**Students that have obtained a Bachelor's degree are required to complete the following courses:**

Code	Title	Credit Hours
<b>A. Electives (43 semester credit hours)</b>		<b>43</b>

These can be selected from 5000–7000 level courses offered in Civil and Environmental Engineering or other departments, with the approval of the Dissertation Committee. The objective of these courses is to provide advanced training in areas considered to form the foundation for the disciplines of Civil Engineering, namely structures, geotechnical, transportation, and water resources. Faculty advisors will develop a plan of study based on the career goals, chosen track, and dissertation objectives of the students. The plan of study will include courses that build the fundamental knowledge required to complete the dissertation, and courses outside of traditional areas for students involved in multidisciplinary research.

<b>B. Seminars (2 semester credit hours)</b>		<b>2</b>
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CE 6991	Graduate Seminar in Civil Engineering (repeated)
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or CE 5991	Graduate Seminar
or CE 6621	Graduate Seminar in Environmental Science and Engineering
or ES 5981	Graduate Seminar in Environmental Science and Engineering

<b>C. Doctoral Research and Dissertation (30 semester credit hours)</b>		<b>30</b>
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15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation:

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

<b>Total Credit Hours</b>	<b>75</b>
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**Building Performance Track Degree Requirements**

Students are required to complete the following courses based on the completion of a Master's degree or Bachelor's degree. Faculty advisors will develop a plan of study based on the career goals and dissertation objectives of the students. The plan of study will include courses that build the fundamental knowledge required to complete the dissertation, and courses outside of traditional areas for students involved in multidisciplinary research.

**Students that have obtained a Master's degree are required to complete the following courses:**

Code	Title	Credit Hours
<b>A. Core Curriculum (9 semester credit hours)</b>		<b>9</b>

At least three Core Curriculum CEE courses will be selected from the list below with the approval of the dissertation committee chair. Other CEE courses can be substituted with the approval of the track coordinator.

CE 5043	Advanced Civil Engineering Statistics
CE 5093	Geographic Information Systems (GIS)
CE 5483	Urban Transportation
CE 5643	Sustainable Energy Systems
CE 5713	Special Topics in Structures
CE 5723	Special Topics in Transportation
CE 5733	Special Topics in Environmental Engineering
CE 6383	Global Change
CE 6953	Independent Study

<b>B. Track Electives (12 semester credit hours)</b>		<b>12</b>
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These can be selected from 5000–7000 level courses offered in the School of Architecture and Planning, with the approval of the Dissertation Committee. The objective of these courses is to provide advanced training in areas considered to form the foundation for the Building Performance track.

<b>C. Free Electives (6 semester credit hours)</b>		<b>6</b>
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These can be selected from 5000–7000 level courses offered in other UTSA departments, with the approval of the Dissertation Committee. The objective of these courses is to expanded knowledge outside of traditional areas and promote interdisciplinary research.

<b>D. Seminars (3 semester credit hours)</b>		<b>3</b>
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ARC 7011	Doctoral Seminar in Architecture (repeated)
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<b>E. Doctoral Research and Dissertation (30 semester credit hours)</b>		<b>30</b>
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15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation:

ARC 7213	Doctoral Research	
	or ARC 7212 Doctoral Research	
	or ARC 7211 Doctoral Research	
ARC 7313	Doctoral Dissertation	
	or ARC 7312 Doctoral Dissertation	
	or ARC 7311 Doctoral Dissertation	
<b>Total Credit Hours</b>		<b>60</b>

**Students that have obtained a Bachelor's degree are required to complete the following courses:**

Code	Title	Credit Hours
<b>A. Core Curriculum (9 semester credit hours)</b>		<b>9</b>
At least three Core Curriculum CEE courses will be selected from the list below with the approval of the dissertation committee chair. Other CEE courses can be substituted with the approval of the track coordinator.		
CE 5043	Advanced Civil Engineering Statistics	
CE 5093	Geographic Information Systems (GIS)	
CE 5483	Urban Transportation	
CE 5643	Sustainable Energy Systems	
CE 5713	Special Topics in Structures	
CE 5723	Special Topics in Transportation	
CE 5733	Special Topics in Environmental Engineering	
CE 6383	Global Change	
CE 6953	Independent Study	
<b>B. Track Electives (21 semester credit hours)</b>		<b>21</b>
These can be selected from 5000–7000 level courses offered in the School of Architecture and Planning, with the approval of the Dissertation Committee. The objective of these courses is to provide advanced training in areas considered to form the foundation for the Building Performance track.		
<b>C. Free Electives (12 semester credit hours)</b>		<b>12</b>
These can be selected from 5000–7000 level courses offered in other UTSA departments, with the approval of the Dissertation Committee. The objective of these courses is to expanded knowledge outside of traditional areas and promote interdisciplinary research.		
<b>D. Seminars (3 semester credit hours)</b>		<b>3</b>
ARC 7011	Doctoral Seminar in Architecture (repeated)	
<b>E. Doctoral Research and Dissertation (30 semester credit hours)</b>		<b>30</b>
15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation:		
ARC 7213	Doctoral Research	
	or ARC 7212 Doctoral Research	
	or ARC 7211 Doctoral Research	
ARC 7313	Doctoral Dissertation	
	or ARC 7312 Doctoral Dissertation	
	or ARC 7311 Doctoral Dissertation	
<b>Total Credit Hours</b>		<b>75</b>

### Construction Science and Management Track Degree Requirements

Students are required to complete the following courses based on the completion of a Master's degree or Bachelor's degree. Faculty advisors will develop a plan of study based on the career goals and

dissertation objectives of the students. The plan of study will include courses that build the fundamental knowledge required to complete the dissertation, and courses outside of traditional areas for students involved in multidisciplinary research.

**Students that have obtained a Master's degree are required to complete the following courses:**

Code	Title	Credit Hours
<b>A. Core Curriculum (9 semester credit hours)</b>		<b>9</b>
At least three Core Curriculum CEE courses will be selected from the list below with the approval of the dissertation committee chair. Other CEE courses can be substituted with the approval of the track coordinator.		
CE 5023	Finite Element Methods	
CE 5043	Advanced Civil Engineering Statistics	
CE 5093	Geographic Information Systems (GIS)	
CE 5143	Numerical Methods in Civil Engineering	
CE 5453	Transportation Engineering	
CE 5463	Foundation Engineering	
CE 5643	Sustainable Energy Systems	
CE 5703	Special Topics in Hydraulics and Hydrology	
CE 5713	Special Topics in Structures	
CE 5733	Special Topics in Environmental Engineering	
CE 5743	Special Topics in Geotechnical Engineering	
CE 6953	Independent Study	
<b>B. Track Electives (18 semester credit hours)</b>		<b>18</b>
Student must select required CSM courses or other electives from the list below according to his/her selected track of study and the requirements above. Other courses could be substituted with the approval of the Dissertation Committee.		
CSM 5133	Construction Practice in a Global Setting	
CSM 5223	Building Information Modeling for Construction Management	
CSM 5243	Sustainable Construction and Delivery	
CSM 5413	Advanced Topics in Construction Systems	
CSM 5423	Advanced Topics in Project Controls and Scheduling	
CSM 5433	Construction Safety Planning and Management	
CSM 5633	Advanced Construction Management	
CSM 6643	Artificial Intelligence in Construction Management	
CSM 6951	Independent Study	
CSM 6953	Independent Study	
CSM 6973	Special Topics	
CSM 6976	Special Topics	
CSM 7103	Decision-Making in Construction Management	
CSM 7113	Resiliency within the Built Environment	
CSM 7203	Research Methods	
<b>C. Seminars (3 semester credit hours)</b>		<b>3</b>
CSM 7011	Construction Graduate Seminar (repeated)	
<b>D. Doctoral Research and Dissertation (30 semester credit hours)</b>		<b>30</b>
15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation:		
CSM 7213	Doctoral Research	
	or CSM 7212 Doctoral Research	

or CSM 7211 Doctoral Research	
CSM 7313 Doctoral Dissertation	
or CSM 7312 Doctoral Dissertation	
or CSM 7311 Doctoral Dissertation	
<b>Total Credit Hours</b>	<b>60</b>

Students that have obtained a Bachelor's degree are required to complete the following courses:

Code	Title	Credit Hours
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**A. Core Curriculum (9 semester credit hours) 9**

At least three Core Curriculum CEE courses will be selected from the list below with the approval of the dissertation committee chair. Other CEE courses can be substituted with the approval of the track coordinator.

CE 5023	Finite Element Methods
CE 5043	Advanced Civil Engineering Statistics
CE 5093	Geographic Information Systems (GIS)
CE 5143	Numerical Methods in Civil Engineering
CE 5453	Transportation Engineering
CE 5463	Foundation Engineering
CE 5643	Sustainable Energy Systems
CE 5703	Special Topics in Hydraulics and Hydrology
CE 5713	Special Topics in Structures
CE 5733	Special Topics in Environmental Engineering
CE 5743	Special Topics in Geotechnical Engineering
CE 6953	Independent Study

**B. Track Electives (33 semester credit hours) 33**

Student must select required CSM courses or other electives from the list below according to his/her selected track of study and the requirements above. Other courses could be substituted with the approval of the Dissertation Committee.

CSM 5133	Construction Practice in a Global Setting
CSM 5223	Building Information Modeling for Construction Management
CSM 5243	Sustainable Construction and Delivery
CSM 5413	Advanced Topics in Construction Systems
CSM 5423	Advanced Topics in Project Controls and Scheduling
CSM 5433	Construction Safety Planning and Management
CSM 5633	Advanced Construction Management
CSM 6643	Artificial Intelligence in Construction Management
CSM 6951	Independent Study
CSM 6953	Independent Study
CSM 6973	Special Topics
CSM 6976	Special Topics
CSM 7103	Decision-Making in Construction Management
CSM 7113	Resiliency within the Built Environment
CSM 7203	Research Methods

**C. Seminars (3 semester credit hours) 3**

CSM 7011	Construction Graduate Seminar (repeated)
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**D. Doctoral Research and Dissertation (30 semester credit hours) 30**

15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation:

CSM 7213 Doctoral Research	
or CSM 7212 Doctoral Research	
or CSM 7211 Doctoral Research	
CSM 7313 Doctoral Dissertation	
or CSM 7312 Doctoral Dissertation	
or CSM 7311 Doctoral Dissertation	
<b>Total Credit Hours</b>	<b>75</b>

**Dissertation Committee**

Students must choose a Dissertation Committee consisting of at least four members. The chair of the committee must be a member of the graduate faculty from the CEE Department and the remaining members must be members of the graduate faculty. For the Building Performance Track and the Construction Science and Management Track, the chair of the committee must be a member of the graduate faculty from the School of Architecture and Planning and the Construction Science and Management department respectively. A minimum of one committee member must be a graduate faculty member from a different technical area within the CEE department, from a different department at UTSA, or an external member not affiliated with UTSA. Students must submit the names of their Dissertation Committee to the Graduate Advisor of Record (GAR) by the end of their second semester of study.

**Advancement to Candidacy**

Ph.D. students advance to candidacy after completing their written and/or oral qualifying examinations. First, students must complete fundamental courses and then take the written or oral 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 CEE graduate studies committee. The qualifying examination may include questions on fundamentals and applied topics related to the six technical areas, namely structures, geotechnical, transportation, water resources, building performance, and construction science and management. In addition, the students may be asked to carry out a critical review of engineering or other relevant research publications. A written qualifying examination will be administered by the CEE graduate studies committee (GSC) with input from the faculty participating in the program. The qualifying examination for the Building Performance Track and the Construction Science and Management Track will include questions on fundamental and applied topics related to Building Performance and Construction Science and Management respectively. Students will be allowed to take an oral qualifying examination in lieu of the written exam. Oral qualifying examinations will be administered by the student's dissertation committee. No more than two attempts to pass the qualifying examination are permitted. Students who fail the qualifying examination twice are terminated from the program.

Upon successful completion of the qualifying examination, students are allowed to take Doctoral Research credit hours. Students must take their oral comprehensive examination within two semesters after passing their qualifying examination. The oral comprehensive examination is a dissertation proposal defense. The dissertation proposal should describe the topic, the literature review, the proposed methodology and 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. No more than two attempts to pass the comprehensive examination are permitted. Students who fail the comprehensive

examination twice are terminated from the program. Upon successful completion of the oral comprehensive examination, students advance to Ph.D. candidacy and are allowed to take Doctoral Dissertation credit hours.

Results of the written and/or oral examinations must be reported to the GSC 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 GSC.

## 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 final oral defense consists of a public presentation of the dissertation work by the Doctoral candidate followed by a question/answer period by his/her Dissertation Committee. The student must notify the Graduate School in writing two weeks prior to the final scheduled oral defense. Results of the oral defense are reported to the Dean of the Graduate School. Awarding of the degree is based on the approval of the candidate's Dissertation Committee and the recommendation of the Dean of the Graduate School, who certifies the completion of all University-wide requirements.

## Doctor of Philosophy Degree in Environmental Science and Engineering

The School of Civil and Environmental Engineering, and Construction Management (CEE) 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

## Admission Requirements

Applicants must satisfy the following requirements, in addition to satisfying the University-wide graduate admission requirements (refer to Student Policies, Admission Policies):

- 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
- A résumé/curriculum vita

Applications must be submitted online (<https://graduateschool.utsa.edu/admissions/graduate-application/>) to the UTSA Graduate School. 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 90 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 and Integrated Design or by other departments at UTSA.

### Students that have obtained a Master's degree are required to complete the following courses:

Code	Title	Credit Hours
<b>A. Degree Core Curriculum (10 semester credit hours):</b>		
CE 5001	Process and Ethics in Thesis/Dissertation Research Development	<b>10</b>
CE 5043	Advanced Civil Engineering Statistics	
or ES 5023	Environmental Statistics	
or STA 5103	Applied Statistics	
ES 5233	Experimental Design and Analysis	<b>10</b>
or ME 5213	Topics in Systems Modeling	

Select one of the following:

CE 6383 Global Change

ES 5043 Global Change

GEO 5033 Geographical Information Systems

**B. Track Electives (12 semester credit hours): 12**

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.

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 and Integrated Design 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 semester credit hours): 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 semester credit hours); 2**

CE 6621 Graduate Seminar in Environmental Science and Engineering

or ES 5981 Graduate Seminar in Environmental Science and Engineering

or GEO 5991 Graduate Seminar in Geology

**E. Doctoral Research and Dissertation (30 semester credit hours): 30**

Select one of the following options (15 semester credit hours required of Doctoral Research and 15 semester credit hours required of Doctoral Dissertation):

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

Option III:

GEO 7213 Doctoral Research

or GEO 7212 Doctoral Research

or GEO 7211 Doctoral Research

GEO 7313 Doctoral Dissertation

or GEO 7312 Doctoral Dissertation

or GEO 7311 Doctoral Dissertation

**Total Credit Hours 60**

**Students that have obtained a Bachelor's degree are required to complete the following courses:**

Code	Title	Credit Hours
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**A. Degree Core Curriculum (10 semester credit hours): 10**

CE 5001 Process and Ethics in Thesis/Dissertation Research Development

CE 5043 Advanced Civil Engineering Statistics

or ES 5023 Environmental Statistics

ES 5233 Experimental Design and Analysis

Select one of the following:

CE 6383 Global Change

ES 5043 Global Change

GEO 5033 Geographical Information Systems

**B. Track Electives (21 semester credit hours): 21**

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.

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 and Integrated Design 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 (12 semester credit hours): 12

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 semester credit hours): 2

CE 6621	Graduate Seminar in Environmental Science and Engineering
or ES 5981	Graduate Seminar in Environmental Science and Engineering
or GEO 5991	Graduate Seminar in Geology

### E. Doctoral Research and Dissertation (45 semester credit hours): 45

Select one of the following options:

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
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or ES 7212 Doctoral Research

or ES 7211 Doctoral Research

ES 7313	Doctoral Dissertation
or ES 7312	Doctoral Dissertation
or ES 7311	Doctoral Dissertation

Option III:

GEO 7213	Doctoral Research
or GEO 7212	Doctoral Research
or GEO 7211	Doctoral Research

GEO 7313	Doctoral Dissertation
or GEO 7312	Doctoral Dissertation
or GEO 7311	Doctoral Dissertation

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**Total Credit Hours**

**90**

## 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.

## 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 in 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.

- Graduate Certificate in Construction Engineering, Science and Management (p. 200)
- Graduate Certificate in Facility management (p. 200)

## Graduate Certificate in Construction Engineering, Science and Management

The Graduate Certificate in Construction Engineering, Science and Management (CESM) is designed to prepare individuals with important practical knowledge necessary for successful careers in the construction industry. It certifies to employers that the individual that received the CESM graduate certificate has completed coursework essential to be valuable assets to companies. The CESM graduate certificate courses will provide students with working knowledge in the areas of Project Controls and Scheduling, Construction Safety Planning and Management, Cost Estimating, Building Information Modeling, Sustainable Construction and Delivery, Artificial Intelligence in Construction Management, Decision-Making in Construction Management, and Resiliency within the Built Environment and Leadership.

### Admission Requirements

The requirement for admission to the certificate program includes at least a senior level of a four year undergraduate degree in either engineering, architecture, business or other related disciplines. Students admitted to the program will be required to have a minimum overall GPA of 3.0. Additionally, 0.1 will be added to the overall GPA for applicants with each full-time year of construction experience. For example, if an applicant has a 2.5 overall GPA and five years of construction industry experience, the finalized GPA would be 3.0 and the applicant would meet the minimum requirement for admission. Students that do not meet the admission requirements could be accepted conditionally by registering in additional leveling courses as indicated by the Chair of the CESM Graduate Certificate Committee and must obtain a minimum GPA of 3.0 in the first 6 semester credit hours in order to be in good standing.

Applications containing official transcripts and a resume must be submitted online through the UTSA Graduate School application portal. Incomplete applications will not be considered. Acceptance to the CESM

graduate certificate program is determined by the CSM faculty graduate committee.

Currently enrolled graduate students fill out the UTSA Graduate Certificate Form (<https://klesse.utsa.edu/>) and send to [debaditya.chakraborty@utsa.edu](mailto:debaditya.chakraborty@utsa.edu)

### Certificate Requirements

A minimum of 15 semester credit hours are required for completion of the graduate CESM certificate program. Students are expected to complete 3 semester credit hours of CSM 6943 Construction Internship/Construction Internship. In exceptional cases and with the approval from the Chair of the Graduate CESM certificate committee, the CSM 6973 Special Topics/Special Topics could be approved as a replacement course for CSM 6943. The remaining 12 semester credit hours will be selected from prescribed elective courses below.

Code	Title	Credit Hours
<b>A. Required Course:</b>		<b>3</b>
CSM 6943	Construction Internship or CSM 6973 Special Topics	
<b>B. Prescribed Graduate Construction Electives. Select 12 semester credit hours from the following courses:</b>		<b>12</b>
CSM 5033	Construction Cost Estimating for International Projects	
CSM 5133	Construction Practice in a Global Setting	
CSM 5223	Building Information Modeling for Construction Management	
CSM 5243	Sustainable Construction and Delivery	
CSM 5413	Advanced Topics in Construction Systems	
CSM 5423	Advanced Topics in Project Controls and Scheduling	
CSM 5433	Construction Safety Planning and Management	
CSM 5633	Advanced Construction Management	
CSM 6643	Artificial Intelligence in Construction Management	
CSM 6953	Independent Study	
CSM 6973	Special Topics	
CSM 7103	Decision-Making in Construction Management	
CSM 7113	Resiliency within the Built Environment	
<b>Total Credit Hours</b>		<b>15</b>

## Graduate Certificate in Facility Management

The graduate certificate in Facility Management is a 100% online, 15-semester-credit-hour certificate program, designed to educate and equip graduate-level facility management students with advanced facilities management knowledge and skills to enhance their performance, capabilities, and increase their professional qualifications. Students who complete the Facility Management graduate certificate will be prepared to make an immediate positive impact that supports and advances the profession.

### Admission Requirements

Applicants for this program must have a bachelor’s or master’s degree in engineering, architecture, sciences, business, or other facility management related field or discipline. Practicing facility managers with

at least two years of experience in facility management and a bachelor's degree in other fields will also be admitted to the program, with approval of the program coordinator.

Applicants will apply for admission to the certificate as a special (non-degree-seeking) graduate student according to UTSA's admission requirements for certificate programs (see Certificate Program Regulations in this catalog). Additionally, applicants will be required to submit a resume detailing their facilities management experience.

## Certificate Program Requirements

To satisfy the requirements for the Graduate Certificate in Facility Management, students must complete 15 semester credit hours as follows:

Code	Title	Credit Hours
A. 15 semester credit hours of the following required courses:		15
FM 5003	Facilities Management Professional Trends	
FM 5113	Operations and Maintenance: Management of Built Assets	
FM 5213	Project Management: Planning and Execution of Projects	
FM 5313	Finance and Business: Financial Aspects of Facilities Management	
FM 5413	Leadership and Strategy: Facilities Management Leadership and Excellence	
<b>Total Credit Hours</b>		<b>15</b>

To maintain enrollment in the certificate program, students should maintain a 3.0 grade point average throughout tenure in the program.

## 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. Differential Tuition: \$55.

### 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). Differential Tuition \$165.

### CE 5033. Experiential Learning in Civil Engineering. (3-0) 3 Credit Hours.

Students may obtain credit for professional work experiences outside of UTSA that align with areas of graduate study in Civil Engineering. Students must develop a portfolio of work demonstrating that they have achieved learning objectives established by a faculty advisor. The portfolio will be evaluated by the faculty advisor, and if approved, the student must pass a proficiency exam evaluating his/her proficiency in the course learning outcomes. Differential Tuition: \$165.

### 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. Differential Tuition: \$165.

### CE 5093. 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. (Formerly CE 5293. Credit cannot be earned for both CE 5093 and CE 5293.) Differential Tuition: \$165.

### 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.) Differential Tuition: \$165.

### 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.) Differential Tuition: \$165.

### 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.) Differential Tuition: \$165.

### 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. Differential Tuition: \$165.

### 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.) Differential Tuition: \$165.

### CE 5163. Advanced Structural Analysis. (3-0) 3 Credit Hours.

The class covers the matrix analysis method applied to structural analysis. The course will cover all the facets of the structural analysis method including the assembly of element and structure stiffness matrices, fixed end force and moment vectors, and nodal displacements. Differential Tuition: \$165.

### CE 5173. Dynamics and Vibrations. (3-0) 3 Credit Hours.

The class covers the fundamentals of structural dynamics, including single-degree-of-freedom and multi-degree-of-freedom systems. The course presents common analysis techniques used to calculate the dynamic response of structures to different types of time-varying loads. Differential Tuition: \$165.

**CE 5183. Experimental Stress Analysis. (3-0) 3 Credit Hours.**

The course covers basic principles of experimental measurements, including basic modeling theory, similitude laws, and dimensional analysis. The course will also cover basic principles of commonly-used sensors for measuring strain, displacement, and load. Students will learn to build and operate sensors through experiments. Differential Tuition: \$165.

**CE 5193. 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. (Formerly CE 5023. Same as ME 5483. Credit cannot be earned for more than one of the following: CE 5023, CE 5193, or ME 5483.) Differential Tuition: \$165.

**CE 5253. Introduction to Masonry Design. (3-0) 3 Credit Hours.**

Design philosophy and methodology for masonry structures. Flexure design, axial load design, and shear design of basic masonry components. Differential Tuition: \$165.

**CE 5263. Design of Buildings for Lateral Loads. (3-0) 3 Credit Hours.**

The class will cover methods to calculate lateral loads for the design of buildings and their application to the design of steel, concrete, wood and masonry structures. Differential Tuition: \$165.

**CE 5283. Design of Nuclear Facilities I. (3-0) 3 Credit Hours.**

The course covers U.S. Nuclear Regulatory Commission regulations, ACI and AISC design codes for nuclear safety-related structures, computation of facility-specific design loads for seismic and other natural hazards and facility operations, ACI and AISC load combinations, design of components of reinforced concrete and steel structures, and safeguards evaluation for explosive and impact loads. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**CE 5323. 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. (Formerly CE 5653. Same as GEO 5413. Credit can be earned for only one of the following: CE 5653, CE 5323, or GEO 5413.) Differential Tuition: \$165.

**CE 5363. Coastal Engineering. (3-0) 3 Credit Hours.**

This course introduces coastal engineering principles. This course will cover various fundamental and applied aspects of coastal engineering, including: wave mechanics, wave-structure interaction, coastal water level fluctuations, coastal zone processes, and design considerations for coastal structures and beach nourishment projects. Differential Tuition: \$165.

**CE 5373. Risk Analysis of Water/Environmental Systems. (3-0) 3 Credit Hours.**

This course is focused on risk and uncertainty analysis applied to hydrology, hydraulics, groundwater, water resources, and environmental engineering systems. Tools for estimating the risk of failure and the reliability of water resources and environmental engineering systems based on probability and statistical methods as well as stochastic simulation techniques will be discussed. Differential Tuition: \$165.

**CE 5383. Water Resources Planning and Management. (3-0) 3 Credit Hours.**

Management and planning of natural and constructed water systems; the planning process, systems analysis methods; institutional framework for water resources engineering; comprehensive integration of engineering, economic, environmental, legal and political considerations in water resources development and management. Integrated management and case studies of water use and environmental resources. Differential Tuition: \$165.

**CE 5393. River Mechanics and Engineering Applications. (3-0) 3 Credit Hours.**

Prerequisite: CE 5323 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. (Formerly CE 5663. Credit cannot be earned for both CE 5393 and CE 5663.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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). Differential Tuition \$165.

**CE 5473. Transportation Planning. (3-0) 3 Credit Hours.**

An introductory course in urban transportation planning. It includes, an overview of highway capacity concepts, trip generation, trip distribution, modal split and trip assignments. Course gives hands-on exposure to software implementing these steps and discusses case studies of San Antonio's 2020 master plan. Finally, it extends this approach to air passenger and road freight transportation. Differential Tuition: \$165.

**CE 5483. Urban Transportation. (3-0) 3 Credit Hours.**

This course is an introduction to urban passenger transportation planning in the USA with a sustainability focus. It is structured around three components: (1) History, theory, and problem definition; (2) The planning process; and (3) Solutions and analytical techniques. The course will help to understand the planning process comprehensively along with its multiple dimensions, how our current transportation systems has evolved over time, what is a sustainable system, policies and planning approaches that help to achieve it, and challenges related to planning. The course provides opportunities to hear from local and regional planners about their work, and learn from their experience about the methods they use in practice. Differential Tuition: \$165.

**CE 5493. Traffic Engineering. (3-0) 3 Credit Hours.**

This course will introduce to students the theories that seek to describe the interactions between the vehicles, drivers, and the infrastructure. The models and theories that characterize the flow of highway traffic, signalized and unsignalized intersections will also be presented. The course will also provide opportunity to learn emerging techniques and to apply them for traffic and incident management. Differential Tuition: \$165.

**CE 5523. Retaining Structures. (3-0) 3 Credit Hours.**

This course covers lateral earth pressure theories and their applications in various retaining wall designs. The included types of retaining walls are mechanically stabilized earth (MSE) wall, soil nail wall, tie-back wall, soldier pile wall, and drilled shaft wall. Students will be required to design and analyze different types of retaining structures using the learned theories. In addition, popular computer software packages will also be introduced in this course as design tools. Differential Tuition: \$165.

**CE 5533. Slope Stability. (3-0) 3 Credit Hours.**

The course includes advanced theories of soil strength and failure, theories of lateral earth pressure with applications, infinite slope analysis, limit equilibrium slope analysis, finite element slope analysis, and mechanics and analysis of reinforced slopes using finite element software and spreadsheet applications. Differential Tuition: \$165.

**CE 5543. Ground Improvement. (3-0) 3 Credit Hours.**

This course covers the fundamental principles and concepts of ground improvement methods. How to use these concepts for design and analysis of various ground improvements. The content of this course focus on the applicability of various ground improvement, design and analysis methods and construction details. Differential Tuition: \$165.

**CE 5553. Advanced Soil Mechanics. (3-0) 3 Credit Hours.**

Permeability and seepage analysis involving dams and sheet piles, stress distribution in earth masses, advanced study of drained and undrained shear strength of soil, behavior of unsaturated soil, and laboratory and field methods for evaluation of soil properties in design practice. Differential Tuition: \$165.

**CE 5563. 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 5463. Credit cannot be earned for both CE 5463 and CE 5563.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**CE 5673. 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. (Formerly CE 5203. Same as ES 5063. Credit can be earned for only one of the following: CE 5673, CE 5203, or ES 5063.) Differential Tuition: \$165.

**CE 5683. 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 CE 5213. Credit cannot be earned for both CE 5683 and CE 5213.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$55.

**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.) Differential Tuition: \$110.

**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.) Differential Tuition: \$165.

**CE 5991. Graduate Seminar. (1-0) 1 Credit Hour.**

Graduate seminar may be repeated for credit up to 3 semester credit hours. Differential Tuition: \$55.

**CE 6123. Theory of Plates and Shells. (3-0) 3 Credit Hours.**

The class covers the fundamentals of plate and shell theories, formulation of finite element analysis using plate and shell elements, and basic solutions for various types of loading and boundary conditions in plate and shell structures. Differential Tuition: \$165.

**CE 6133. Advanced Behavior of Reinforced Concrete Members. (3-0) 3 Credit Hours.**

The class covers the behavior of reinforced concrete members under the effects of flexure, axial load, and shear. Technical references are presented that provide the foundation for modern reinforced concrete analysis theories and reinforced concrete design codes. The references discussed in the class provide a basic understanding of the intent and limitations of design code provisions as well as introduce students to techniques for modeling the behavior of reinforced concrete structures in the nonlinear range of response. Differential Tuition: \$165.

**CE 6163. Non-linear Finite Element Analysis. (3-0) 3 Credit Hours.**

The class covers the modeling, formulation, and application of the finite element method for nonlinear problems in structural mechanics. Differential Tuition: \$165.

**CE 6173. Earthquake Engineering. (3-0) 3 Credit Hours.**

The class presents an introduction to engineering seismology including the most important characteristics of earthquake ground motions. The class will also cover methods to simulate the response of structures to strong earthquakes, methodologies employed by seismic design codes, and performance-based design. Differential Tuition: \$165.

**CE 6263. Repair and Rehabilitation of RC Structures. (3-0) 3 Credit Hours.**

Prerequisites: CE 5163 and CE 6173 or equivalents. Condition assessment of existing structures. Evaluation of in-situ capacity of structures using advanced modeling and numerical simulation techniques. Methods for repair and rehabilitation of deficient structures. Differential Tuition: \$165.

**CE 6283. Design of Nuclear Facilities II. (3-0) 3 Credit Hours.**

The course covers the structural design of nuclear facilities including steel components in accordance with AISC N690 and concrete components in accordance with ACI 349 and ACI 359. Differential Tuition: \$165.

**CE 6313. 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. (Formerly CE 6013. Credit cannot be earned for both CE 6313 and CE 6013.) Differential Tuition: \$165.

**CE 6323. Control of Floods and Droughts. (3-0) 3 Credit Hours.**

This course will discuss flood and drought characteristics, impacts; structural, nonstructural flood control measures; drought prediction, drought control, and drought management. Focus will be on preparedness, mitigation, and risk management to respond to these phenomena. Differential Tuition: \$165.

**CE 6343. Water Resources Systems Analysis. (3-0) 3 Credit Hours.**

Systems Analysis methods use algorithmic and mathematical approaches for problem-solving. These are powerful methods that can be applied to solve complex design and management problems for water resources systems and other engineering areas. This class will focus on optimization methods, such as linear programming, integer programming, nonlinear programming, genetic algorithms, and dynamic programming, and their application to water resources systems. Differential Tuition: \$165.

**CE 6363. Advanced Fluid Mechanics. (3-0) 3 Credit Hours.**

This course will be theory oriented with advanced mathematical and physical concepts. Starting with basic conservation laws and constitutive equations of fluid mechanics and flow kinematics, the course will first cover ideal (inviscid) flows and then viscous flows of incompressible fluids. Two-dimensional potential flows will be covered as part of ideal fluid flows. Exact solutions and low-Reynolds number approximate solutions of Navier-Stokes equations will be covered as part of viscous fluid flows. Differential Tuition: \$165.

**CE 6383. 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. (Formerly CE 6113. Same as ES 5043 and GEO 5043. Credit can be earned for only one of the following: CE 6383, CE 6113, ES 5043, or GEO 5043.) Differential Tuition: \$165.

**CE 6403. Airport Engineering. (3-0) 3 Credit Hours.**

This course covers airport master planning and layout, aircraft characteristics and their effects on airport design, and orientation of runways and taxiways including length and cross sections. The course also covers airport capacity and delay, types of airport configurations and methods to design of airport pavements. Differential Tuition: \$165.

**CE 6423. Railway Engineering. (3-0) 3 Credit Hours.**

This course provides an overview of industry-specific topics including key statistics that shape design, construction, maintenance, operations, and evaluation of rail infrastructure and networks. Specific topics also include track-train dynamics, safety, intercity and urban passenger and freight rail operations and capacity, motive power and equipment. Differential Tuition: \$165.

**CE 6453. Pavement Sustainability. (3-0) 3 Credit Hours.**

This course provides design tools that will encourage the use of sustainable pavement materials and structures, such as permeable pavements, rubber asphalt, recycled asphalt pavement (RAP), recycled asphalt shingles (RAS) and alternative cement binders. The course covers potential multiple use of asphalt pavement roadways to have a considerable impact on energy production, fuel consumption, reduced greenhouse gas (GHG) emissions, and life-cycle costs. Differential Tuition: \$165.

**CE 6503. Landfill Design. (3-0) 3 Credit Hours.**

The course will include principles of waste disposal, sanitary landfill site assessment, in-depth design, construction, operation and maintenance of sanitary landfill including landfill gas and leachate management and groundwater monitoring issues close to landfills. Differential Tuition: \$165.

**CE 6513. Advanced Foundation Engineering. (3-0) 3 Credit Hours.**

This course is an extension of CE 5563 Foundation Engineering and covers advanced foundation theories and analytical methods. In addition, this course will cover latest advancements in foundation testing such as static test and Osterberg tests. The concept of sustainability in foundation design will also be introduced in this course. Differential Tuition: \$165.

**CE 6533. Remediation Geotechnics. (3-0) 3 Credit Hours.**

Application of geotechnical engineering to the disposal of wastes, remediation of polluted sites containing contaminated soil and groundwater. Topics include subsurface exploration techniques and geotechnically-oriented remedial action technologies including pump and treat method, soil vapor extractions, air sparging, PRBs, etc. Differential Tuition: \$165.

**CE 6603. 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 6103 and CE 6053 Topic 1: Fate and Transport of Contaminants in Environmental System. Credit can be earned for only one of the following CE 6603, CE 6103, or CE 6053 Fate and Transport of Contaminants in Environmental System.) Differential Tuition: \$165.

**CE 6621. 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. The grade report for the course is either "CR" (satisfactory) or "NC" (unsatisfactory). May be repeated for credit. (Formerly CE 6221. Same as ES 5981.) Differential Tuition: \$55.

**CE 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Written permission from 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 student's program of study. Differential Tuition: \$55.

**CE 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Written permission from 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 student's program of study. Differential Tuition: \$110.

**CE 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Written permission from 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 student's program of study. Differential Tuition: \$165.

**CE 6961. Comprehensive Examination. (0-0) 1 Credit Hour.**

Prerequisite: Written permission from 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). Differential Tuition: \$55.

**CE 6991. Graduate Seminar in Civil 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 civil engineering, and advanced graduate students who are about to complete their dissertation research. May be repeated for credit. Differential Tuition: \$55.

**CE 7211. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisites: For CE Ph.D. students, consent of advisor; for ESE Ph.D. students, 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. Differential Tuition: \$55.

**CE 7212. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisites: For CE Ph.D. students, consent of advisor; for ESE Ph.D. students, 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. Differential Tuition: \$110.

**CE 7213. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisites: For CE Ph.D. students, consent of advisor; for ESE Ph.D. students, 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. Differential Tuition: \$165.

**CE 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: For CE Ph.D. students, successful defense of comprehensive exam; for ESE Ph.D. students, 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. Differential Tuition: \$55.

**CE 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisites: For CE Ph.D. students, successful defense of comprehensive exam; for ESE Ph.D. students, 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. Differential Tuition: \$110.

**CE 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: For CE Ph.D. students, successful defense of comprehensive exam; for ESE Ph.D. students, 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. Differential Tuition: \$165.

## Construction Science and Management (CSM) Courses

**CSM 5033. Construction Cost Estimating. (3-0) 3 Credit Hours.**

Emphasis on pricing work, subcontracting, and bidding strategies utilizing applicable software. Generally offered: Fall, Spring. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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.) Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**CSM 6643. Artificial Intelligence in Construction Management. (3-0) 3 Credit Hours.**

This course introduces the concepts of artificial intelligence and machine learning to help construction students build data-driven solutions. Students will also learn to analyze multidimensional data and develop machine learning models in Python using datasets that are relevant to the CSM discipline. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$55.

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

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$165.

**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. Differential Tuition: \$165.

**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. Differential Tuition: \$330.

**CSM 7011. Construction Graduate Seminar. (1-0) 1 Credit Hour.**

Will include presentations of current research by faculty, invited guests who are experts in fields related to construction science and management, and advanced graduate students who are about to complete their dissertation research. May be repeated for credit. The grade report for the course is either "CR" (satisfactory) or "NC" (unsatisfactory). Differential Tuition: \$55.

**CSM 7103. Decision-Making in Construction Management. (3-0) 3 Credit Hours.**

Decision processes can range from quantitative computational analysis to qualitative experiential evaluations. This course provides a set of practical tools and theoretical frameworks to help construction managers address the challenges of decision-making and problem-solving. Differential Tuition: \$165.

**CSM 7113. Resiliency within the Built Environment. (3-0) 3 Credit Hours.**

This course provides students with the opportunity to obtain a thorough understanding of resiliency issues and its interrelation with the built environment by retrospectively investigating technological progress, addressing current issues, and contemplating on possible futures. Differential Tuition: \$165.

**CSM 7203. Research Methods. (3-0) 3 Credit Hours.**

This course provides guidance on research formulation and methodologies adopted for scientific and engineering experiments, model building and simulations, exploration and analysis of multidimensional data. Students are introduced to concepts necessary for producing research proposals, executing the research, and reporting the results. Differential Tuition: \$165.

**CSM 7211. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisite: Consent of advisor. 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. Differential Tuition: \$55.

**CSM 7212. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisite: Consent of advisor. 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. Differential Tuition: \$110.

**CSM 7213. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisite: Consent of advisor. 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. Differential Tuition: \$165.

**CSM 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisite: Successful defense of comprehensive exam. 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. Differential Tuition: \$55.

**CSM 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisite: Successful defense of comprehensive exam. 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. Differential Tuition: \$110.

**CSM 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisite: Successful defense of comprehensive exam. 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. Differential Tuition: \$165.

**Facility and Property Management (FM) Courses****FM 5003. Facilities Management Professional Trends. (3-0) 3 Credit Hours.**

Course includes an in-depth analysis of the most common practices of Facility and Property Managers, including sustainability issues, environmental factors, buildings safety, leasing activities, building technologies, continuous quality improvement, and FM and real estate trends and practices.

**FM 5113. Operations and Maintenance: Management of Built Assets. (3-0) 3 Credit Hours.**

Course provides an in-depth discussion of Facility and Property Management Operations and Maintenance, including building systems, and approaches to operating and maintaining facilities, the effective development and management of facilities predictive, preventive, and corrective maintenance programs, and other aspects of FM maintenance and operations.

**FM 5213. Project Management: Planning and Execution of Projects. (3-0) 3 Credit Hours.**

Course provides an in-depth discussion of facilities project management from initial project planning, estimating and scope definition, through design and construction to project close out. Course includes project manager roles and responsibilities, project processes and life cycles, programming, scope, design deliverables, project plans, critical path method project scheduling and control, and project oversight from start to finish.

**FM 5313. Finance and Business: Financial Aspects of Facilities. (3-0) 3 Credit Hours.**

Course includes analysis, budgeting, accounting, risk management & reporting to demonstrate applications of facility financial management to prepare students to analyze & interpret financial statements to make FM decisions, and understand & apply accounting and finance principles to facility management business operations, and manage facilities financial and other high value assets to effectively deliver facility services.



**FM 5413. Leadership and Strategy: Facilities Management Leadership. (3-0) 3 Credit Hours.**

Course provides fundamental FM leadership concepts and practices from strategic facility planning, development and execution of facility services, effective leadership of the facility organization, appropriate methods of measuring and evaluating facility performance, identification of root causes of negative performance and ways to continuously improve performance with a focus on performance excellence.

**FM 5513. Energy, Utilities and Environmental Stewardship. (3-0) 3 Credit Hours.**

Course provides students an understanding of operational energy and utility system management in the context of the built environment, and equips students to understand and implement energy and utility conservation measures, and sustainability initiatives to reduce institutional carbon footprint and enhance stewardship of the natural environment. Course includes discussion of energy management systems, Energy Star and STARS assessments and ratings, energy calculations, energy efficiency programs, commissioning and retro# commissioning, energy and utility audits, and FM sustainability practices and trends.

**FM 5613. Human Factors and Resources in Facilities Management. (3-0) 3 Credit Hours.**

Course introduces students to occupancy and human resources management in a facilities management organization, including space management, staff recruitment, hiring, job families and career paths, training and skill development, advancement, performance management, retention and termination, safety and security, and current regulatory environment. Also includes discussion of outsourcing issues, and "To# do#or#buy" analysis to aide in decision making related to potential outsourcing of facility functions.

**FM 5713. Quality, Productivity and Technology in Facility Management. (3-0) 3 Credit Hours.**

Course will provide foundational concepts relating to facility management technology and how it is used to assure quality, productivity and operational excellence in facility operations. Includes the use technology, quality assurance, economics and life#cycle cost analysis and performance measurement and operational reporting to advance the productivity of facilities staff and provide customers and stakeholders with excellence in FM Services.

**FM 5813. Environmental Health, Safety, Risk Management, and Business. (3-0) 3 Credit Hours.**

Course will provide students an understanding of environmental health, safety, and risk management issues in the built environment and equip them to effectively develop and implement emergency management and business continuity plans, and respond to workplace emergencies and other contingencies impacting the ability of the organization to perform its mission.

**FM 5903. Graduate Capstone Project – Solving Problems in Facilities. (3-0) 3 Credit Hours.**

Prerequisites: FM 5003, FM 5113, FM 5213, FM 5313, FM 5413, FM 5513, FM 5613, FM 5713, and FM 5813. Capstone course will be a student# led effort to identify a significant facility management challenge, analyze causes and impacts of the challenge, consider various solution options, and implications of each, and develop a thoughtful and effective solution to address the challenge. Includes the study of formal problem solving principles, and presentation of multi#media findings to address all aspects of the challenge and solution to executive leadership.

# COLLEGE FOR HEALTH, COMMUNITY AND POLICY

The College for Health, Community and Policy offers the following graduate degrees and certificates:

- Master of Dietetics Studies (p. 209)
- Master of Science in Health and Kinesiology (p. 209)

## Department of Criminology and Criminal Justice (p. 214)

- Master of Science in Criminology and Criminal Justice (p. 214)

## Department of Demography (p. 217)

- Master of Science in Applied Demography (p. 217)
- Doctor of Philosophy in Applied Demography (p. 217)

## Department of Kinesiology (p. 226)

## Department of Psychology (p. 226)

- Master of Science in Psychology (p. 226)
- Doctor of Philosophy in Psychology (p. 226)

## Department of Public Administration (p. 232)

- Master of Public Administration (p. 232)
- Graduate Certificate in Nonprofit Administration and Leadership (p. 233)

## Department of Public Health (p. 237)

- Graduate Certificate in Applied Health Research (p. 237)
- Graduate Certificate in Community Nutrition (p. 237)
- Graduate Certificate in Health (p. 237)

## Department of Social Work (p. 241)

- Master of Social Work (p. 241)

## Department of Sociology (p. 246)

- Master of Science in Sociology (p. 246)

- Master of Dietetics Studies (p. 209)
- M.S. in Health and Kinesiology (p. 210)

## Master of Dietetics Studies

The Master of Dietetic Studies (MDS) is part of the 3 year joint degree, which includes the Bachelor of Science (B.S.) in Nutrition and Dietetics, and the 1200 hours of supervised practice. The MDS is a non-thesis degree with an emphasis in Health Promotion, and Disease Prevention and Treatment. Students who successfully complete the joint CPD degree receive a verification statement that certifies their eligibility to take the Commission on Dietetics Registration national examination to become a Registered Dietitian Nutritionist (RD/RDN).

### Criminal History Policy and Acknowledgement

The Coordinated Program in Dietetics (CPD) prepares practitioners for a variety of work settings which require practicum, internship and service-learning. Placements occur in educational, clinical, health care facilities, hospital, and/or medical settings which require a criminal background check. The University of Texas at San Antonio is required to inform you of the requirements set forth by the Texas Occupation Code, Chapter 53, Sections 53.001 through 53.105. (<http://www.texas-statutes.com/occupations-code/chapter-53-consequences-of-criminal-conviction/>)

As a prospective student in a licensure or certification program, you are required to acknowledge that you have been made aware of these requirements and that you have read the Criminal History Policy. The information can be found on the Dietetic program webpage.

## Program Admission Requirements

Admission to the program is based on the following criteria:

- Students must maintain a 3.0 in the CPD undergraduate program and meet all other program requirements to be eligible to transition to the Master of Dietetic Studies (MDS).
- Transfer students seeking the Master of Dietetic Studies-Advancing Standing Option must have a 3.0 GPA and hold a Bachelor in Dietetics or nutrition related field and 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. Students will be required to complete select CPD undergraduate coursework and practicums to meet requirements prior to master transition. Advanced Standing option admission is reviewed case-by-case and is contingent on accreditation requirements and the number of placements available for the advanced practicum/internship.
- Students will apply directly to the Coordinated Program in Dietetics. The application is open every January. The application process is competitive and includes a formal interview.

Note: Applicants that hold a bachelor's degree in an unrelated field would be required to complete all pre-requisite courses and all equivalent undergraduate courses in dietetics and nutrition to meet core knowledge and competencies mandated by the accreditation.

## Degree Requirements

Minimum of 30-semester-credit-hours.

Code	Title	Credit Hours
<b>Core Courses (30 semester credit hours):</b>		<b>30</b>
NDT 5323	Nutrition Pathophysiology	
NDT 5313	Public Health Nutrition and Policy	
NDT 5333	Nutritional Supplements and Functional Foods	
NDT 5343	Integration of Metabolism	
NDT 5947	Advanced Dietetics Practicum I	
NDT 5957	Advanced Dietetics Practicum II	
NDT 5901	Seminar in Dietetics	
NDT 5913	Research Seminar	
Students must successfully pass a comprehensive examination under the capstone course NDT 5901 Seminar in Dietetics		
<b>Total Credit Hours</b>		<b>30</b>

## Standards and Procedures

Only one course with the grade of "C" will be accepted towards this degree. Students must earn a grade of "B" or better in NDT 5901, 5947, 5957. Students who earn a grade of "C" or lower in Seminar in Dietetics, Advanced Dietetics I or II must retake that course and earn a grade of "B" or better before progressing in the course sequence.

## 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. This degree is jointly administered by the Departments of Kinesiology and Public Health.

There are two specializations (Health and Kinesiology) each with a thesis or non-thesis option. Both options are 33 credits:

- The Health Specialization provides advanced training in public health education and community health promotion.
- The Kinesiology Specialization provides advanced training to students who are interested in exercise science and other kinesiology-related research, careers in therapeutic professions and wellness/fitness, and physical education.

### 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. 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.
4. Applicants whose native language is not English must have a score of at least 60 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.
5. Applicants whose undergraduate major was not in Kinesiology or Health may be required to take 6 semester credit hours of undergraduate leveling courses. These courses will be decided by the student's faculty advisor.
6. Applicants are required to submit two professional references to the Graduate Committee.
7. 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 specialization of interest (Health or Kinesiology).

### Degree Requirements

Minimum 33 semester credit hours, including: 6 hours of core courses, 21 required specialization hours, and 6 thesis hours **OR** 6 free graduate elective hours.

Code	Title	Credit Hours
<b>A. Core Courses. 6 semester credit hours required:</b>		
KAH 5093	Statistics in Kinesiology or KAH 5363 Data Management and Descriptive Statistics	6
KAH 5123	Research in Kinesiology	

or KAH 5353 Research Methods in Community and Public Health

<b>B. Specialization Courses. Select one of the following specializations:</b>	<b>21</b>
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**Health Specialization (4 required courses plus 3 additional courses from the list below or courses approved by the Graduate Advisor of Record.)**

KAH 5063	Health Behavior Theory (required course)
KAH 5133	Health Program Planning and Implementation (required course)
KAH 5083	Epidemiology (required course)
KAH 5383	Health Program Evaluation (required course)
KAH 5303	Community Health
KAH 5323	Community Nutrition
KAH 5333	Nutrition through the Lifecycle
KAH 5343	Public Policy and Nutrition
KAH 5373	Inferential Statistics
KAH 6053	Nutrition in Health and Disease
KAH 6063	Obesity and Health

**Kinesiology Specialization (Select any 7 courses from the list below or courses approved by the Graduate Advisor of Record.)**

KAH 5053	Principles of Exercise Physiology
KAH 5103	Biomechanics
KAH 5173	Measurement and Evaluation in Physical Education
KAH 5243	Learning and Teaching Styles in Physical Education
KAH 5313	Adapted Physical Activity
KAH 5403	Applied Cardiovascular Physiology
KAH 6013	The Role of Sport in Society
KAH 6033	Sport Psychology
KAH 6043	Applied Sport Psychology
KAH 6203	Psychological Perspectives of Motor Learning and Control
KAH 6213	Motor Development
KAH 6223	Exercise Nutrition

<b>C. Thesis and Non-Thesis Options. 6 semester hours.</b>	<b>6</b>
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Thesis Option - 6 credit hours of KAH 6983 Master's Thesis. Successful completion of the thesis manuscript and oral defense satisfies the Graduate School requirements for a Thesis and a Comprehensive Exam.

Non-Thesis Option – 6 credit hours of free graduate electives. Successful completion of a computer-based exam covering concepts from research, statistics, and the student's area of specialization satisfies the Graduate School requirement of a Comprehensive Exam.

<b>Total Credit Hours</b>	<b>33</b>
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### 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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5063. Health Behavior Theory. (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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.") Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5083. Epidemiology. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5093. Statistics in 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 field of Kinesiology. (Formerly titled "Statistics and Research in Health and Kinesiology." Same as KAH 5363. Credit cannot be earned for both KAH 5093 and KAH 5393.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5123. Research in 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. (Formerly titled "Research in Health and Kinesiology." Same as KAH 5353. Credit cannot be earned for both KAH 5123 and KAH 5353.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5133. Health Program Planning and Implementation. (3-0) 3 Credit Hours.**

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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5303. Community Health. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5313. Adapted Physical Activity. (3-0) 3 Credit Hours.**

This course is designed to provide an introduction to adapted physical activity, including sport and leisure, for persons with disabilities across school, community, and clinical based programs. This course will also provide you with information and knowledge on how to teach physical activities to persons with disabilities in various settings. Current legislation requires that sport, recreation and exercise programs provide reasonable access for persons with disabilities. Thus, the course is important for future education, recreation, sport, and exercise professionals, as employment in such areas now increasingly involves contact with individuals with disabilities. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5323. Community Nutrition. (3-0) 3 Credit Hours.**

Nutrition-related issues in public health, various community resources, agencies, and programs involved in health promotion and disease prevention. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5333. Nutrition through the Lifecycle. (3-0) 3 Credit Hours.**

This course provides the basic nutritional knowledge required to discuss the nutritional needs during various stages of the lifecycle as influenced by physiological, socio-economic, cultural, and environmental factors. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5343. Public Policy and Nutrition. (3-0) 3 Credit Hours.**

The role of public health policy in managing nutrition related chronic health disease and health promotion. This course will discuss the social, economic and environmental policies impacting food access and healthy eating behaviors. Credit cannot be earned for both KAH 5343 and NDT 5313. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5353. Research Methods in Community and Public Health. (3-0) 3 Credit Hours.**

Introduction to fundamentals of research methods in health education and promotion in community settings. Topics will include principles of research investigation, research design, sampling methods, and measurements. Issue and problems that are commonly encountered in community-based research will be discussed using real-world examples. (Same as KAH 5123. Credit cannot be earned for both KAH 5353 and KAH 5123.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5363. Data Management and Descriptive Statistics. (3-0) 3 Credit Hours.**

This course will introduce students to the commonly used data management software in community and public health. The focus of this course will be to familiarize students with processes of data management such as data monitoring, data cleaning and descriptive analysis for the purpose of research and evaluation. Additionally, information will be provided regarding institutional, state and federal protections regarding the use and storage of health-related data. (Same as KAH 5093. Credit cannot be earned for both KAH 5363 and KAH 5093.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5373. Inferential Statistics. (3-0) 3 Credit Hours.**

This course will introduce students to the methods commonly used in inferential statistics. The course will provide skills related to sampling procedures, hypothesis testing, and interpreting and disseminating results. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5383. Health Program Evaluation. (3-0) 3 Credit Hours.**

Study of health program evaluation methodology and application in community, school, business, or industry settings. This course is designed to provide graduate health students with an overview of the evaluation process including formative and summative evaluation methods and procedures. We will examine evaluation for intrapersonal, interpersonal and macro-level programs and we will discuss critical issues associated with rigorous evaluation. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5403. Applied Cardiovascular Physiology. (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. (Formerly titled "Cardiovascular Fitness.") Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GHC1 \$25; LRHC \$10; STHC \$6.

**KAH 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GHC1 \$75; LRHC \$10; STHC \$18.

**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). Course Fees: GH01 \$25; STSH \$6.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fees: GH01 \$25; LRHC \$10, STSH \$6.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fees: GH01 \$75; LRHC \$10, STSH \$18.

**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. Course Fees: GH01 \$75; STSH \$18.

**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. Course Fees: GH01 \$25; STSH \$6.

**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. Course Fees: GH01 \$75; STSH \$18.

**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. Credit cannot be earned for both NDT 5313 and KAH 5343. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$25; STSH \$6.

**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. Course Fees: GH01 \$50; STSH \$12.

**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. Course Fees: GH01 \$75; STSH \$18.

**NDT 5901. Seminar in Dietetics. (1-0) 1 Credit Hour.**

Prerequisite: Must be in good academic standing. Corequisite: NDT 5957. 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. Course Fees: DNTM \$112; GH01 \$25; LRH1 \$10; STSH \$6.

**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. Course Fees: GH01 \$25; LRH1 \$10; STSH \$6.

**NDT 5913. Research Seminar. (3-0) 3 Credit Hours.**

Discussion of current research topics, use of databases, and evaluation of research articles. May be repeated for credit. Course Fees: DL01 \$75; GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: DNPF \$20; GH01 \$25; LRH1 \$10; STSH \$6.

**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. Course Fees: DNPF \$40; GH01 \$50; LRH1 \$10; STSH \$12.

**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. Course Fees: DNPF \$60; GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: DNPF \$100; GH01 \$125; LRH1 \$10; STSH \$30.

**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. Course Fees: DNPF \$140; GH01 \$175; LRH1 \$10; STSH \$42.

**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. Course Fees: DNPF \$20; GH01 \$25; LRH1 \$10; STSH \$6.

**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. Course Fees: DNPF \$60; GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: DNPF \$140; GH01 \$175; LRH1 \$10; STSH \$42.

# Department of Criminology and Criminal Justice

## Mission Statement

Our mission is to provide criminology and criminal justice 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 policy and practice.

The Department of Criminology and Criminal Justice offers a Master of Science degree in Criminology and Criminal Justice.

## Master of Science Degree in Criminology and Criminal Justice

The Master of Science (M.S.) degree in Criminology and Criminal Justice is designed to provide students with competency in research, policy planning, evaluation, agency management, and preparation for continued graduate study in criminology and criminal justice. 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:

- An online application
- All official transcripts
- Two letters of recommendation
- A resume
- A personal statement

An applicant admitted unconditionally as a degree-seeking student must possess a baccalaureate degree from an accredited university or equivalent training at a foreign institution; have a grade point average of 3.0 or better in the last 60 semester credit hours of undergraduate work as well as all previous graduate work; have 18 hours in criminal justice, criminology, or a closely-related discipline, or professional experience in the justice system; be in good standing at the last institution attended; and the recommendation of the Criminology and Criminal Justice 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 graduate 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:

Code	Title	Credit Hours
A. 15 semester credit hours of core courses: <sup>1</sup>		15
CRJ 5073	Research Methods	
CRJ 5083	Quantitative Analysis	
CRJ 5103	The Criminal Justice System	

CRJ 5123	Criminal Justice Policy	
CRJ 6373	Criminological Theory	
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 5133	Justice Organizations and Administration	
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 and Crime	
CRJ 6233	Minorities and Crime	
CRJ 6303	Seminar on Topics in Policing/CP	
CRJ 6343	Study Abroad: International Crime and Justice	
CRJ 6383	Capstone Course	
CRJ 6403	Seminar on Topics in Law and Society	
CRJ 6951	Independent Study	
CRJ 6953	Independent Study	
CRJ 6961	Comprehensive Examination	

2. Up to 6 semester credit hours of 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. **Non-Thesis Option (Written Comprehensive Examination):** Students who select the non-thesis 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 have one calendar year (two semesters) from their initial attempt to successfully pass the comprehensive exam. Students will be dismissed from the program after two unsuccessful attempts to 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.

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**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 5103 The Criminal Justice System, and CRJ 6373 Criminological Theory in their first semester and CRJ 5083 Quantitative Analysis and CRJ 5123 Criminal Justice Policy 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. Course Fee: STHC \$18.

### 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. Course Fee: STSP \$9.

### CRJ 5103. The Criminal Justice System. (3-0) 3 Credit Hours.

Introduction to contemporary issues in criminal justice, including current and historical concepts of criminal justice, the different components of the system, the interrelationships among the components of the system, and the function of the criminal justice system in society. Course Fee: STHC \$18.

### CRJ 5123. Criminal Justice Policy. (3-0) 3 Credit Hours.

Examines criminal justice policy formation, implementation, and evaluation. Familiarizes students with various criminal justice policies and their effectiveness. (Formerly titled "Justice Policy Formation and Implementation.") Course Fee: STSP \$9.

### CRJ 5133. Justice Organizations and Administration. (3-0) 3 Credit Hours.

Examines organization and administration of justice and legal organizations. Covers organization theory and behavior as applied to justice and legal organizations. (Formerly titled "Management of Justice Organizations.") Course Fee: STSP \$9.

### 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. Course Fee: STSP \$9.



**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**CRJ 6213. Gender and Crime. (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. (Formerly titled "Gender Issues in the Criminal Justice System.") Course Fee: STSP \$9.

**CRJ 6233. Minorities and Crime. (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. (Formerly titled "Minorities in the Criminal Justice System.") Course Fee: STSP \$9.

**CRJ 6303. Seminar on Topics in Policing/CP. (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. (Formerly titled "Seminar in Topics in Policing and Crime Control.") Course Fee: STSP \$9.

**CRJ 6343. Study Abroad: International Crime and 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. Course Fee: STSP \$9.

**CRJ 6373. Criminological Theory. (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. (Formerly titled "Justice Policy Formation and Implementation.") Course Fee: STSP \$9.

**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 from the core courses. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Course Fee: STSP \$9.

**CRJ 6403. Seminar on Topics in Law and Society. (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. (Formerly titled "Seminar on Topics in Law, Society and Justice Policy.") Course Fee: STSP \$9.

**CRJ 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: STSP \$3.

**CRJ 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: STSP \$9.

**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). Course Fee: STSP \$3.

**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. Course Fee: STSP \$3.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$18.

## Department of Demography

The Department of Demography offers a Master of Science degree and 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. The program faculty has two broad areas of focus: Health and Inequality, and Migration.

- M.S. in Applied Demography (p. 217)
- Ph.D. in Applied Demography (p. 218)

### Master of Science in Applied Demography

The Master of Science in Applied Demography will give students a graduate level introduction to the study of population and how the tools of a demographer are used to guide policy decisions. At the end of the degree program, students will be able to: work with large and complex data sources; analyze these data using appropriate statistical tests; graphically present data using statistical techniques and GIS; and write reports and papers based on empirically based questions using real data.

#### Admission Requirements

Applicants for admission to the MS in Applied Demography must satisfy all University-wide graduate admission requirements and all applicants must possess a bachelor's degree.

Admission to the MS in Applied Demography program will be based on faculty review of the following required application materials:

1. A completed Graduate School Application Form
2. All official academic transcripts detailing completed undergraduate and graduate (if applicable) coursework
3. A letter of application describing the applicant's academic and work backgrounds and goals and objectives related to the applicant's MS program
4. A writing sample
5. Three letters of recommendation
6. For international students, results of the Test of English as a Foreign Language (TOEFL; minimum score of 60 on the paper version, 79 on the internet version), or results of the International English Language Testing System (IELTS; a minimum score of 6.5).

#### Degree Requirements

The degree plan includes 21 hours of foundation (required) courses, 6 hours of free electives, and a 3 hour capstone course that will require a final exit paper.

Code	Title	Credit Hours
A. 21 semester credit hours of core courses:		21
DEM 5013	Demographic Methods of Analysis	
DEM 5093	GIS for Population Science	
DEM 5113	Social Demography and Community Trends	
DEM 5213	Introduction to Population Data	
DEM 5273	Statistics for Demographic Data I	
DEM 5283	Statistics for Demographic Data II	
One of the following:		
DEM 5033	Mortality	
DEM 5043	Migration	

DEM 5083	Fertility	
B. 6 semester credit hours of electives approved by the Graduate Advisor of Record.		6
MS students will have the option to take any of the 7XX3 courses in the Applied Demography PhD program if they are approved as electives by the Graduate Advisor of Record.		
C. 3 semester credit hours of the Capstone Course.		3
DEM 6383	Capstone	
The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance).		
D. Comprehensive Exam		
The comprehensive exam will be a research paper evaluated by a committee of the departmental faculty.		
<b>Total Credit Hours</b>		<b>30</b>

## 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

### Admission Requirements

Applicants for admission to the Ph.D. program in Applied Demography must satisfy all University-wide graduate admission requirements.

Entrance to the Ph.D. program can be gained through one of two tracks:

1. Applicant possesses a bachelor's degree (Track I)
2. Applicant possesses a Master of Science degree from an accredited university in demography/sociology, geography, economics, biology, political science, statistics, mathematics, business, or a similar field (Track II). 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.

Applicants must submit the following items:

1. A completed Graduate School Application Form
2. All official academic transcripts detailing completed undergraduate and graduate coursework
3. A letter of application describing the applicant's academic and work backgrounds and goals and objectives related to the applicant's Ph.D. program
4. A writing sample
5. Three letters of recommendation
6. Graduate Record Examination (GRE) scores with their application 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. These scores will be considered as only one element in the evaluation of applicants.

Applicants admitted to the Ph.D. program may receive unconditional, conditional, or probationary admission status. Only completed applications will be reviewed. 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

The Applied Demography Ph.D. requires students following Track I to complete a minimum of 54 hours of organized coursework, 12 hours of doctoral research credits, and a minimum of 12 hours of dissertation credits for a total of at least 78 hours. Students following Track II 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.

The doctoral program has a base of core courses that will result in all students having a firm grounding in demography and related methodological training with students then choosing their 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.

#### Degree Requirements – Track I

##### 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.

#### Earning a Master's Degree

Students who complete Sections A-C of the Program of Study (30 credit hours), including the Capstone Course<sup>1</sup>, will be awarded the M.S. degree, and will be given permission to work toward completion of doctoral requirements. Students who fail their final paper in the Capstone Course may be given one of two options by their Advisory Committee. Those options are: permission to rewrite the final paper based on recommendations of the Instructor OR permission to pursue a terminal

M.S. degree according to the requirements of that degree program. All students who successfully complete all required components will earn an M.S. in Applied Demography.

<sup>1</sup> In consultation with the instructor, students will be required to write a final paper in DEM 6383 Capstone Course on a topic of their choice. This will serve as the comprehensive examination requirement for earning an M.S. degree.

### Program of Study for Ph.D. in Applied Demography – Track I

Code	Title	Credit Hours
<b>A. Core Methods, Statistics, and Demography Courses</b>		<b>21</b>
DEM 5013	Demographic Methods of Analysis	
DEM 5093	GIS for Population Science	
DEM 5113	Social Demography and Community Trends	
DEM 5213	Introduction to Population Data	
DEM 5273	Statistics for Demographic Data I	
DEM 5283	Statistics for Demographic Data II	
One of the following		
DEM 5033	Mortality	
DEM 5043	Migration	
DEM 5083	Fertility	
<b>B. Free Elective Courses (Graduate Advisor of Record approval required)</b>		<b>6</b>
<b>C. Capstone Course</b>		<b>3</b>
DEM 6383	Capstone	
<b>D. Advanced courses</b>		<b>24</b>
1. 3 semester credit hours of required courses		
DEM 7243	General Research Methods for Demographers	
2. 3 semester credit hours to be selected from the following courses:		
DEM 7223	Event History Analysis	
DEM 7263	Spatial Demography	
DEM 7473	Applied Hierarchical Modeling	
DEM 7023	Advanced Methods of Demographic Analysis	
3. 6 semester credit hours to be selected from the following courses:		
DEM 7033	Mortality	
DEM 7043	Migration	
DEM 7083	Fertility	
DEM 7053	International Migration	
4. 12 semester credit hours to be selected from either the Applied Demography or Sociology Concentration		
All courses are to be selected with approval of the Graduate Advisor of Record		
<b>E. Doctoral Research</b>		<b>12</b>
<b>F. Doctoral Dissertation</b>		<b>12</b>
<b>Total Credit Hours</b>		<b>78</b>

### Degree Requirements – Track II

#### Program of Study for Students Admitted With a Master's Degree (from another institution)

All students who are accepted into the Doctoral program with 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 may receive approval to transfer

some coursework to UTSA, pending review by the Graduate Program Committee.

### Program of Study for Ph.D. in Applied Demography – Track II

Code	Title	Credit Hours
<b>A. Core Research and Statistics Courses:</b>		<b>12</b>
1. Nine semester credit courses of required courses:		
DEM 7243	General Research Methods for Demographers	
DEM 7273	Statistics for Demographic Data I	
DEM 7283	Statistics for Demographic Data II	
2. One additional course to be selected from the following (3 semester credit hours):		
DEM 7023	Advanced Methods of Demographic Analysis	
DEM 7223	Event History Analysis	
DEM 7263	Spatial Demography	
DEM 7473	Applied Hierarchical Modeling	
<b>B. Core Demography Courses:</b>		<b>18</b>
1. Nine semester credit hours selected from the following courses:		
DEM 7013	Demographic Methods of Analysis	
DEM 7093	GIS for Population Science	
DEM 7113	Social Demography and Community Trends	
2. Nine semester credit hours of required courses:		
DEM 7033	Mortality	
DEM 7083	Fertility	
DEM 7043	Migration	
	or DEM 7053 International Migration	
<b>C. Advanced Courses (a minimum of 12 semester credit hours selected from approved electives is required):</b>		<b>12</b>
DEM 7063	Applied Demography in Policy Settings	
DEM 7073	Disparities in Health and Health Care	
DEM 7123	Applied Demography in Education	
DEM 7153	Applied Demography in Public Health	
DEM 7173	Applied Demography in Urban and Regional Planning	
DEM 7183	Social and Economic Impact Assessment	
DEM 7253	Survey Methods for Demographers	
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 7413	Demography of Inequality and Poverty	
DEM 7453	Sexual and Reproductive Health	
DEM 7463	Family Demography	
DEM 7783	Internship in Applied Demography	
DEM 7803	Directed Research (Maximum 6 hours)	
DEM 7801	Directed Research (Maximum 6 hours)	
DEM 7811	Doctoral Research (Maximum 6 hours)	
DEM 7813	Doctoral Research (Maximum 6 hours)	
DEM 7816	Doctoral Research (Maximum 6 hours)	
DEM 7903	Special Topics (Maximum 9 hours)	
<b>D. Doctoral Dissertation (minimum 12 semester credit hours):</b>		<b>12</b>
DEM 7911	Doctoral Dissertation	
DEM 7913	Doctoral Dissertation	

DEM 7916	Doctoral Dissertation	
<b>Total Credit Hours</b>		<b>54</b>

**Concentration in Applied Demography**

Code	Title	Credit Hours
12 semester credit hours selected from the following courses:		
DEM 7063	Applied Demography in Policy Settings	
DEM 7073	Disparities in Health and Health Care	
DEM 7123	Applied Demography in Education	
DEM 7153	Applied Demography in Public Health	
DEM 7173	Applied Demography in Urban and Regional Planning	
DEM 7183	Social and Economic Impact Assessment	
DEM 7253	Survey Methods for Demographers	
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 7413	Demography of Inequality and Poverty	
DEM 7453	Sexual and Reproductive Health	
DEM 7463	Family Demography	
DEM 7783	Internship in Applied Demography	
DEM 7803	Directed Research (Maximum 6 hours)	
DEM 7801	Directed Research (Maximum 6 hours)	
DEM 7811	Doctoral Research (Maximum 6 hours)	
DEM 7813	Doctoral Research (Maximum 6 hours)	
DEM 7816	Doctoral Research (Maximum 6 hours)	
DEM 7903	Special Topics (Maximum 9 hours)	

**Concentration in Sociology**

Code	Title	Credit Hours
12 semester credit hours selected from Health, Immigration of Family:		
<b>1. Health</b>		
a. One course (3 semester credit hours):		
DEM 7073	Disparities in Health and Health Care	
b. Three courses to be selected from the following (9 semester credit hours):		
DEM 7153	Applied Demography in Public Health	
SOC 5133	Sociology of Health and Health Care	
SOC 6713	Health Care System in the United States	
SOC 6723	Religion, Health and Mortality	
SOC 6733	The Social Psychology of Health and Illness	
<b>2. Immigration</b>		
a. One course (3 semester credit hours):		
DEM 7433	Demography of Race and Ethnicity	
b. Three courses (9 semester credit hours):		
SOC 5223	Mexican Americans: Community, Culture, and Class	
SOC 5253	Border Studies	
SOC 6043	Immigration and Society	
<b>3. Family</b>		

a. One course (3 semester credit hours):

DEM 7443	Demography of Adolescence and the Transition to Adulthood
b. Three courses to be selected from the following (9 semester credit hours):	
SOC 5123	Family Contexts and Social Change
SOC 5323	Sociology of Childhood
SOC 6743	Religion, Spirituality and Families
SOC 6753	Racial/Ethnic Minority Families in the United States
SOC 6763	Youth and Emerging Adulthood
DEM 7063	Applied Demography in Policy Settings
DEM 7123	Applied Demography in Education
DEM 7173	Applied Demography in Urban and Regional Planning
DEM 7183	Social and Economic Impact Assessment
DEM 7253	Survey Methods for Demographers
DEM 7413	Demography of Inequality and Poverty
DEM 7783	Internship in Applied Demography

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 for Health, Community and Policy for final approval.

**Primary Advisor**

Initially all students will be advised by the Graduate Advisor of Record (GAR). During the first year in the program, students are encouraged to learn about and meet all faculty members in the Department. Once students entering with a B.A./B.S. (without a Master's Degree) have completed between 30 and 48 credit hours, students should identify a Primary Advisor (not to be completed later than the completion of 60 hours).

**Qualifying Exam**

Each Ph.D. candidate in the Department of Demography must pass a two-day examination in demography. This qualifying exam is normally taken after the candidate's course work has been substantially completed. In order to take the exam, students matriculating on Track I (entering with a B.S./B.A., without a Master's Degree) must have completed 54 credit hours of coursework. Student in Track II or III must complete 30 credit hours of coursework prior to be eligible for the comprehensive exams. In addition to the credit hour requirements, students must have selected a dissertation topic. The exam will be administered during the summer semester after the requisite credit hours of coursework are complete, and the time of the exam will be set by the GAR in consultation with the Graduate Program Committee (GPC).

**Dissertation Stage**

**Committee**

Students are encouraged to work with their Primary Advisor in advance of the qualifying exam to also define a Dissertation Committee. The Dissertation Committee must be comprised of at least four (4) members of the graduate faculty. One of these committee members may be from outside the Department of Demography. The composition of the Committee should, in principle, provide a group of research scholars and scientists who constitute an important resource to the candidate and his/her dissertation research.

## Proposal Defense

Upon successful completion of the qualifying examination students will need to defend their dissertation proposal. Once the dissertation proposal has been approved by the student's Dissertation Committee, they may proceed with the dissertation project. If at any time the project changes significantly from what was originally approved, the student will have to orally defend the dissertation proposal again for approval.

## Admission to Candidacy

To be admitted to candidacy for the doctoral degree in Applied Demography, the student must receive approval from the GPC. Approval by GPC is contingent upon the following:

1. Satisfactory completion of all required courses and an approved Program of Study form on file with the Graduate Advisor of Record;
2. Cumulative grade point average of at least 3.0 in all coursework undertaken since matriculation in the program;
3. Report by the Qualifying Examination Committee that the student has passed the examination and;
4. Report by the student's Primary Advisor (Dissertation Chair) and other graduate faculty members, as appropriate, that the student has clearly evidenced the potential for productive and independent investigation with a successful dissertation defense.

## Supervision of the Dissertation Research

After formal approval of the Doctoral Dissertation Committee, the Dissertation Chair may convene the Doctoral Dissertation Committee at appropriate intervals to discuss with the candidate his/her research progress and projected future work. The Doctoral Dissertation Committee may approve or direct alterations in the research plans within the general context of the dissertation proposal.

## Submission of the Dissertation

After all members of the Doctoral Dissertation Committee agree that the research has progressed sufficiently for submission of the dissertation, a draft of the dissertation shall be submitted to the Dissertation Chair and to all other members of the Doctoral Dissertation Committee. It is the responsibility of the candidate to follow the guidelines for preparation of the dissertation provided by the Graduate School Dean's Office. The candidate also has the responsibility to ensure adequate time for review and modification of the dissertation in accordance with the schedule of deadlines provided each term by the Graduate School Dean's Office.

## Final Oral Examination

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. 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.

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.

## Recommendation for granting of the degree

The candidate shall submit to the Graduate School Office the final electronic copy of the dissertation. Once received, the College for Health, Community and Policy and the Graduate School will consider the recommendation for granting of the degree. If the Council does not approve recommendation, the matter will be referred to Committee on Graduate Studies with recommendations for remedial action. If the Council does approve, the Dean of the Graduate School (UTSA) will notify the President that the candidate has fulfilled all requirements for the degree of Doctor of Philosophy.

## Demography (DEM) Courses

### DEM 5013. Demographic Methods of Analysis. (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 and population projection methods. (Same as DEM 7013. Credit cannot be earned for both DEM 5013 and DEM 7013.) Course Fee: STSP \$9.

### DEM 5033. Mortality. (3-0) 3 Credit Hours.

Prerequisite: DEM 5113 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. (Same as DEM 7033. Credit cannot be earned for both DEM 5033 and DEM 7033.) Course Fee: STSP \$9.

### DEM 5043. Migration. (3-0) 3 Credit Hours.

Prerequisite: DEM 5113 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. (Same as DEM 7043. Credit cannot be earned for both DEM 5043 and DEM 7043.) Course Fee: STSP \$9.

### DEM 5083. Fertility. (3-0) 3 Credit Hours.

Prerequisite: DEM 5113 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. (Same as DEM 7083. Credit cannot be earned for both DEM 5083 and DEM 7083.) Course Fee: STSP \$9.

**DEM 5093. 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. (Same as DEM 7093. Credit cannot be earned for both DEM 5093 and DEM 7093.) Course Fee: STSP \$9.

**DEM 5113. 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. (Same as DEM 7113. Credit cannot be earned for both DEM 5113 and DEM 7113.) Course Fee: STSP \$9.

**DEM 5213. Introduction to Population Data. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. The purpose of this course is to introduce students to demographic data and how to use them effectively. Students will use statistical software to learn how to read-in raw data, make data modifications relative to research goals, assess data quality, and conduct basic descriptive statistics. The course will also teach students how to make use of data codebooks and request the use of restricted data. Course Fee: STSP \$9.

**DEM 5273. 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 either SAS, STATA or R statistical programming languages. (Same as DEM 7273. Credit cannot be earned for both DEM 5273 and DEM 7273.) Course Fee: STSP \$9.

**DEM 5283. Statistics for Demographic Data II. (3-0) 3 Credit Hours.**

Prerequisite: DEM 5273 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. (Same as DEM 7283. Credit cannot be earned for both DEM 5283 and DEM 7283.) Course Fee: STSP \$9.

**DEM 6383. Capstone. (3-0) 3 Credit Hours.**

Prerequisite: Completion of 21 semester credit hours of Required Courses. This course is designed to prepare students to write a final exit paper that serves as the comprehensive exam for completion of the MS program. It covers topics including but not limited to: Demographic Data, Research Methods, Quantitative Analysis, Demographic Processes, Health, and/or Inequality. The grade report for the course is either "CR" (satisfactory performance on the final exit paper) or "NC" (unsatisfactory performance on the final exit paper). Course Fee: STSP \$9.

**DEM 7013. Demographic Methods of Analysis. (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 and population projection methods. (Formerly titled "Demographic Methods of Analysis I.") (Same as DEM 5013. Credit cannot be earned for both DEM 5013 and DEM 7013.) Course Fee: STSP \$9.

**DEM 7023. Advanced Methods of Demographic Analysis. (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 "Demographic Methods of Analysis II.") Course Fee: STSP \$9.

**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. (Same as DEM 5033. Credit cannot be earned for both DEM 5033 and DEM 7033.) Course Fee: STSP \$9.

**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. (Same as DEM 5043. Credit cannot be earned for both DEM 5043 and DEM 7043.) Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. (Same as DEM 5083. Credit cannot be earned for both DEM 5083 and DEM 7083.) Course Fee: STSP \$9.

**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. (Same as DEM 5093. Credit cannot be earned for both DEM 5093 and DEM 7093.) Course Fee: STSP \$9.

**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. (Same as DEM 5113. Credit cannot be earned for both DEM 5113 and DEM 7113.) Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**DEM 7223. Event History Analysis. (3-0) 3 Credit Hours.**

Prerequisites: DEM 7013, DEM 7023, and DEM 7273 or consent of instructor. This course covers 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, R or STATA software. (Formerly titled "Advanced Methods for Life Table Analysis.") Course Fee: STSP \$9.



**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. Course Fee: STSP \$9.

**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.") Course Fee: STSP \$9.

**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 geo-databases for population studies. The course will have a large analytical component with topics to include global and local spatial autocorrelation, analysis of spatial point patterns, neighborhood statistics and spatial regression analysis. Emphasis is placed on usage of computer software for the analysis of population data. Course Fee: STSP \$9.

**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 either SAS, STATA or R statistical programming languages. (Formerly titled "Univariate and Categorical Statistical Analysis for Demographic Data.") (Same as DEM 5273. Credit cannot be earned for both DEM 5273 and DEM 7273.) Course Fee: STSP \$9.

**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.") (Same as DEM 5283. Credit cannot be earned for both DEM 5283 and DEM 7283.) Course Fee: STSP \$9.

**DEM 7413. Demography of Inequality and 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. (Formerly titled "Demographic Perspectives on Poverty.") Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**DEM 7453. Sexual and Reproductive Health. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. The purpose of this course is to introduce students to a number of sexual and reproductive health issues nationally and internationally. The course content will emphasize demographic, social, economic, behavioral, and political factors that affect family planning, reproductive health, fertility, parenthood, and pregnancy/birth outcomes. Emergent sources of data for sexual and reproductive health issues will be discussed. Course Fee: STSP \$9.

**DEM 7463. Family Demography. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. This seminar will examine changes in family behaviors and household relationships from a socio-demographic perspective. Specific topics include union formation and dissolution, childbearing, parenthood, intergenerational relationships, and the intersection of gender, work, and family. Although this course will focus primarily on post-World War II United States, some attention will also be given to recent family changes in other industrialized nations and in the developing world. Demographic data sources pertaining to families and households will be discussed. Course Fee: STSP \$9.

**DEM 7473. Applied Hierarchical Modeling. (3-0) 3 Credit Hours.**

Prerequisite: DEM 7283 or consent of instructor. This course will immerse students in the area of hierarchical modeling. Hierarchical models are fast becoming ubiquitous in the social and behavioral sciences as the availability of longitudinal, geocoded-restricted and panel data sources become the norm. This class will apply techniques of Bayesian computation to hierarchical modeling with less emphasis on the theory of Bayesian analysis, and more on the practical side of its use. Topics will include linear and generalized linear mixed effects models, with special attention to structured random effect models, models for longitudinal data and the application of Bayesian computational techniques. Data examples will include the use of social and health survey data sources, and all students are expected to complete a project using the methods presented in class to their own research interests. Course Fee: STSP \$9.

**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. Course Fee: STSP \$3.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$3.

**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. Course Fee: STSP \$9.

**DEM 7811. 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 6 hours will apply to the Doctoral degree. Course Fee: STSP \$3.

**DEM 7813. 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 6 hours will apply to the Doctoral degree. Course Fee: STSP \$9.

**DEM 7816. 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 6 hours will apply to the Doctoral degree. Course Fee: STSP \$18.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$3.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$18.

## Department of Kinesiology

The Master of Science degree in Health and Kinesiology is jointly administered by the Departments of Kinesiology and Public Health. Degree description and requirements are located under the College for Health, Community and Policy (p. 209).

## Department of Psychology

The Department of Psychology offers the Master of Science Degree in Psychology and the Doctor of Philosophy Degree in Psychology.

- M.S. in Psychology (p. 226)
- Ph.D. in Psychology (p. 227)

### 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 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 website (<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:

Code	Title	Credit Hours
<b>A. 15 semester credit hours of core courses:</b>		<b>15</b>
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>B. 9 semester credit hours chosen from the following:</b>		<b>9</b>
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	
<b>C. 6 semester credit hours of electives chosen from the following:</b>		<b>6</b>
PSY 6513	Research Internship	
PSY 6951	Independent Study	
PSY 6953	Independent Study	
PSY 6973	Special Topics in Psychology	
<b>D. Select one of the following options:</b>		<b>6</b>

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 psychological research. Graduates will have a reputation for excellence in both theoretical and applied aspects of research, particularly research drawing on core areas of Psychology with either direct or downstream implications for 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 applied settings, particularly military health settings, 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 the published deadline (<https://graduateschool.utsa.edu/admissions/doctoral-application-deadlines/>). Degree-seeking students 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. Examples of acceptable alternatives include a published research article, a manuscript prepared for publication or, for those applying while their master's thesis is in progress, an approved thesis proposal or research paper submitted for credit in an independent or honors study project. Other forms of documentation will be acceptable if judged by the committee to be substantially similar to the alternatives provided.
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. Applicants scoring below 600 on the paper version or 100 on the Internet version will need to take part in UTSA's English Language Assessment Program before registration, the results of which may result in the applicant being required to enroll in English for International Students courses prior to the end of their first year at UTSA.

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:

Code	Title	Credit Hours
<b>A. 9 semester credit hours of core courses:</b>		<b>9</b>
PSY 7003	Multivariate Statistical Analysis	
PSY 7013	Advanced Research Design	
PSY 7023	Military Health Psychology	
<b>B. 12 semester credit hours chosen from the following Advanced Topics seminars:</b>		<b>12</b>
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	
<b>C. 6 semester credit hours of prescribed electives chosen from the following:</b>		<b>6</b>
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	
<b>D. 9 semester credit hours from a combination of the following research activities:</b>		<b>9</b>
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	
<b>E. 12 semester credit hours of Doctoral Dissertation from the following:</b>		<b>12</b>
PSY 7921	Doctoral Dissertation	
PSY 7922	Doctoral Dissertation	
PSY 7923	Doctoral Dissertation	
PSY 7924	Doctoral Dissertation	
PSY 7925	Doctoral Dissertation	
PSY 7926	Doctoral Dissertation	
<b>Total Credit Hours</b>		<b>48</b>

## 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 the Graduate Catalog, 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 the Graduate Catalog, 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.") Course Fee: GL01 \$90.

### 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.") Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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.") Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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.") Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.") Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**PSY 6223. Couple and Family Psychology Research. (3-0) 3 Credit Hours.**

Prerequisite: PSY 5213 or PSY 7013, and PSY 5413 or equivalent. Couple and family psychology is a specialty area within the field of psychology. This course will focus on systems and evidence based models of couple and family functioning and psychological research methods to study couples and families. Family structure, process and relationship patterns of couples and families will be a focus of this course. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**PSY 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**PSY 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$180.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**PSY 7911. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisites: Permission from the 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. Course Fee: GL01 \$30.

**PSY 7912. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisites: Permission from the 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. Course Fee: GL01 \$60.

**PSY 7913. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisites: Permission of the 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. Course Fee: GL01 \$90.

**PSY 7914. Doctoral Research. (0-0) 4 Credit Hours.**

Prerequisites: Permission from the 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. Course Fee: GL01 \$120.

**PSY 7915. Doctoral Research. (0-0) 5 Credit Hours.**

Prerequisites: Permission from the 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. Course Fee: GL01 \$150.

**PSY 7916. Doctoral Research. (0-0) 6 Credit Hours.**

Prerequisites: Permission from the 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. Course Fee: GL01 \$180.

**PSY 7921. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: Permission from the Graduate Advisor of Record and dissertation director; must be a Doctoral 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. Course Fee: GL01 \$30.



**PSY 7922. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and dissertation director; must be a Doctoral 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. Course Fee: GL01 \$60.

**PSY 7923. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and dissertation director; must be a Doctoral 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. Course Fee: GL01 \$90.

**PSY 7924. Doctoral Dissertation. (0-0) 4 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and dissertation director; must be a Doctoral 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. Course Fee: GL01 \$120.

**PSY 7925. Doctoral Dissertation. (0-0) 5 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and dissertation director; must be a Doctoral 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. Course Fee: GL01 \$150.

**PSY 7926. Doctoral Dissertation. (0-0) 6 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and dissertation director; must be a Doctoral 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. Course Fee: GL01 \$180.

## 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 UTSA MPA program contributes to regional governance by educating skilled and responsible leaders and managers for the public and non-profit sectors. The program faculty, comprised of academics and practitioners, guide students to broaden their world views and develop their analytical and decision-making capacity through teaching informed by community-relevant research and public sector experience. The MPA course of study enables a diverse body of pre-service and mid-career students who are passionate about public service to improve their organizations and communities. The program empowers students to fulfill their potential as public servants who formulate and solve complex problems collaboratively. Possessing breadth of management and analytical knowledge, MPA graduates are cognizant of the diversity of values, interests, and stakeholders in a free society, address public issues with effectiveness, professional skill and transparency, and advocate public policies for the advancement of justice, fairness, and democracy.

#### Program Admission Requirements

Applicants for unconditional admission must satisfy University-wide graduate admission requirements as well as the MPA program requirements.

All applications must include:

- A completed UTSA Graduate School application;
- Official transcripts from all colleges and universities attended;
- Letter of Intent;  
A carefully written letter of intent is a significant part of the application. The 500-word letter of intent must state the applicant's reasons for pursuing a MPA, how their educational and/or career experience has prepared them for a MPA program, and how they anticipate that the degree will help them achieve their stated goals.
- Letter of Recommendation;  
One letter of recommendation is required, although up to two letters of recommendation may be provided. The letter(s) should be from a professor or work supervisor who can address the applicant's academic or work abilities relevant to success in a graduate program.
- Résumé;
- At least one successfully completed undergraduate course in U.S. government or politics, or an equivalent as determined by the 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 graduate student may be considered by the Graduate Program Committee.

## 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 3 semester credit hours of PAD 6963 Internship; 43 credit hours are required for students without prior work experience.

Degree candidates must complete the following requirements:

Code	Title	Credit Hours
A. 25 semester credit hours of core courses:		25
PAD 5003	Introduction to Public Service Leadership and Management	
PAD 5011	Professional Skills Seminar	
PAD 5033	Managing Public Organizations	
PAD 5323	Public Policy Process	
PAD 5363	Public Budgeting and Finance	
PAD 5393	Economics for Public Affairs	
PAD 6823	Research 1: Design	
PAD 6833	Research 2: Applied Quantitative Methods	
PAD 6923	Capstone Seminar: Research Paper in Public Administration	
Students enroll in PAD 5003 and PAD 5011 during their initial semester.		
B. 15 semester credit hours of Public Administration electives. (NOTE: Up to 6 semester credit hours of graduate-level courses may be taken outside of public administration in related UTSA graduate programs with approval of the Graduate Advisor of Record (GAR).)		15
C. Comprehensive examination. The oral comprehensive examination is administered in the form of a research presentation to a faculty committee, and includes a review of essential competencies.		
<b>Total Credit Hours</b>		<b>40</b>

## 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:

Code	Title	Credit Hours
A. 9 semester credit hours of required courses:		9
PAD 5033	Managing Public Organizations	
PAD 5913	Foundations of Nonprofits	
PAD 5923	Nonprofit Leadership and Management	
B. 6 semester credit hours selected from the following courses:		6
PAD 5333	Program Evaluation	
PAD 5343	Managing Human Resources in Public Organizations	
PAD 5933	Development and Management of Nonprofit Resources	
PAD 5943	Strategic Management	
PAD 5953	Grant Development and Proposal Writing	
PAD 6973	Special Topics (with permission from Advisor)	
<b>Total Credit Hours</b>		<b>15</b>

Course substitutions for non-PAD graduate students in UTSA graduate-level degree-awarding programs may be allowed for Section B in the Graduate Certificate in Nonprofit Administration and Leadership, with the approval of the program advisor for the graduate student's degree-seeking program and the approval of the Graduate Certificate in Nonprofit Administration and Leadership Program Advisor.

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 Certificate Program Regulations 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 expectations and ethics of service in civil society. Students have the opportunity to develop the skills and knowledge of effective public servants in a diverse world. In addition to a basic introduction to the field of public administration, other topics may include a general overview of leadership and public service values, including justice, fairness and transparency. Students should take this course in their first 6 hours of coursework. (Formerly titled "Introduction to Public Administration.") Course Fee: STSP \$9.

### **PAD 5011. Professional Skills Seminar. (1-0) 1 Credit Hour.**

This is the professional development course in the MPA program. The course is designed to enhance the professional skills of students as they enter or continue in the public, nonprofit, and private sectors. The primary focus is on communication and presentation skills that, per the MPA mission, demonstrate a broad perspective cognizant of the conflicting values and interests in a free society. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). (Formerly PAD 6001. Formerly titled "Leadership and Communication Skills Development Seminar.") Credit cannot be earned for both PAD 5011 and PAD 6001.) Course Fee: STSP \$9.

### **PAD 5033. Managing Public Organizations. (3-0) 3 Credit Hours.**

Building from foundation in organization theory, this course is an overview of the unique management challenges in organizations serving public purposes. Topics include public organization environment and stakeholders, organizational processes and structures, organizational design and change, accountability and transparency, performance measurement and management. (Formerly titled "Theories of Public Organizations.") Course Fee: STSP \$9.

### **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, the local tools of land use control, and the impact of land use law on a more diverse public, such as renters and low income residents. Course Fee: STSP \$9.

### **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. Course Fee: STSP \$9.

### **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. Course Fee: STSP \$9.

### **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. Course Fee: STSP \$9.

### **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. Course Fee: STSP \$9.

### **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.) Course Fee: STSP \$9.

### **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. Course Fee: STSP \$9.

### **PAD 5343. Managing Human Resources in Public Organizations. (3-0) 3 Credit Hours.**

The course explores key managerial and leadership challenges involved in leading employees towards achieving public organizations' missions while promoting public values, fairness, and social justice. Topics include history and legal framework of human resource management, strategic analysis of human resource challenges, recruitment and retention, rewards and motivation, performance appraisal, diversity and inclusion, teamwork and collaboration, work design, and ethical leadership. (Formerly titled "Human Resource Management in the Public Sector.") Course Fee: STSP \$9.

**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.") Course Fee: STSP \$9.

**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.") Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**PAD 5573. Public Policy and Policymaking in San Antonio. (3-0) 3 Credit Hours.**

The politics, economy, and built form of a city shaped by decisions and choices, both public and private, made over decades. Contemporary San Antonio shares a great many common dimensions with the "new cities" of the Sunbelt. At the same time, its economic and political development reflects many unique characteristics and its own history. The purpose of this course is to develop a framework for understanding the present day circumstances and needs of the San Antonio area, as they have been shaped over the nineteenth and twentieth centuries. Students have the opportunity to understand how various elements of the city's environment, society, and economy have developed, and how today's issues, problems, and policy making processes have been shaped. Course Fee: STSP \$9.

**PAD 5913. Foundations of Nonprofits. (3-0) 3 Credit Hours.**

This introductory overview course examines the history, theoretical and legal foundations, unique values, and major trends currently shaping the nonprofit sector. The intention is to help students develop a 'cognitive map' of the nonprofit sector that helps them to understand how to foster sustainable organizations given their political roles, various challenges and unique contribution to governance and service delivery in the United States. (Formerly titled "Nonprofit Organizations.") Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**PAD 5933. Development and Management of Nonprofit Resources. (3-0) 3 Credit Hours.**

This course addresses two integrated management functions central to strategic decision making for successful nonprofits: financial management and resource development. The objectives of the course are to provide students with the knowledge and skills necessary to manage and generate financial resources, including financial roles and responsibilities within an organization, financial reporting, budgeting, and management tools. Students will learn how to build a comprehensive development program, the fundraising cycle, organizational stewardship and accountability with regard to fundraising and philanthropy. (Formerly titled "Fiscal Resource Development in Nonprofit Organizations.") Course Fee: STSP \$9.

**PAD 5943. Strategic Management. (3-0) 3 Credit Hours.**

This course introduces students to the concepts and techniques of strategic management. Particular topics to cover are mission and vision, goal setting process, environmental scanning and analysis, issue identification, strategy formulation, implementation, and control techniques. Case studies may be utilized to demonstrate strategic management applications in public and nonprofit organizations. (Formerly titled "Research in Health and Kinesiology Nonprofit Organizations.") Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$9.

**PAD 6823. Research 1: Design. (3-0) 3 Credit Hours.**

An introduction to conducting social science research, with emphasis on research design as the means to address the common obstacles to making appropriate comparisons and drawing casual inferences. The course prepares students to develop their own research projects, and to understand and habitually articulate and incorporate the elements of effective research design in their work and in assessing the work of others. The course reviews common quantitative and qualitative methodologies for answering research questions, and also includes modules on skills such as professional writing, source and data acquisition, evaluation, and management. (Formerly PAD 5233 Applied Research I. Credit cannot be earned for both PAD 6823 and PAD 5233.) Course Fee: STSP \$9.

**PAD 6833. Research 2: Applied Quantitative Methods. (3-0) 3 Credit Hours.**

Prerequisite: PAD 6823. A review of basic statistics, the course develops an intuitive and practical understanding of statistical techniques, and prepares students to generate, manage, evaluate, analyze, and present data. The course reviews descriptive statistics, exploratory data analysis, probability theory, statistical inference, hypothesis testing, and regression analysis, and provides the skills to describe data sets, and to use them to make inferences about the entities they describe to aid analyzing management, public policy, program evaluation, or public opinion issues for which appropriate data exist. (Formerly PAD 5023 Research Design and Methods. Credit cannot be earned for both PAD 6833 and PAD 5023.) Course Fee: STSP \$9.

**PAD 6923. Capstone Seminar: Research Paper in Public Administration. (3-0) 3 Credit Hours.**

Prerequisites: PAD 6823, PAD 6833, and at least 24 completed MPA credit hours. This course enables students to integrate the knowledge, skills and values gained in the MPA program by applying theory to practice on a research topic of each student's choice. It serves as an important bridge between the classroom and the world of professional practice. This class is usually taken in the last semester in the program. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Course Fee: STSP \$9.

**PAD 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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 3 hours, regardless of discipline, will apply to the Master's degree. Course Fee: STSP \$3.

**PAD 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: STSP \$9.

**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). Course Fee: STSP \$3.

**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. Course Fee: STSP \$9.

**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. Course Fee: STSP \$18.

**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. Course Fee: STSP \$9.

## Department of Public Health

The Master of Science degree in Health and Kinesiology is jointly administered by the Departments of Kinesiology and Public Health. Degree description and requirements are located under the College for Health, Community and Policy. Additionally, the Department of Public Health offers three online graduate certificates: the Certificate in Applied Health Research, the Certificate in Community Nutrition, and the Certificate in Health.

- Graduate Certificate in Applied Health Research (p. 237)
- Graduate Certificate in Community Nutrition (p. 237)
- Graduate Certificate in Health (p. 238)

### Graduate Certificate in Applied Health Research

The Graduate Certificate in Applied Health Research is designed to meet the needs of students who want to develop skills related to community and applied public health research. These students include those with a general background in health education, health promotion, psychology, nutrition, or other related field. The certificate provides students with an understanding of the scope and skills associated with applied health research, especially community-based participatory research. The certificate is offered 100% online and provides the opportunity to gain critical skills in responsibilities and competencies related to both health educator certification and public health research.

The certificate coursework allows students to develop skills to identify potential data sources and determine appropriate study designs. In addition, the coursework will expose students to utilizing data collection methods that yield reliable and valid data, conducting descriptive and inferential analysis of data, interpreting epidemiological studies, and using epidemiological findings to inform community health research projects.

The following departmental requirements are applicable to the Graduate Certificate in Applied Health Research:

- Bachelor's degree in Health Education, Health Promotion, Public Health, Psychology, Nutrition, or Dietetics. Closely related degrees will be considered based on completed coursework
- Minimum grade point average (GPA) of 3.0, though students with a 3.0 GPA in their last two years will be considered
- To maintain enrollment in the certificate program, students should maintain a 3.0 GPA throughout tenure in the program
- Two professional letters of recommendation with specified criteria to address
- Statement of Purpose in pursuing the certificate

### Certificate Program Requirements

To meet the curricular requirements for the Graduate Certificate in Applied Health Research, students must complete the following 12-semester-credit-hours with a grade point average of 3.0 or above:

Code	Title	Credit Hours
<b>Required courses:</b>		
KAH 5083	Epidemiology	3

KAH 5353	Research Methods in Community and Public Health	3
KAH 5363	Data Management and Descriptive Statistics	3
KAH 5373	Inferential Statistics	3
<b>Total Credit Hours</b>		<b>12</b>

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 in Applied Health Research. All other requirements for admission as a special graduate student described in Student Policies, Admission Policies, are applicable.

All other requirements for certificate programs described in Certificate Program Regulations of this catalog apply to this program.

### Graduate Certificate in Community Nutrition

The 12-hour Graduate Certificate in Community Nutrition is designed to meet the needs of students who want to contribute to the emerging field of community and public health nutrition. The certificate provides students with an understanding of both the scope and skills associated with community nutrition education and promotion. Specifically, this certificate is offered to equip students to fill the growing need for community nutrition practitioners, especially in south Texas.

The Graduate Certificate in Community Nutrition is offered 100% online and will provide critical knowledge regarding nutrition needs across lifespans. The certificate addresses the growing need for community and public health professionals with nutrition backgrounds. The certificate coursework provides students with a strong foundation in community nutrition content, evidence-based practices, and exposure to the professional roles associated with nutrition programs and policy in dietary behaviors.

The following departmental requirements are applicable to the Graduate Certificate in Community Nutrition:

- Bachelor's degree in Health Education, Health Promotion, Public Health, Psychology, Nutrition, or Dietetics. Closely related degrees will be considered based on completed coursework
- Minimum grade point average (GPA) of 3.0, though students with a 3.0 GPA in their last two years will be considered
- To maintain enrollment in the certificate program, students should maintain a 3.0 GPA throughout tenure in the program
- Two professional letters of recommendation with specified criteria to address
- Statement of Purpose in pursuing the certificate

### Certificate Program Requirements

To meet the curricular requirements for the Graduate Certificate in Community Nutrition, students must complete the following 12-semester-credit-hours with a grade point average of 3.0 or above:

Code	Title	Credit Hours
<b>Required courses:</b>		
KAH 5323	Community Nutrition	3
KAH 5333	Nutrition through the Lifecycle	3
KAH 5343	Public Policy and Nutrition	3

KAH 6053	Nutrition in Health and Disease	3
<b>Total Credit Hours</b>		<b>12</b>

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 Community Nutrition. All other requirements for admission as a special graduate student described in Student Policies, Admission Policies, are applicable. All other requirements for certificate programs described in Certificate Program Regulations of this catalog apply to this program.

## Graduate Certificate in Health

The 12-hour Graduate Certificate in Health is designed to meet the needs of students who want to contribute to the emerging field of community health. The certificate provides students with an understanding of both the scope and skills associated with community health across a variety of settings. The certificate is offered 100% online and will provide critical skills in responsibilities and competencies related to health educator certification and public health practice, and evaluation. It is designed to equip students interested in meeting the need for community health practitioners, especially in underserved areas like South Texas.

The Health certificate allows students to expeditiously engage in both community and public health collaborations to address the urgent health needs of South Texas and beyond. This training is critical to addressing the problem of increasing rates of chronic health-related diseases along the Texas-Mexico border. Students earning the certificate will be trained to contribute to health promotion projects and engage and mobilize communities in promoting health.

The following departmental requirements are applicable to the Graduate Certificate in Health:

- Bachelor's degree in Health Education, Health Promotion, Public Health, Psychology, Nutrition, or Dietetics; closely related degrees considered based on completed coursework
- Minimum grade point average (GPA) of 3.0, though students with a 3.0 GPA in their last two years will be considered
- To maintain enrollment in the certificate program, students should maintain a 3.0 GPA throughout tenure in the program
- Two professional letters of recommendation with specified criteria to address
- Statement of Purpose in pursuing the certificate

## Certificate Program Requirements

To meet the curricular requirements for the Graduate Certificate in Health, students must complete the following 12-semester-credit-hours with a grade point average of 3.0 or above:

Code	Title	Credit Hours
<b>Required courses:</b>		
KAH 5063	Health Behavior Theory	3
KAH 5133	Health Program Planning and Implementation	3
KAH 5303	Community Health	3
KAH 5383	Health Program Evaluation	3
<b>Total Credit Hours</b>		<b>12</b>

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 Health. All other requirements for admission as a special graduate student described in the Student Policies, Admission Policies, are applicable.

All other requirements for certificate programs described in Certificate Program Regulations of this catalog apply to this program.

## 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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5063. Health Behavior Theory. (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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.") Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5083. Epidemiology. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5093. Statistics in 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 field of Kinesiology. (Formerly titled "Statistics and Research in Health and Kinesiology." Same as KAH 5363. Credit cannot be earned for both KAH 5093 and KAH 5393.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5123. Research in 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. (Formerly titled "Research in Health and Kinesiology." Same as KAH 5353. Credit cannot be earned for both KAH 5123 and KAH 5353.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5133. Health Program Planning and Implementation. (3-0) 3 Credit Hours.**

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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5303. Community Health. (3-0) 3 Credit Hours.**

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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5313. Adapted Physical Activity. (3-0) 3 Credit Hours.**

This course is designed to provide an introduction to adapted physical activity, including sport and leisure, for persons with disabilities across school, community, and clinical based programs. This course will also provide you with information and knowledge on how to teach physical activities to persons with disabilities in various settings. Current legislation requires that sport, recreation and exercise programs provide reasonable access for persons with disabilities. Thus, the course is important for future education, recreation, sport, and exercise professionals, as employment in such areas now increasingly involves contact with individuals with disabilities. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5323. Community Nutrition. (3-0) 3 Credit Hours.**

Nutrition-related issues in public health, various community resources, agencies, and programs involved in health promotion and disease prevention. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5333. Nutrition through the Lifecycle. (3-0) 3 Credit Hours.**

This course provides the basic nutritional knowledge required to discuss the nutritional needs during various stages of the lifecycle as influenced by physiological, socio-economic, cultural, and environmental factors. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5343. Public Policy and Nutrition. (3-0) 3 Credit Hours.**

The role of public health policy in managing nutrition related chronic health disease and health promotion. This course will discuss the social, economic and environmental policies impacting food access and healthy eating behaviors. Credit cannot be earned for both KAH 5343 and NDT 5313. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5353. Research Methods in Community and Public Health. (3-0) 3 Credit Hours.**

Introduction to fundamentals of research methods in health education and promotion in community settings. Topics will include principles of research investigation, research design, sampling methods, and measurements. Issue and problems that are commonly encountered in community-based research will be discussed using real-world examples. (Same as KAH 5123. Credit cannot be earned for both KAH 5353 and KAH 5123.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5363. Data Management and Descriptive Statistics. (3-0) 3 Credit Hours.**

This course will introduce students to the commonly used data management software in community and public health. The focus of this course will be to familiarize students with processes of data management such as data monitoring, data cleaning and descriptive analysis for the purpose of research and evaluation. Additionally, information will be provided regarding institutional, state and federal protections regarding the use and storage of health-related data. (Same as KAH 5093. Credit cannot be earned for both KAH 5363 and KAH 5093.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5373. Inferential Statistics. (3-0) 3 Credit Hours.**

This course will introduce students to the methods commonly used in inferential statistics. The course will provide skills related to sampling procedures, hypothesis testing, and interpreting and disseminating results. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5383. Health Program Evaluation. (3-0) 3 Credit Hours.**

Study of health program evaluation methodology and application in community, school, business, or industry settings. This course is designed to provide graduate health students with an overview of the evaluation process including formative and summative evaluation methods and procedures. We will examine evaluation for intrapersonal, interpersonal and macro-level programs and we will discuss critical issues associated with rigorous evaluation. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 5403. Applied Cardiovascular Physiology. (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. (Formerly titled "Cardiovascular Fitness.") Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.



**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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.) Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

**KAH 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$25; LRHC \$10; STSH \$6.

**KAH 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GH01 \$75; LRHC \$10; STSH \$18.

**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). Course Fees: GH01 \$25; STSH \$6.

**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. Course Fees: GH01 \$75; LRH1 \$10; STSH \$18.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fees: GH01 \$25; LRHC \$10, STSH \$6.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fees: GH01 \$75; LRHC \$10, STSH \$18.

**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. Course Fees: GH01 \$75; STSH \$18.

**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. Course Fees: GH01 \$25; STSH \$6.

**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. Course Fees: GH01 \$75; STSH \$18.

## Department of Social Work

The Department of Social Work offers the Master of Social Work (MSW) degree, educating students for transformative, culturally competent practice with diverse populations within a local-global context.

### Master of Social Work

The Master of Social Work (MSW) degree prepares students for advanced social work practice. Graduates work in professional positions serving diverse individuals, families, groups, organizations, and communities. Students graduating from the program will demonstrate a commitment to 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 (<https://www.dshs.state.tx.us/socialwork/>) for additional information.

The Master of Social Work degree program consists of two program tracks:

- 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 24 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.

### 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. A narrative statement addressing interest in and the fit with the UTSA MSW program not to exceed 1,250 words (approximately five pages). Statement must address required questions provided in the narrative statement guidelines
  - b. Three completed department recommendation forms from professionals familiar with applicant preparation for graduate social work education
  - c. 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 60 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 24 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 5 years from the date of application or have successfully completed a minimum of 24 graduate semester credit hours in a CSWE-accredited Master of Social Work program. The time limit will extend up to 10 years for BSW graduates with a current social work license and with post BSW practice experience.

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 in another program 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
- 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 generalist courses and 36 hours of additional specialized 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:

- 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 previously completed
- Be in good standing at the last institution attended
- Be recommended for admission by the UTSA Department of Social Work Graduate Program Committee

**Classification and Academic Standing Requirements**

Students with a cumulative grade point average (GPA) under 3.0 (on a 4.0 scale) may apply for probationary admission status by directly addressing GPA as part of their narrative statement. 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 student does not guarantee subsequent admission as a degree-seeking student; such students must reapply for degree-seeking status.

Please refer to department website (<http://copp.utsa.edu/social-work/>) for further information.

**Degree Requirements**

**36-Hour Program**

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, and 36 for the modified MSW degree option for transfer students from CSWE-accredited graduate social work programs.

Code	Title	Credit Hours
A. 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	6
SWK 5513	Culturally Competent Practice with Diverse Populations	
B. 18 semester credit hours in Specialized Culturally Competent Practice. All students must complete the following courses:		
SWK 5423	Specialized Field Practicum III and Integrative Seminar	18
SWK 5433	Specialized Field Practicum IV and Integrative Seminar	
SWK 5443	Specialized Social Work Methods: Individuals	
SWK 5463	Specialized Social Work Methods: Groups	
SWK 5493	Specialized Social Work Methods: Community Practice	
SWK 5523	Specialized Social Work Methods: Children and Families	
C. 6 semester credit hours in Specialized Research and Policy. All students must complete the following courses:		
SWK 5243	Specialized Social Work Research: Practice and Program Evaluation	6
SWK 5473	Specialized Social Work Methods: Policy Practice and Advocacy	
D. 3 semester credit hours from the following selectives. All students must complete one of the following courses:		
SWK 5483	Multidimensional Assessment	3
	or SWK 5633 Transformational Leadership in Social Work	
E. 3 semester credit hours of additional electives. All students must complete the following:		

3 semester credit hours of open elective graduate coursework chosen in consultation with the graduate advisor of record.

**Total Credit Hours** **36**

**60-Hour Social Work Program**

The minimum number of semester credit hours required for the degree, exclusive of coursework or other study required to remove deficiencies is 60 for the non-BSW student. Academic course credit cannot be granted for life or previous work experience.

Code	Title	Credit Hours	
A. 24 semester credit hours of generalist courses. Non-BSW students must complete the following courses:			
SWK 5013	Human Behavior and Social Environment: Dynamics of Individuals and Families	24	
SWK 5103	Social Problems and Social Welfare Policy Analysis		
SWK 5113	Generalist Social Work Practice		
SWK 5203	Social Work Research		
SWK 5303	Foundations of Social Work I		
SWK 5313	Foundations of Social Work II		
SWK 5403	Generalist Field Practicum I and Integrative Seminar		
SWK 5413	Generalist Field Practicum II and Integrative Seminar		
B. 6 semester credit hours of courses particular to program mission and goals. All students must complete the following courses:			
SWK 5233	Global Context of Social Work		6
SWK 5513	Culturally Competent Practice with Diverse Populations		
C. 18 semester credit hours in Specialized Culturally Competent Practice. All students must complete the following courses:			
SWK 5423	Specialized Field Practicum III and Integrative Seminar	18	
SWK 5433	Specialized Field Practicum IV and Integrative Seminar		
SWK 5443	Specialized Social Work Methods: Individuals		
SWK 5463	Specialized Social Work Methods: Groups		
SWK 5493	Specialized Social Work Methods: Community Practice		
SWK 5523	Specialized Social Work Methods: Children and Families		
D. 6 semester credit hours in Specialized Research and Policy. All students must complete the following courses:			
SWK 5243	Specialized Social Work Research: Practice and Program Evaluation	6	
SWK 5473	Specialized Social Work Methods: Policy Practice and Advocacy		
E. 3 semester credit hours from the following selectives. All students must complete one of the following courses:			
SWK 5483	Multidimensional Assessment	3	
	or SWK 5633 Transformational Leadership in Social Work		
F. 3 semester credit hours of additional electives. All students must complete the following:			

3 semester credit hours of open elective graduate coursework chosen in consultation with the graduate advisor of record.

**Total Credit Hours**

**60**

## Comprehensive Examination

Students who successfully complete SWK 5433 Specialized Field Practicum IV and Integrative Seminar Specialized 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 generalist coursework and an additional 450 clock hours over one or two semesters as part of their specialized coursework. Advanced standing students complete 450 clock hours of field practicum as part of their advanced coursework - advanced standing students with fewer than 450 field clock hours from their BSW programs may need to complete additional field hours for a total of 900 field clock hours (combined BSW and MSW). 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. Placement cannot be guaranteed exclusively during evening and weekend hours.

## Social Work (SWK) Courses

### SWK 5013. Human Behavior and Social Environment: Dynamics of Individuals and Families. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing and consent of instructor or graduate advisor. This generalist course focuses on building students' understanding 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. Attention is given to increasing students' understanding of individual and family dynamics by developing their abilities to understand, evaluate, and differentially apply multiple paradigms and theories. Emphasis is placed on the social construction of knowledge of human development. Course Fee: STSP \$9; SWF1 \$60.

### SWK 5103. Social Problems and Social Welfare Policy Analysis. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing and consent of instructor or graduate advisor. This generalist 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. Course Fee: STSP \$9; SWF1 \$60.

### SWK 5113. Generalist Social Work Practice. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing and consent of instructor or graduate advisor. This course is taken the semester before students enter their first semester generalist field practicum. It 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. Course Fee: STSP \$9; SWF1 \$60.

### SWK 5203. Social Work Research. (3-0) 3 Credit Hours.

Prerequisite: Graduate standing and consent of instructor or graduate advisor. This generalist 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. Course Fee: STSP \$9; SWF1 \$60.

### SWK 5233. Global Context of Social Work. (3-0) 3 Credit Hours.

Prerequisite: Completion of all generalist 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. Course Fee: STSP \$9; SWF1 \$60.

### SWK 5243. Specialized Social Work Research: Practice and Program Evaluation. (3-0) 3 Credit Hours.

Prerequisite: Completion of all generalist courses. This specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5303. Foundations of Social Work I. (3-0) 3 Credit Hours.**

Prerequisites: Completion of SWK 5013, SWK 5103, and SWK 5113, and concurrent enrollment in SWK 5403. This generalist 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 Generalist 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. Course Fee: STSP \$9; SWF1 \$60.

**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 generalist 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. Building upon the ecological systems, strengths, and empowerment perspectives, 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5403. Generalist Field Practicum I and Integrative Seminar. (2-8) 3 Credit Hours.**

Prerequisites: Completion of SWK 5013, SWK 5103, and SWK 5113, and concurrent enrollment in SWK 5303. This generalist 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5413. Generalist Field Practicum II and Integrative Seminar. (2-8) 3 Credit Hours.**

Prerequisites: Completion of SWK 5303 and SWK 5403, and concurrent enrollment in SWK 5313. This generalist 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5423. Specialized Field Practicum III and Integrative Seminar. (2-8) 3 Credit Hours.**

Prerequisite: Completion of all generalist coursework and the majority of specialized courses. Building on generalist or BSW field experiences, this specialized field practicum course provides a supervised practicum at an assigned practicum site and a weekly integrative seminar, with an emphasis on specialized 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 the specialized 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 Specialized 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 specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5433. Specialized Field Practicum IV and Integrative Seminar. (2-8) 3 Credit Hours.**

Prerequisite: Completion of all generalist coursework and all specialized 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 the specialized curriculum level. The internship can be designed as a block of one semester (450 clock hours) when taken concurrently with SWK 5423 Specialized 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 specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5443. Specialized Social Work Methods: Individuals. (3-0) 3 Credit Hours.**

Prerequisites: Completion of all generalist courses; concurrent enrollment in SWK 5423 is recommended. This specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5463. Specialized Social Work Methods: Groups. (3-0) 3 Credit Hours.**

Prerequisite: Completion of all generalist courses. This specialized 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 multidimensional contextual 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5473. Specialized Social Work Methods: Policy Practice and Advocacy. (3-0) 3 Credit Hours.**

Prerequisite: Completion of all generalist courses or consent of instructor or graduate advisor. This specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5483. Multidimensional Assessment. (3-0) 3 Credit Hours.**

Prerequisites: Completion of all generalist courses, or consent of instructor or graduate advisor. This specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5493. Specialized Social Work Methods: Community Practice. (3-0) 3 Credit Hours.**

Prerequisite: Completion of all generalist courses. This course in specialized community practice is for students who have already achieved a general 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5513. Culturally Competent Practice with Diverse Populations. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing and consent of graduate advisor; must be completed prior to enrollment in the generalist 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5523. Specialized Social Work Methods: Children and Families. (3-0) 3 Credit Hours.**

Prerequisite: Completion of all generalist courses. This specialized 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. Course Fee: STSP \$9; SWF1 \$60.

**SWK 5633. Transformational Leadership in Social Work. (3-0) 3 Credit Hours.**

Prerequisites: Completion of all generalist courses or consent of graduate advisor. This course focuses on the social responsibility of social workers who have specialized in cultural competence 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 specialized knowledge and skills needed for effective culturally competent practice in human service organizational settings. The course incorporates coverage of management theory and organizational management functions, including providing leadership for a diverse workforce. Course Fee: STSP \$9; SWF1 \$60.

**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. Course Fee: STSP \$3; SWF1 \$20.

**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. Course Fee: STSP \$9; SWF1 \$60.

**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). Course Fee: STSP \$3.

**SWK 6973. Special Topics in Culturally Competent Practice. (3-0) 3 Credit Hours.**

Prerequisites: Graduate standing and consent of instructor or graduate advisor. This is an organized course offering the opportunity for specialized study in culturally competent practice not usually available as part of the regular course offerings. Special Topics courses may be repeated for credit when topics vary, but no more than 6 semester credit hours, regardless of discipline, will apply to the Master's degree. Course Fee: STSP \$9; SWF1 \$60.

## 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, to teach at the college level 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.

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 graduate student may be considered by the Graduate Program Committee upon request of the applicant. Admission as a special graduate student 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 (<http://graduateschool.utsa.edu/>)
2. An application fee
3. Official transcripts from all collegiate institutions attended, including community colleges
4. A personal statement (approximately 500 words, or two typed pages) indicating your interest and goals in studying sociology
5. Three letters of recommendation from references who can speak to your qualifications for the graduate program (at least two of these must be from someone who can speak to your academic qualifications)
6. 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:

Code	Title	Credit Hours
<b>A. 9 semester credit hours of core courses:</b>		<b>9</b>
SOC 5003	Sociological Theory	
SOC 5063	Research Design	
SOC 5073	Quantitative Research Methods	
<b>B. 21 semester credit hours of prescribed electives from the following courses:</b>		<b>21</b>
SOC 5033	Qualitative Research Methods	
SOC 5043	Evaluation Research	
SOC 5053	Professionalization Seminar	
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 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 6713	Health Care System in the United States	
SOC 6723	Religion, Health and Mortality	
SOC 6733	The Social Psychology of Health and Illness	
SOC 6743	Religion, Spirituality and Families	
SOC 6753	Racial/Ethnic Minority Families in the United States	
SOC 6763	Youth and Emerging Adulthood	
SOC 6903	Topics in Advanced Sociology	
SOC 6973	Special Problems	

Students may take up to 6 credit hours of non-sociology graduate level courses with approval from the Department Chair and Graduate Advisor of Record.

**C. 6 semester credit hours from one of the following options:** **6**

1. Thesis Option: This option is available only with permission from an instructor, the Graduate Advisor of Record, and after the completion of 24 semester credit hours. Students electing the thesis option are required to enroll in SOC 6983 or SOC 6986 Master's Thesis for a total of 6 credit hours, which includes completion of an oral comprehensive exam (i.e., successful thesis 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 SOC 6981 Master's Thesis. The Master's thesis requires compliance with UTSA thesis requirements and a successful final thesis defense.

2. Internship Option: Students may participate in an internship after completion of 18 semester credit hours (which must include the core courses). Internships offer work-oriented experiences in local organizational settings where the principles, theories, concepts, and methods of the discipline can be applied. Students electing the internship option are required to enroll in SOC 6963 (repeated for a total of 6 credit hours). A research paper under the supervision of assigned faculty is required, including completion of an oral comprehensive exam (i.e., successful internship proposal defense).

3. Exit Seminar Option (Written Comprehensive Examination): The Master's degree exit seminar must be taken in the final semester of the student's program if this completion option is selected. Students who select this 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 SOC 6933 Exit Seminar, which is graded as Credit/Non-Credit. This course provides a review of the three core courses from which all exam questions will be drawn. At the end of the course, the written comprehensive examination will be administered. The comprehensive exam is a time-limited, closed-book exam administered in two 4-hour sessions on one day at the end of each semester. 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 sections, the student must retake the full comprehensive exam in a subsequent semester. Students have one calendar year (two semesters) from their initial attempt to successfully pass the comprehensive exam. Students will be dismissed from the program after two unsuccessful attempts to pass the comprehensive exam. Students do not need to re-enroll in SOC 6933 to retake the comprehensive exam. Students not enrolled in any other courses would be required to enroll in 1 credit hour of SOC 6961 Comprehensive Examination in the subsequent long semester in which the student wishes to retake the comprehensive exam.

**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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.



**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). Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.") Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**SOC 6713. Health Care System in the United States. (3-0) 3 Credit Hours.**

This course covers the complexities of health care organization and finance and presents a general overview of how the U.S. health care system works and how the major components within the system fit together. Covers basic structures and operations of the U.S. health system - from its historical origins and resources, to its individual services, cost, and quality. Compares and contrasts the U.S. health care system with other health care systems around the world. Course Fee: GL01 \$90.

**SOC 6723. Religion, Health and Mortality. (3-0) 3 Credit Hours.**

A growing body of theory and research explores the connections between religion (and its close cousin, spirituality) and a diverse array of mental and physical health outcomes, including mortality risk. In this course, explanatory pathways receive particular attention, including the role of religion in shaping health behaviors and lifestyles, social resources, psychological resources, coping practices, healthy beliefs, character strengths, and other potential mechanisms. A number of other topics are considered as well, including: the negative health effects of religion, racial/ethnic and other subgroup variations in the religion-health connection, faith-based health programming, the role of religion and spirituality in healthcare settings, and others. Although the primary focus is on the U.S. and developed western societies, comparative materials may also be introduced. Course Fee: GL01 \$90.

**SOC 6733. The Social Psychology of Health and Illness. (3-0) 3 Credit Hours.**

This course is organized primarily around the "stress process model" in the social psychology of health and illness. The "stress process" perspective explains individual- and group-level variations in health outcomes partly in terms of (a) differential exposure to stressful events and conditions and (b) differential vulnerability to (or resilience in the face of) such stressors. Thus, we will selectively examine literature on the definition, measurement, and epidemiology of stress. Particular attention is given to the social and psychological resources available to - and the specific coping strategies used by - persons experiencing stressful circumstances. The course will emphasize the impact of stressors and resources on mental disorders, physical health problems, and even mortality risk. In addition, it will examine the usefulness of the "stress process" approach for explaining the social patterning of various mental and physical health outcomes, such as those determined by objective and subjective aspects of socio-economic position, race and ethnicity, gender, and other important elements of social location. Course Fee: GL01 \$90.

**SOC 6743. Religion, Spirituality and Families. (3-0) 3 Credit Hours.**

After a long period of neglect, scholars and practitioners are once again interested in the relationships between religion, spirituality, and family life. This course will introduce students to key theoretical, methodological, and substantive issues in this broad area. Specific coverage will be given to the complex links between religious factors and sexual behavior and fertility, child-rearing ideals and practices, gender roles, intimate relationships, intergenerational relations, and other facets of family life. The role of religion among racial and ethnic minority families will receive particular attention. Although much of the course material focuses on the United States, comparative cases will also be considered. Course Fee: GL01 \$90.

**SOC 6753. Racial/Ethnic Minority Families in the United States. (3-0) 3 Credit Hours.**

This course will be devoted to a survey of racial/ethnic families in contemporary America. The course is designed to help students to better understand the concept of "family ethnicity," as the United States is approaching the time when a majority of its citizens will be members of ethnically or culturally diverse families. This course will compare differences and similarities in family lives across a number of racial/ethnic groups in the United States. Specifically, four major groups of racial/ethnic families - African, Hispanic, Asian, and Native American families - will be explored and compared. Families with different ethnic/cultural backgrounds such as Hawaiian and/or Jewish American families will be discussed briefly as well. Course Fee: GL01 \$90.

**SOC 6763. Youth and Emerging Adulthood. (3-0) 3 Credit Hours.**

This course will focus on youth and adolescence as well emerging adulthood from a sociological perspective. It will examine theoretical and empirical research related to youth, adolescence and emerging adulthood as well as connect these ideas to practical concerns and current events. It will explore the lives and diverse experiences of young people and will focus on topics such as the historical development and distinguishing characteristics of adolescence and emerging adulthood, the social and cultural context of adolescence and emerging adulthood, gender and identity, family relationships, peers and friends, dating, romance, and family formation, religion and spirituality, school and education, and work and the future. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**SOC 6933. Exit Seminar. (3-0) 3 Credit Hours.**

Prerequisites: Completion of the 9 semester credit hours of core courses, 21 semester credit hours of electives, and permission from the Graduate Advisor of Record is required. This course is designed to prepare students for the written comprehensive examination and covers topics on sociological theory and methods. The grade report for the course is either "CR" (satisfactory performance on the comprehensive examination) or "NC" (unsatisfactory performance on the comprehensive examination). Course Fee: GL01 \$90.

**SOC 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**SOC 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$180.

**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. Course Fee: GL01 \$90.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director, and 24 semester 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 semester in which the thesis is in progress.

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

Prerequisites: Permission from 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. Course Fee: GL01 \$90.

**SOC 6986. Master's Thesis. (0-0) 6 Credit Hours.**

Prerequisites: Permission from 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. Course Fee: GL01 \$180.

**SOC 7001. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisite: Admission to Candidacy for the Doctoral degree in Translational Science. Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree. Course Fee: GL01 \$30.

**SOC 7003. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisite: Admission to Candidacy for the Doctoral degree in Translational Science. Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree. Course Fee: GL01 \$90.

**SOC 7006. Doctoral Dissertation. (0-0) 6 Credit Hours.**

Prerequisite: Admission to Candidacy for the Doctoral degree in Translational Science. Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours may be applied to the Doctoral degree. Course Fee: GL01 \$180.

**SOC 7891. Doctoral Research. (0-0) 1 Credit Hour.**

Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 6 hours will apply to the Doctoral degree. Course Fee: GL01 \$30.

**SOC 7893. Doctoral Research. (0-0) 3 Credit Hours.**

Preparation and writing of dissertation proposal. May be repeated for credit, but not more than 6 hours will apply to the Doctoral degree. Course Fee: GL01 \$90.

# COLLEGE OF LIBERAL AND FINE ARTS

The College of Liberal and Fine Arts offers the following graduate degrees and certificates:

## College-wide Programs

- Graduate Certificate in Latin American Studies (p. 251)

### Department of Anthropology (p. 252)

- Master of Arts in Anthropology (p. 252)
- Doctor of Philosophy in Anthropology (p. 252)

### Department of Art and Art History (p. 260)

- Master of Fine Arts in Art (p. 260)
- Master of Arts in Art History (p. 260)

### Department of Communication (p. 264)

- Master of Arts in Communication (p. 264)

### Department of English (p. 267)

- Master of Arts in English (p. 267)
- Doctor of Philosophy in English (p. 267)
- Graduate Certificate in Creative Writing (p. 270)
- Graduate Certificate in Rhetoric and Composition (p. 270)

### Department of History (p. 273)

- Master of Arts in History (p. 273)

### Department of Modern Languages and Literatures (p. 277)

- Master of Arts in Spanish (p. 277)
- Graduate Certificate in Linguistics (p. 277)
- Graduate Certificate in Translation and Interpreting Studies (p. 277)

### Department of Music (p. 281)

- Master of Music (p. 281)
- Graduate Certificate in Instrumental Performance (p. 283)
- Graduate Certificate in Keyboard Pedagogy (p. 283)
- Graduate Certificate in Voice Pedagogy (p. 283)

### Department of Philosophy and Classics (p. 287)

- Master of Arts in Philosophy (p. 287)

### Department of Political Science and Geography (p. 290)

- Master of Arts in Geography (p. 290)
- Master of Arts in Global Affairs (p. 290)
- Master of Arts in Political Science (p. 290)

## Graduate Certificate in Latin American Studies

The Graduate Certificate in Latin American Studies is a 15-semester-credit-hour certificate available to degree-seeking students who have been admitted to any UTSA graduate program, as well as non-degree seeking graduate students who meet all the requirements outlined in the *UTSA Graduate Catalog*.

The Graduate Certificate in Latin American Studies offers advanced and multidisciplinary coursework designed to provide students with an in-depth understanding of the foundations of Latin American cultures,

including skills necessary for applied work. This certificate will be particularly valuable for students in the Social Sciences and Humanities who are interested in building cultural competency in Latin America and the international arena.

The Graduate Certificate in Latin American Studies requires completion of 15 semester credit hours of graduate coursework related to Latin America and/or Latinx people in the U.S. In order to ensure students obtain a multidisciplinary perspective on Latin America, it is required that the courses be housed in at least two different departments, with at least 6 semester credit hours outside the student's home department. Thus, students can individualize their program of study to meet their own specific areas of interest, while ensuring thematic breadth across disciplines. It is strongly encouraged to have basic proficiency in Spanish or Portuguese.

In addition to the courses outlined below, study abroad programs and courses taken as part of an international education program in Latin America also qualify for the Graduate Certificate.

The courses listed in the Program of Study below all qualify for the certificate. In addition, any graduate course cross-listed with a LAS prefix qualifies for the certificate. Courses not on the list below that have significant Latin American and/or Latinx content may be applied to the certificate, with the approval of the graduate certificate coordinator.

## Program of Study

Code	Title	Credit Hours
Required Courses: Must include at least two content areas and 6 credit hours outside home department.		
<b>Anthropology</b>		
ANT 6513	Maya Civilization	15
ANT 5563	Seminar in Andean Archaeology and Ethnography	
ANT 5603	Ancient Civilizations	
ANT 6973	Special Problems (Footsteps of Early Maya Explorers)	
ANT 6973	Special Problems (Seminars that include significant Latin American content)	
<b>Art and Art History</b>		
AHC 5823	Topics in Mesoamerican Pre-Columbian Art	
AHC 5843	Topics in Latin American Colonial Art	
AHC 5853	Topics in Contemporary Latin American Art	
AHC 5813	Topics in Art History (Only when course includes significant Latin American content)	
<b>History</b>		
HIS 5253	Mexican American History	
HIS 5263	History of the Spanish Borderlands	
HIS 5323	The U.S.–Mexico Border	
HIS 5423	Colonial Mexico	
HIS 5433	Modern Mexico	
HIS 5483	Colonial Latin America	
HIS 6173	Latina/os in the United States	
HIS 6433	Topics in Latin American History	
<b>Modern Languages and Literatures</b>		
SPN 5123	Hispanic Film	
SPN 5413	History of Ideas in the Hispanic World	
SPN 5473	Latin American Civilization	

SPN 5483	Topics in Hispanic Cultures
SPN 5763	Latin American Literature to Modernism
SPN 5773	Latin American Literature from Modernism to the Present
SPN 5803	Mexican American Literature
SPN 5813	Topics in Hispanic Literatures
Political Science and Geography	
POL 5363	Mexican Politics
POL 5303	Topics in Comparative and International Politics
GRG 6973	Special Problems
English	
ENG 5763	Latina/o Literature
ENG 6053	Latina/o Studies: Text and Context
ENG 7053	Seminar: Latina/o Studies
<b>Total Credit Hours</b>	<b>15</b>

## 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 Anthropology

The Department of Anthropology offers the Master of Arts Degree in Anthropology and the Doctor of Philosophy Degree in Anthropology.

- M.A. in Anthropology (p. 252)
- Ph.D. in Anthropology (p. 253)

## Master of Arts Degree in Anthropology

The Department of Anthropology at UTSA offers M.A. degrees specializing in archaeology, biological anthropology, and cultural anthropology. The department emphasizes a holistic approach to Master's level training that focuses on methods and skills that have applications within the diverse array of careers in today's **academic** and **non-academic** job market. Through formal coursework, internships, and independent thesis research, students learn contemporary theoretical approaches within the discipline as well as **specific marketable skills** in laboratory methods, geographic information systems (GIS), research design, grant writing, teaching, and primatological, ethnographic, and archaeological practices.

In addition to pursuing Ph.D.s in anthropology and related disciplines, M.A. graduates are prepared for **careers** in a variety of settings including: heritage management; museums, zoos, and wildlife organizations; GIS technician/analyst; national and international NGOs focused on health and well-being, social justice, and conservation; conservation area management; medical and laboratory research; qualitative research consultancy for various industries; and teaching at K-12 and community-college levels.

Theoretical and applied emphases of the department's faculty include: archaeology of the Maya lowlands and Andean South America; archaeology of Texas, the American Southwest, and Northwest Mexico; primate behavioral ecology; primate conservation ecology and genetics; community-based conservation practices and general conservation strategy; resource management and extraction; human-animal relations; indigenous peoples and politics; environmental politics; coastal political ecology and the making of environmental markets; applied anthropology; and several specialties within medical anthropology, including aging and end of life, the anthropology of care, wellbeing, and health and healthcare in the U.S.-Mexico borderlands. With faculty expertise in North, South, and Central America; the Caribbean; Africa; East Asia; and Island Pacific, our students work throughout the world.

## Application Procedures

The Anthropology Department admits Master's students once a year in the Fall.

In addition to satisfying the University-wide graduate admission requirements, applicants should have a 3.3 grade point average in undergraduate coursework and have successfully taken 12 hours of coursework in anthropology or in related areas as determined by the Graduate Program Committee. It is preferable, although not required, that this coursework include courses in 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 and special graduate students (see Student

Policies, under Admission Policies, for definitions), the application to the Master of Arts program in Anthropology consists of:

- An online application form
- Official academic transcripts
- An essay (statement of purpose). 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
  - 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.
- Three 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 60 and 65 (paper version) or 79 and 100 (Internet version). See Student Policies, under Admission Policies, for details.

Applications will not be reviewed until complete.

Applicants can request graduate degree-seeking or special graduate student status. A graduate degree-seeking applicant admitted to the program may receive unconditional, conditional, or probationary admission status. Special graduate students may be limited in the courses they are permitted to take. Admission as a special graduate student 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:

Code	Title	Credit Hours
<b>A. 9 semester credit hours of required basic courses:</b>		<b>9</b>
ANT 5023	History, Method, and Theory of Archaeology	
ANT 5033	Theory in Cultural Anthropology	
ANT 5073	Advanced Biological Anthropology	
<b>B. 3 semester credit hours of a dedicated methods class, as approved by the student's advisor.</b>		<b>3</b>
<b>C. 15 semester credit hours of elective courses chosen in consultation with the student's advisor and subject to the following conditions:</b>		<b>15</b>
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).		
<b>D. Proficiency in a Second Language or Statistics</b>		
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.		
<b>E. Comprehensive Examination</b>		
A written comprehensive examination is required. It takes the form of a detailed thesis proposal. 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.		
<b>F. Master's Thesis</b>		<b>6</b>
6 semester credit hours of ANT 6983 Master's Thesis.		
<b>Total Credit Hours</b>		<b>33</b>

## 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, the Caribbean, Africa, and Island Pacific (cultural anthropology).

The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and the Graduate Catalog, 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 online application form
- CV or resume
- Official academic transcripts
- An essay (750–900 word statement of purpose)
- A writing sample
- Three letters of recommendation
- Graduate Record Examination (GRE) scores: 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 60 and 65 (paper version) or 79 and 100 (Internet version). See Student Policies, under Admission Policies, 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 66 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.

Code	Title	Credit Hours
<b>A. 12 semester credit hours of Doctoral Core courses:</b>		
ANT 5023	History, Method, and Theory of Archaeology	12

ANT 5033	Theory in Cultural Anthropology	
ANT 5073	Advanced Biological Anthropology	
ANT 6603	Ecological Anthropology	
<b>B. 6 semester credit hours of methods courses, as approved by the student's advisor</b>		<b>6</b>
<b>C. 33 semester credit hours of elective courses, as approved by the student's advisor.</b>		<b>33</b>
If students wish to take elective courses outside the Department, they first must seek approval from the Graduate Program Committee.		
<b>D. Doctoral Dissertation Proposal</b>		<b>3</b>
3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of the qualifying examination and nearing the completion of organized coursework)		
<b>E. Doctoral Research and Dissertation (minimum 12 semester credit hours):</b>		<b>12</b>
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	
<b>Total Credit Hours</b>		<b>66</b>

### 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 can apply for 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.

### Dissertation Committee

Following successful completion of the qualifying exams, 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 Doctoral Degree Regulations, for further information on requirements of committee composition).

### Doctoral Dissertation Proposal

Doctoral students are required to produce a dissertation proposal that will be submitted to their Dissertation 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.

### 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, forming a Dissertation Committee approved by the University, and submitting and successfully defending the dissertation proposal.

### Dissertation

Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation that makes a significant contribution to the field. The student, in consultation with his or her Supervising Professor, determines the research topic. The student's Dissertation Committee will guide and critique the candidate's research. The Dissertation Committee must unanimously accept a dissertation for examination. The dissertation shall then be defended publicly before the Dissertation Committee. Students should be continually registered in Directed Doctoral Research (ANT 7011-ANT 7013) or 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 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 are required to take an additional 36 graduate hours beyond the Master's degree. The Anthropology Graduate Program Committee will determine the applicability of the Master's degree to the student's program of study. 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.

To complete their Ph.D. program of study, students entering the program with an acceptable Master's degree must complete the following minimum requirements:

Code	Title	Credit Hours
<b>A. Required Course:</b>		
ANT 6603	Ecological Anthropology	3

**B. A minimum of 18 semester credit hours of additional coursework, 18 as approved by the student's advisor and chosen from the following domains:**

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. Doctoral Dissertation Proposal 3**

3 semester credit hours of ANT 7003 Dissertation Proposal (after successful completion of the qualifying examination and nearing the completion of organized coursework)

**D. Doctoral Research and Dissertation (minimum 12 semester credit hours): 12**

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 36**

### 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.

### Dissertation Committee

Following successful completion of the qualifying exams, 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 Doctoral Degree Regulations, for further information on requirements of committee composition).

### Doctoral Dissertation Proposal

Doctoral students are required to produce a dissertation proposal that will be submitted to their Dissertation Committee for review. This will occur following successful completion of the qualifying examination, and as students near completion of required coursework (21 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.

### **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, forming a Dissertation Committee approved by the University, and submitting and successfully defending the dissertation proposal.

### **Dissertation**

Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation that makes a significant contribution to the field. The student, in consultation with his or her Supervising Professor, determines the research topic. The student's Dissertation Committee will guide and critique the candidate's research. The Dissertation Committee must unanimously accept a dissertation for examination. The dissertation shall then be defended publicly before the Dissertation Committee. Students should be continually registered in Directed Doctoral Research (ANT 7011-ANT 7013) or 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 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. Course Fee: GL01 \$90.

### **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.") Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **ANT 5113. Professional Skills Development. (3-0) 3 Credit Hours.**

This course provides an overview of the various skills necessary for obtaining a position and working in an academic environment, one specifically involving research and teaching at the university level. Topics include: basic leadership skills, grant application preparation, research ethics, giving a presentation/poster, developing a syllabus, preparing for the job market, what to expect as a new faculty member, how to peer review manuscript/grant applications, communicating science to the public, and mentoring future students. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$180.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ANT 5703. The Anthropology of Space and Place. (3-0) 3 Credit Hours.**

This course examines key theoretical and philosophical orientations for the consideration of space and place in the social sciences. Attention will be given to both foundational texts and ethnographic uses in the social sciences. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ANT 6443. Supervised 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. Course Fee: GL01 \$90.

**ANT 6446. Supervised 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 or laboratory 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. Course Fee: GL01 \$180.

**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). Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ANT 6623. Seminar in Analytical Methods. (3-0) 3 Credit Hours.**

Basic quantitative and qualitative approaches to the analysis and interpretation of anthropological field and laboratory data are reviewed. (Formerly ANT 5513. Credit cannot be earned for both ANT 6623 and ANT 5513.) Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.") Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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; and cross-cultural classification and the social construction of animals. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ANT 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**ANT 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$60.

**ANT 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$60.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$60.

**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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$90.

**ANT 7011. Directed Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. 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. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Course Fee: GL01 \$30.

**ANT 7012. Directed Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. 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. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Course Fee: GL01 \$60.

**ANT 7013. Directed Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. 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. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Course Fee: GL01 \$90.

**ANT 7021. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree. Enrollment in either ANT 7021-3 or ANT 7011-3, depending on progress, is required each term in which the dissertation is in progress. Course Fee: GL01 \$30.

**ANT 7022. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree. Enrollment in either ANT 7021-3 or ANT 7011-3, depending on progress, is required each term in which the dissertation is in progress. Course Fee: GL01 \$60.

**ANT 7023. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: Permission of the Ph.D. Graduate Advisor of Record and dissertation director. Preparation and writing of the Doctoral dissertation. May be repeated for credit, but not more than 12 hours will apply to the Doctoral degree. Enrollment in either ANT 7021-3 or ANT 7011-3, depending on progress, is required each term in which the dissertation is in progress. Course Fee: GL01 \$90.

# 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.

- M.F.A. in Art (p. 260)
- M.A. in Art History (p. 260)

## 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 (<https://graduateschool.utsa.edu/admissions/graduate-application/>). A complete application includes:

- The online application
- Personal contact information
- Educational background
- Transcripts
- A statement of intent concerning graduate school
- An artist's statement about the applicant's work
- Three letters of recommendation (submitted digitally by recommender)
- Portfolio (see below)

The Graduate Record Examination (GRE) is not required as part of the application for the M.F.A.

Artist Statements and Statements of Purpose should be submitted as separate files.

### 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. Ideally, a strong portfolio will suggest a specific direction or overarching thematic interest. Portfolios may be submitted as a PDF document uploaded through the application portal. The PDF should be created as a PowerPoint with a white background and each slide should include title, medium, size, and date of completion for each piece in each image. Slides for time-based artworks should include a still image with an additional html link (not

embedded) to a YouTube or Vimeo site where a video can be viewed or a sound file can be heard for the piece.

Note: Due to the format of studio laboratory art courses, auditing is not permitted.

## Degree Requirements

A minimum of 60 semester credit hours is required for the Master of Fine Arts degree, exclusive of coursework or other study required to remove admission deficiencies. Full-time enrollment of 9 or more semester credit hours during regular semesters is expected of degree-seeking students. In addition to satisfying all University-wide requirements, M.F.A. students must pass a First Semester Review, a Semester End Progress Review, an Advancement to Candidacy Review (available after the third or fourth semester of study and completion of 30-36 semester credit hours of the program of study), and a final M.F.A. Oral Comprehensive Examination. The M.F.A. degree culminates in an exhibition supported by a written process document. 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.

Code	Title	Credit Hours
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
<b>Total Credit Hours</b>		<b>60</b>

### Leaves of Absence-Enrollment interruptions during completion of the MFA Program

M.F.A. students must seek permission to have a "leave of absence" from the program by submitting a memo that defines the length of the "leave of absence." Approval for the leave requires 3 signatures – the major professor or area coordinator, the Graduate Advisor of Record (GAR), and the Chair. "Leaves of absence" can be extended as situations develop up to the University limitation policy of four non-enrollment semesters. M.F.A. students are responsible for communicating with the GAR during their leave of absence to reinstate enrollment or to extend their leave.

## Master of Arts Degree in Art History

The Master of Arts degree in Art History provides students with the opportunity to gain an academic and theoretical foundation and to specialize in a range of historical and cultural arenas in the history of art. Students work closely with engaged faculty who specialize in Pre-Columbian, Colonial Latin American, Latin American, European, Modern, and Contemporary Art, as well as Museum Studies. Students gain knowledge of diverse cultural histories; artists, artisans, patrons, and institutions; methods, materials, and styles; and critical, practical, and aesthetic considerations. Course work provides instruction and training in traditional literary scholarship; hands-on investigations and fieldwork; cutting-edge digital research and presentation technologies; interdisciplinary analysis; and critical thinking, writing, discussion, and exhibition practices. The degree is designed to prepare students for a career in museum curation, 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 (18 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 website (<http://graduateschool.utsa.edu/>). Students can obtain information, detailed instructions of what additional material they must submit (three letters of recommendation, official transcripts, a writing sample, and statement of intent), as well as forms, from the Graduate School's website. Deadlines for all materials for each term can be found on the same website.

## 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 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.

Code	Title	Credit Hours
<b>A. 3 semester credit hours required:</b>		<b>3</b>
AHC 5123	Seminar in Research Methods and Writing (must be taken in student's first year)	
<b>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:</b>		<b>21</b>
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	
<b>C. 6 semester credit hours of free electives</b>		<b>6</b>
These are courses outside the discipline of art history in any of the supporting fields comprising the College of Liberal and Fine Arts, including studio art, with the selection approved by the Graduate Advisor of Record (GAR) for Art History.		
<b>D. 6 semester credit hours of Master's Thesis or Project</b>		<b>6</b>
AHC 6983	Master's Thesis (Enrollment in AHC 6983 requires successful completion (graduate level passing grade) of AHC 6961, Comprehensive Examination.)	
<b>Total Credit Hours</b>		<b>36</b>

In addition to the semester credit hour requirements set forth above, all candidates for the degree are required to pass the Comprehensive Examination, an image 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. Please note: Enrollment in AHC 6983 Master's Thesis requires successful completion (graduate level passing grade) of AHC 6961 Comprehensive Examination.

## 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. Course Fee: GL01 \$90.

### 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. Course Fees: DL01 \$75, GL01 \$90, STLF \$18.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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 Studio Art GARs as well as the approval of the Department Chair. Course Fee: GL01 \$90.

**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 Studio Art GARs as well as the approval of the Department Chair. Course Fee: GL01 \$90.

**AHC 6843. Project in Art History. (0-0) 3 Credit Hours.**

Prerequisites: Permission of the Graduate Advisor of Record (GAR) 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 Studio Art GARs as well as the approval of the Department Chair. Course Fee: GL01 \$90.

**AHC 6913. Seminar in Art History. (3-0) 3 Credit Hours.**

Prerequisites: Graduate standing, consent of instructor, 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 Studio Art GARs as well as the approval of the Department Chair. Course Fee: GL01 \$90.

**AHC 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available in the Department Office) from the instructor and the Graduate Advisor of Record (GAR). 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 Studio Art GARs as well as the approval of the Department Chair. Course Fee: GL01 \$90.

**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 of Record (GAR) 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 (CR) which indicates satisfactory progress or No-Credit (NC) which indicates unsatisfactory progress for each semester of enrollment. Students receiving an evaluation of No-Credit (NC) will be placed on program probation and students receiving two evaluations of No-Credit will be reviewed for a determination of removal from the degree program. The Instructor of Record will make the determination of Credit (CR) or No-Credit (NC) for each semester of enrollment. Determination of continuation within the program, in the event of two No-Credit (NC) evaluations, will be made by a majority vote of the full-time graduate faculty of the Art History faculty. Enrollment in AHC 6983 requires successful completion (graduate-level passing grade) of AHC 6961, Comprehensive Examination. Course Fee: GL01 \$90.

## 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. Course Fees: GL01 \$90; SAF1 \$35.

**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. Course Fees: GL01 \$90; SAF1 \$35.

**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. Course Fees: GL01 \$90; SAF1 \$35.

**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. Course Fees: GL01 \$90; SAF1 \$35.

**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. Course Fees: GL01 \$90; SAF1 \$35.

**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.") Course Fees: GL01 \$90; SAF1 \$35.

**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. Course Fees: GL01 \$90; SAF1 \$35.

**ART 6033. Internship in the Visual Arts. (0-0) 3 Credit Hours.**

Prerequisites: Consent of instructor and approval from the Department Chair prior to the beginning of the internship. A learning laboratory in which art methods and principles are applied in a practical manner outside the classroom in areas such as museum and gallery activities, historical preservation, providing technical studio assistance for artists, 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 once for credit, but not more than 6 hours total of ART 6033 and ART 6043 will apply to the Master of Fine Arts degree in Studio Art.

**ART 6043. Practicum in the Visual Arts. (0-0) 3 Credit Hours.**

Prerequisites: Consent of instructor and approval from the Department Chair prior to the beginning of the practicum. Students are provided with the opportunity to gain teaching experience as a teaching assistant to an instructor of record in their area of emphasis. Students are given guidance in preparing and presenting course materials, providing technical and conceptual support for student projects, and preparing and implementing grading rubrics. Students submit a teaching portfolio at the culmination of the course. May be repeated once for credit, but not more than 6 hours total of ART 6043 and ART 6033 will apply to the Master of Fine Arts degree in Studio Art. (Formerly ART 6013.) Course Fees: GL01 \$90; SAF1 \$35.

**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) from 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. Course Fee: GL01 \$90.

**ART 6971. Special Problems. (0-2) 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 Master of Fine Arts degree. Course Fee: GL01 \$90.

**ART 6972. Special Problems. (0-4) 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 Master of Fine Arts degree. Course Fee: GL01 \$90.

**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. Course Fees: GL01 \$90; SAF1 \$35.



# 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 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 intends 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. Complete online application (<https://graduateschool.utsa.edu/admissions/graduate-application/>).
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.
4. Submit transcripts from all undergraduate programs.

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:

Code	Title	Credit Hours
<b>A. 15 semester credit hours of core courses:</b>		<b>15</b>
COM 5003	Introduction to Graduate Studies in Communication <sup>1</sup>	
COM 5013	Communication Theory	
COM 5023	Quantitative Research Methods	
COM 5033	Qualitative Research Methods	
COM 5103	Theories and Applications of Communication	

**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.** 9

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

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 6933	Directed Readings
COM 6943	Internship in Communication
COM 6951	Independent Study
COM 6953	Independent Study

**E. Master's Thesis or Project** 6

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. Comprehensive Examination**

As per University requirements, all students must complete a comprehensive examination as detailed below.

**Total Credit Hours** 36

- <sup>1</sup> 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### 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. Course Fee: GL01 \$90.

### COM 5213. Relational Communication. (3-0) 3 Credit Hours.

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

### COM 5223. Small Group Communication. (3-0) 3 Credit Hours.

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

### COM 5313. Health Communication. (3-0) 3 Credit Hours.

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

### COM 5323. Special Topics in Health Communication. (3-0) 3 Credit Hours.

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

### COM 5413. Seminar in Organizations. (3-0) 3 Credit Hours.

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

### COM 5423. Organizational Implementation of Integrated Communication. (3-0) 3 Credit Hours.

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

**COM 5613. New Media Design and Production. (3-0) 3 Credit Hours.**

Prerequisite: COM 5103 or consent of instructor. Introduction to information design and application of communication theories to practice. Advanced study of new media development. Hands-on skill development in creating digital content elements for use in multimedia and combining these elements into interactive presentations. The course includes integration of communication theory with research and/or practice. Course Fee: GL01 \$90.

**COM 5813. International Communication. (3-0) 3 Credit Hours.**

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

**COM 5823. Intercultural Communication. (3-0) 3 Credit Hours.**

Prerequisite: COM 5103 or consent of instructor. 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

## Department of English

The Department of English offers a Master of Arts Degree in English, a Graduate Certificate in Creative Writing, a Graduate Certificate in Rhetoric and Composition, and a Doctor of Philosophy Degree in English.

- M.A. in English (p. 267)
- Ph.D. in English (p. 269)

## Master of Arts Degree in English

The Master of Arts degree in English offers the student an opportunity to specialize in either Literature, Creative Writing, or Rhetoric and Composition, while also developing a broad knowledge of literatures written primarily in English. Students will develop an understanding of the historical and cultural contexts surrounding literary production, acquire skills in critical and creative analysis, and learn 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.

### 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.

Early in their first semester, students should meet with the M.A. Graduate Advisor of Record to draw up a program of study.

#### Thesis Option: English Studies Track

The thesis option is designed for students seeking to specialize in a specific area of study and requires that they complete a substantial research project. Some areas of specialization include Literature and Literary Theory, Linguistics, Postcolonial Studies, and Cultural Studies. The Creative Writing and Rhetoric and Composition specializations have their own, separate tracks (see below).

Upon submission and approval of a thesis proposal to a Thesis Director and the Graduate Program Committee, students will enroll in either ENG 6983 or ENG 6986 Master's Thesis.

Thesis candidates must complete the following requirements:

Code	Title	Credit Hours
<b>A. 18 semester credit hours in the major, distributed as follows: 18</b>		
1. Core Courses (6 semester credit hours):		
ENG 5013	Introduction to the Graduate Study of Literature (normally must be taken in the student's first semester)	
ENG 5053	Topics in Literary Genres	
2. Prescribed electives (12 semester credit hours):		

a. ENG literary study from before 1700, at least 3 semester credit hours must be ENG 5943 Topics in Major English Authors (minimum 3 semester credit hours)

b. ENG literary study between 1700 and 1900 (minimum 3 semester credit hours)

c. ENG literary study after 1900 (minimum 3 semester credit hours)

At least 3 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: 12**

In consultation with the M.A. Graduate Advisor of Record and their Thesis Advisor, the student will select elective courses appropriate to their specialized areas of study.

**C. Masters Thesis (6 semester credit hours) 6**

ENG 6983	Master's Thesis
ENG 6986	Master's Thesis

**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 of Record, may choose to include electives from outside of English.

Thesis Option students must successfully complete a defense of their project (to be conducted by their thesis committee). This defense constitutes the student's comprehensive examination

For more information about the English Studies Thesis track, students should contact the M.A. Graduate Advisor of Record.

#### Thesis Option: Creative Writing Track

M.A. in English students enrolled in the Creative Writing Certificate Program may opt for a Thesis with Creative Writing Specialization. Upon submission and approval of a thesis proposal to a Thesis Director who is a Core Creative Writing Faculty Member, and to the Graduate Program Committee, students may enroll in Thesis Hours: ENG 6983 and ENG 6986 Master's Thesis.

Thesis candidates in the Creative Writing Track must complete the following requirements:

Code	Title	Credit Hours
<b>A. 18 semester credit hours in the major, distributed as follows: 18</b>		
1. Core Courses (6 semester credit hours):		
ENG 5013	Introduction to the Graduate Study of Literature (normally must be taken in the student's first semester)	
ENG 5053	Topics in Literary Genres	
2. Prescribed electives (12 semester credit hours):		
a. ENG literary study from before 1700, at least 3 semester credit hours must be ENG 5943 Topics in Major English Authors (minimum 3 semester credit hours)		
b. ENG literary study between 1700 and 1900 (minimum 3 semester credit hours)		
c. ENG literary study after 1900 (minimum 3 semester credit hours)		
At least 3 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 Creative Writing Workshops 12**

ENG 6043 Graduate Creative Writing Workshops are regularly offered in Fiction and Poetry (and occasionally Creative Non-Fiction). At least two genres of workshop must be successfully completed during the student's coursework.

**C. Masters Thesis (6 semester credit hours) 6**

ENG 6983 Master's Thesis

ENG 6986 Master's Thesis

**Total Credit Hours 36**

Creative Writing thesis track students must successfully complete a defense of their project (to be conducted by their thesis committee). This defense constitutes the student's comprehensive examination.

For more information about the Creative Writing thesis track (to include the Creative Writing Certificate), students should contact the Creative Writing Program Director.

**Thesis Option: Rhetoric and Composition Track**

M.A. in English students enrolled in the Rhetoric and Composition Certificate Program may opt for a Thesis with Rhetoric and Composition Specialization. Upon submission and approval of a thesis proposal to a Thesis Director who is a Core Rhetoric and Composition Faculty Member, and to the Graduate Program Committee, students may enroll in Thesis Hours: ENG 6983 and ENG 6986 Master's Thesis.

Thesis candidates in the Rhetoric and Composition track must complete the following requirements::

Code	Title	Credit Hours
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**A. 18 semester credit hours in the major, distributed as follows: 18**

1. Core Courses (6 semester credit hours):

ENG 5013 Introduction to the Graduate Study of Literature (normally must be taken in the student's first semester)

ENG 5053 Topics in Literary Genres

2. Prescribed electives (12 semester credit hours):

a. ENG literary study from before 1700, at least 3 semester credit hours must be ENG 5943 Topics in Major English Authors (minimum 3 semester credit hours)

b. ENG literary study between 1700 and 1900 (minimum 3 semester credit hours)

c. ENG literary study after 1900 (minimum 3 semester credit hours)

At least 3 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 Rhetoric and Composition Coursework 12**

ENG 5133 Development of Rhetoric and Composition

9 semester credit hours selected from the following courses:

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

**C. Masters Thesis (6 semester credit hours) 6**

ENG 6983 Master's Thesis

ENG 6986 Master's Thesis

**Total Credit Hours 36**

Courses may be repeated when topics vary, but not more than six (6) hours of any one course may be applied to the thesis track.

Rhetoric and Composition students must successfully complete a defense of their project (to be conducted by their thesis committee). This defense constitutes the student's comprehensive examination.

For more information about the Rhetoric and Composition thesis track (to include the Rhetoric and Composition Certificate), students should contact the Rhetoric and Composition Graduate Certificate Director.

**Non-Thesis Option**

Non-thesis degree candidates must complete the following requirements:

Code	Title	Credit Hours
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**A. 24 semester credit hours in the major, distributed as follows: 24**

1. Core Courses:

ENG 5013 Introduction to the Graduate Study of Literature (normally must be taken in the student's first semester)

ENG 5053 Topics in Literary Genres

2. Prescribed electives:

a. ENG literary study from before 1700, at least 3 semester credit hours must be ENG 5943 Topics in Major English Authors (minimum 6 semester credit hours)

b. ENG literary study between 1700 and 1900 (minimum 6 semester credit hours)

c. ENG literary study after 1900 (minimum 6 semester credit hours)

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: 12**

In consultation with the M.A. 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 of Record, may choose to include electives from outside of English.

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. 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 rhetoric and 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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.
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. An online application
2. A statement of purpose (2–3 pages)
3. A writing sample (a research paper of approximately 15 pages)
4. Three letters of recommendation attesting to the student's academic training, capability, and potential
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 60 (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:

Code	Title	Credit Hours
<b>A. Core Curriculum:</b>		<b>9</b>
ENG 5183	Theory and Practice of Teaching Composition (if a course equivalent has already been taken)	
	or ENG 5133 Development of Rhetoric and Composition	
ENG 6013	Theoretical and Research Methods	
ENG 6053	Latina/o Studies: Text and Context	
<b>B. Seminars:</b>		<b>9</b>
ENG 7053	Seminar: Latina/o Studies	
ENG 7063	Seminar: Issues in Culture	
ENG 7073	Seminar: Theory and Criticism	
<b>C. Electives:</b>		<b>15</b>
1. Select one of the following prescribed electives:		
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

ENG 6083 Cultural Rhetorics

2. Free electives (minimum 12 semester credit hours, including at least 6 in ENG graduate courses). The student, in consultation with an academic advisor and the Doctoral Advisor of Record, will select at least 12 hours of freely elected courses. Students will select coursework from available graduate courses in ENG or, with approval of the Graduate Program Committee, related disciplines.

**D. Doctoral research:** **6**

ENG 7313 Doctoral Dissertation

**Total Credit Hours** **39**

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. 270)
- Graduate Certificate in Rhetoric and Composition (p. 270)

## 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.

### Certificate Requirements

Requirements for the Graduate Certificate include 12 semester credit hours. No course in which a grade lower than "B" is earned may be used to complete a Graduate Certificate in Creative Writing.

Code	Title	Credit Hours
<b>Required Courses (12 semester credit hours):</b>		<b>12</b>
ENG 6043	Creative Writing	
May be repeated in any combination, but at least 3 hours must be taken in each genre (poetry and fiction)		
<b>Total Credit Hours</b>		<b>12</b>

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 the English program, Rhetoric and Composition. It 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.

### Certificate Requirements

Requirements for the Graduate Certificate in Rhetoric and Composition comprise 12 semester credit hours, including:

Code	Title	Credit Hours
<b>A. Required Course (3 semester credit hours):</b>		<b>3</b>
ENG 5133	Development of Rhetoric and Composition	
<b>B. Electives (9 semester credit hours):</b>		<b>9</b>
Select 3 of the following courses:		
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	
<b>Total Credit Hours</b>		<b>12</b>

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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ENG 5513. Nineteenth-Century British Literature. (3-0) 3 Credit Hours.**

Critical study of poetry and prose of nineteenth-century British writers. Course Fee: GL01 \$90.

**ENG 5613. Nineteenth-Century American Literature. (3-0) 3 Credit Hours.**

Critical study of poetry and prose of nineteenth-century American writers. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ENG 5763. Latina/o Literature. (3-0) 3 Credit Hours.**

Critical study of poetry, prose, and drama of Latina/o writers. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ENG 5783. African American Literature. (3-0) 3 Credit Hours.**

Critical study of poetry, prose, and drama of African American writers. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.") Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**ENG 6083. Cultural Rhetorics. (3-0) 3 Credit Hours.**

Study and research of rhetorical, social, and pedagogical dimensions of cultural communities, including texts, practices, and ideas. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**ENG 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**ENG 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.



**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$180.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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 from 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. Course Fee: GL01 \$30.

**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 from 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

## 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:

1. 18 upper-division semester credit hours in history or courses with demonstrably significant historical content;
2. 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.

Applicants must submit:

1. An online application form
2. Official transcripts from all institutions attended. All international transcripts must be recorded in English or officially translated to English.
3. A 500-word statement describing how an M.A. in History will advance personal and professional goals
4. All applicants must submit one writing sample not to exceed 5,000 words. The writing sample should be one of the following:
  - a. A research paper that utilizes primary sources
  - b. An analytical paper that compares two or more scholarly resources
  - c. A book review of a scholarly historical work that has influenced the applicant's decision to pursue a Master's degree in History.
5. 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. (*Candidates who are returning to graduate study more than five years after receiving the B.A. may consult with the Graduate Advisor of Record to provide appropriate letters.*)

Applicants for admission as special graduate students should have completed at least 12 semester credit hours in history. Special graduate students may be limited in the courses they are permitted to take. Admission as a special graduate student does not ensure subsequent admission as a degree-seeking student. Consult *UTSA Student Policies* on regulations regarding "special graduate student" 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:

Code	Title	Credit Hours
<b>A. 3 semester credit hours of required coursework:</b>		<b>3</b>
HIS 5003	Introduction to History: Theories and Methods (Students must enroll in this course in the first semester of their program.)	
<b>B. 3 semester credit hours in Historical Practices. Students can fulfill this requirement by taking one of the following courses:</b>		<b>3</b>
HIS 5093	Designing a History Course	
HIS 6913	Making History in the Digital Age	
HIS 6923	Teaching Practicum	
HIS 6973	Special Studies in History (GIS, Public History, Historical Preservation, and other relevant topics)	
HIS 6993	Internship in History	
<b>C. 6 semester credit hours consisting of one of the following two sequences:</b>		<b>6</b>
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)	
A total of 6 semester credit hours of HIS 6983 can be applied toward the total 30 semester credit hours required for this degree. Students writing a thesis will complete HIS 6983 (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.		
<b>D. 18 semester credit hours of elective courses, chosen in consultation with the student's advisor:</b>		<b>18</b>
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.		
<b>E. Students pursuing Sequence I must pass the comprehensive examinations. Students pursuing Sequence II are not required to take comprehensive examinations.</b>		
<b>Total Credit Hours</b>		<b>30</b>

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.) Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **HIS 5253. Mexican American History. (3-0) 3 Credit Hours.**

Examines the history of Mexican Americans from colonial times to the present. It emphasizes the diverse nature of Mexican American society by exploring its class, gender, and regional divisions. The course may also explore relations between Mexican Americans and other ethnic groups. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

**HIS 5483. Colonial Latin America. (3-0) 3 Credit Hours.**

An examination of Spanish and Portuguese America from the first encounters between Europeans and Native Americans at the end of the fifteenth century to the independence movements of the early nineteenth century. Special attention is paid to the role of race, gender, and religion in colonial societies and political and economic trends across regions. Course Fee: GL01 \$90.

**HIS 5653. Modern China: State and Revolution. (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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**HIS 6173. Latina/os in the United States. (3-0) 3 Credit Hours.**

Topics may include the experiences of people of Mexican, Cuban, Puerto Rican, Central American, and South American heritage 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. Course Fee: GL01 \$90.

**HIS 6193. U.S. Metropolitan History. (3-0) 3 Credit Hours.**

Explores the history of metropolitan development in modern American history. The class addresses the many ways in which public policies have reshaped the built and lived landscapes of metropolitan America while probing the complex, often contentious relationships among residents of cities, suburbs, and rural areas. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**HIS 6513. Topics on Gender and Sexuality. (3-0) 3 Credit Hours.**

This graduate seminar explores the subject of gender and/or sexuality through the historical lens. Students will have the opportunity to study the historiography of the chosen topic and various related theories and methodologies. Topics may vary and the content be comparative in scope. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**HIS 6523. Topics on Borderlands and Migrations. (3-0) 3 Credit Hours.**

This graduate readings seminar examines the scholarship on borderlands and/or migrations in a specific region of the world or in a comparative context. A borderlands focus will examine the politics of contested regions, frontiers, and borders as well as the social and economic effects on residents of these areas. A focus on migrations will explore the reasons that fuel migrations in sending countries, as well as the social and economic effects in the receiving countries. The historical periods and topics may vary. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**HIS 6533. Topics on Empires, States, and Revolutions. (3-0) 3 Credit Hours.**

This course examines the history and historiography of changing power relations between state entities and oppositional bodies, and between center and periphery/frontier. Emphasis will be placed on the intersection between the ideological and material conditions that shape hegemonic dynamics, and give rise to various forms of resistance and revolution. Specific topics and time periods may vary. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**HIS 6543. Topics on War and Society. (3-0) 3 Credit Hours.**

This graduate seminar probes the history of warfare at the social, economic, cultural and political levels. Students will have the opportunity to study the historiography on particular military conflicts and explore the wider impact of warfare. Topics may vary and the content be comparative in scope. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**HIS 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**HIS 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

**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.") Course Fee: GL01 \$90.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$30.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$90.

**HIS 6991. Internship in History. (0-0) 1 Credit Hour.**

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). Course Fee: GL01 \$30.

**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). Course Fee: GL01 \$90.

## Department of Modern Languages and Literatures

The Department of Modern Languages and Literatures offers the Master of Arts degree in Spanish, a Graduate Certificate in Linguistics, and a Graduate Certificate in Translation and Interpreting 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 linguistics—underscoring the unity of the Hispanic world rather than its national components. Elective courses in Linguistics (LNG) and Translation and Interpreting Studies (TIS) 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 cultures, literatures, 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.
- A grade point average of 3.0 (on a 4.0 scale) is required in undergraduate upper-division 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 letters of recommendation.

#### Application Materials

In addition to meeting University-wide requirements, all applicants must submit:

- An online application
- All transcripts
- A one- to two-page statement written in Spanish describing the objectives of proposed graduate study
- At least two academic letters of recommendation which address the candidate's potential for research and suitability for graduate-level work

#### 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:

Code	Title	Credit Hours
<b>A. 3 semester credit hours of required coursework:</b>		<b>3</b>
SPN 5373	Introduction to Graduate Hispanic Studies (This course must be taken within the first 18 hours of graduate work.)	

**B. 27 semester credit hours distributed as follows:** **27**

9 hours in culture (SPN)
9 hours in Spanish language and linguistics (SPN and LNG)
9 hours in literature (SPN)

**C. Electives** **6**

6 semester credit hours of electives in Spanish (SPN), Linguistics (LNG), Translation and Interpreting Studies (TIS), or other courses as approved by the Graduate Advisor of Record. TIS 6013 Practicum in Translation cannot be applied toward the degree.

**D. Comprehensive Examination**

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.

**E. 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 the Graduate Catalog, 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.)

**Total Credit Hours** **36**

- Graduate Certificate in Linguistics (p. 277)
- Graduate Certificate in Translation and Interpreting Studies (p. 278)

### Graduate Certificate in Linguistics

The Graduate Certificate in Linguistics is a 12-semester-credit-hour concentration available to degree-seeking students who have been admitted to any UTSA graduate program and who qualify for admission to the certificate program, as well as special graduate students who meet all the requirements outlined in the UTSA Graduate Catalog.

The Graduate Certificate in Linguistics offers coursework in the advanced, interdisciplinary study of language for students working at the master's or doctoral level. This certificate will also enhance students' employment credentials as college and university writing instructors, editors, or professional writers in corporate, non-profit, and educational settings. Requirements: One foundations course (LNG 5003, SPN 5903, ENG 6033, ESL 5003) and 9 additional semester credit hours of approved graduate linguistics courses. Courses may be repeated when topics vary but not more than six (6) hours of any one course may be applied to the certificate without the approval of an advisor. No course in which a grade lower than "B" is earned may be used to complete a Graduate Certificate in Linguistics. In order to receive this certificate, students must maintain a 3.0 average grade point average in the above courses.

Individuals interested in the Graduate Certificate in Linguistics should contact the Graduate Office of the Department of Modern Languages and Literatures.

#### Program Requirements

Code	Title	Credit Hours
<b>A. Foundation Course</b>		<b>3</b>
Select one course from the following:		
LNG 5003	Introduction to Linguistics	
SPN 5903	Topics in Hispanic Linguistics	

ENG 6033	Language and Linguistics
ESL 5003	Linguistics for Second Language and Bilingual Specialists
<b>B. Elective Courses</b> <span style="float: right;"><b>9</b></span>	
Select three of the following courses:	
LNG 5013	Sociolinguistics
LNG 5143	Forensic Linguistics
LNG 5153	Topics in Contemporary Linguistics
SPN 5843	History of the Spanish Language
SPN 5853	Spanish of the United States
SPN 5863	Spanish Phonetics and Phonology
SPN 5883	Spanish Morphology and Syntax
SPN 5893	Spanish Dialects
SPN 5903	Topics in Hispanic Linguistics
ENG 6033	Language and Linguistics
ESL 5003	Linguistics for Second Language and Bilingual Specialists
ESL 5013	Foundations of Second Language Acquisition
ESL 5083	Pedagogical Grammar
ESL 6013	Second Language Acquisition Research
BBL 5123	Sociolinguistics and Education
BBL 7133	Bilingualism and Second Language Acquisition
BBL 7233	Seminar in Second Language Learning & Multilingualism
BBL 7243	Seminar in Applied Linguistics
<b>Total Credit Hours</b>	<b>12</b>

## Graduate Certificate in Translation and Interpreting Studies

The Certificate in Translation and Interpreting 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 translation and interpreting studies theory, cultural competency, ethics, the practice of language mediation 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 who are not already admitted to the M.A. in Spanish 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.

### 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 academic letter of recommendation which addresses the candidate's potential for research and suitability for graduate-level work.

## Program Requirements

The Certificate in Translation and Interpreting 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, TIS 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. A maximum of one grade of "C" shall be applicable toward coursework for the Certificate in Translation and Interpreting Studies.

Students must complete the following requirements:

Code	Title	Credit Hours
<b>A. 9 semester credit hours from the following:</b>		<b>9</b>
TIS 5043	Principles of Translation and Interpreting	
TIS 5013	Interpreting in Legal Settings	
TIS 5023	Interpreting in Medical Settings	
TIS 5123	Theory and Practice of Translation or Interpreting	
TIS 5973	Topics in Translation and Interpreting Studies	
<b>B. 3 semester credit hours from the following:</b>		<b>3</b>
SPN 5023	Writing and Editing in Spanish	
LNG 5143	Forensic Linguistics	
SPN 5843	History of the Spanish Language	
SPN 5863	Spanish Phonetics and Phonology	
SPN 5853	Spanish of the United States	
SPN 5883	Spanish Morphology and Syntax	
SPN 5893	Spanish Dialects	
SPN 5903	Topics in Hispanic Linguistics	
<b>C. Practicum in Translation</b>		<b>3</b>
TIS 6013	Practicum in Translation	
<b>Total Credit Hours</b>		<b>15</b>

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 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. Course Fees: GL01 \$120; MM01 \$7.

### 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. Course Fees: GL01 \$120; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**Linguistics (LNG) Courses****LNG 5003. Introduction to Linguistics. (3-0) 3 Credit Hours.**

Basic principles of analysis and description of the structure of language, including phonetics/phonology, morphology, syntax, semantics, and pragmatics. Also, overview of selected subfields of linguistics, such as historical linguistics, sociolinguistics, language acquisition, and bilingualism. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**LNG 5143. Forensic Linguistics. (3-0) 3 Credit Hours.**

This course examines how the analysis and manipulation of language are used to commit, solve, and prevent crimes. Students will explore case studies from law enforcement and counter-terrorism dealing with coerced confessions, the determination of authorship, and the manipulation of suspects under interrogation, among others. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**SPN 5373. Introduction to Graduate Hispanic 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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**SPN 5483. Topics in Hispanic Cultures. (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, as reflected in their literature and arts. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**SPN 5813. Topics in Hispanic Literatures. (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. Course Fees: GL01 \$90; MM01 \$7.



**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. Course Fees: GL01 \$90; MM01 \$7.

**SPN 5853. Spanish of the United States. (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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$30; MM01 \$7.

**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 cultures, literatures, and/or languages. May be repeated once for credit as an elective. Course Fees: GL01 \$90; MM01 \$7.

**SPN 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GL01 \$30; MM01 \$7.

**SPN 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GL01 \$60; MM01 \$7.

**SPN 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fees: GL01 \$90; MM01 \$7.

**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. Course Fees: GL01 \$30; MM01 \$7.

**SPN 6976. Special Problems. (6-0) 6 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. Course Fees: GL01 \$180; MM01 \$7.

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

Prerequisites: Permission from 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 in SPN 6981 or SPN 6983 is required each term in which the thesis is in progress. Course Fees: GL01 \$30.

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

Prerequisites: Permission from 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 in SPN 6981 or SPN 6983 is required each term in which the thesis is in progress. Course Fees: GL01 \$90; MM01 \$7.

## Translation and Interpreting Studies (TIS) Courses

**TIS 5013. Interpreting in Legal Settings. (3-0) 3 Credit Hours.**

Designed to prepare students to interpret in legal settings between Spanish and English by exploring interpreter training in the US, ethics in court interpreting, professional certification, language access legislation and civil rights, terminology building, current research trends in legal interpreting, and by developing interpreting skills and strategies. Course Fees: GL01 \$90; MM01 \$7.

**TIS 5023. Interpreting in Medical Settings. (3-0) 3 Credit Hours.**

This course aims to prepare students to interpret in medical settings between Spanish and English by providing a panoramic overview of biomedical culture in the US, body systems and anatomy, medical terminology, and by developing interpreting skills and strategies. Course Fees: GL01 \$90; MM01 \$7.

**TIS 5043. Principles of Translation and Interpreting. (3-0) 3 Credit Hours.**

Introduction to current and fundamental research in translation and interpreting studies. May be repeated for credit when topics vary. (Formerly FL 5043.) Course Fees: GL01 \$90; MM01 \$7.

**TIS 5123. 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. (Formerly SPN 6083.) Course Fees: GL01 \$90; MM01 \$7.

**TIS 5973. Topics in Translation and Interpreting Studies. (3-0) 3 Credit Hours.**

A seminar in advanced and specialized topics in translation and interpreting studies. May be repeated for credit when topics vary. Course Fees: GL01 \$90; MM01 \$7.

**TIS 6013. Practicum in Translation. (0-0) 3 Credit Hours.**

Prerequisite: TIS 5043 or TIS 5123 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. (Formerly FL 6013.) Course Fees: GL01 \$90; MM01 \$7.

## Department of Music

The Department of Music offers the Master of Music degree, a Graduate Certificate in Instrumental Performance, and a Graduate Certificate in Music Pedagogy (Voice or Keyboard).

### Master of Music Degree

The Master of Music degree program in the Department of Music is currently 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, Piano Performance and Pedagogy, or Vocal Performance and Pedagogy. 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 audition requirements:

#### Choral and Instrumental Conducting

Provide a recent 20-30 minute video (private YouTube link) demonstrating the level of mastery in rehearsal and performance situations. Candidates will be invited to on-campus audition and placement examinations after pre-screening.

#### Music Education

Submit a 20 minute digital video of classroom teaching (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. Candidates will be invited to campus for music education faculty interview and placement examinations after pre-screening.

#### Instrumental Performance

Prepare 20-30 minutes of music for an in-person audition (or with acceptable justification approved by the auditioning committee, provide a recent high-quality recording via private YouTube link) demonstrating the level of mastery in the proposed performance medium. Some instrumental areas may require candidates to submit a pre-screening video. Candidates will also complete placement examinations on scheduled audition date.

#### Vocal Performance

Provide a recent video of a minimum of two selections (private YouTube link) demonstrating the level of mastery in the proposed performance medium for pre-screening. Candidates will be invited to on-campus audition and placement examinations after pre-screening.

#### Piano Performance and Pedagogy

Prepare 20-30 minutes of music for an in-person audition (or with acceptable justification approved by the auditioning committee, provide a recent high-quality recording via private YouTube link) demonstrating the

level of mastery in the proposed performance medium. Candidates will also complete placement examinations on scheduled audition date.

### Vocal Performance and Pedagogy

Provide a recent video of a minimum of two selections (private YouTube link) demonstrating the level of mastery in the proposed performance medium for pre-screening. Candidates will be invited to on-campus audition and placement examinations after pre-screening.

### Placement Examinations

Students in all emphases are required to take placement examinations in music theory, aural skills, and music history, and, where appropriate, complete the corresponding review classes before taking graduate topics courses in music history and music theory.

Students in the vocal performance, vocal performance and pedagogy, and choral conducting emphases are required to 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.

Placement examinations are administered on official audition days.

### 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 33 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. (Please note that the number of semester credit hours required for the different emphases in this degree, 33-36 hours, differs from the requirements in earlier catalogs. These changes are pending final approval.)

### 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 35 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 Performance and Pedagogy or Vocal Performance and Pedagogy must complete a total of 36 semester credit hours.

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.

Degree candidates for each respective program must complete the following requirements:

### Master of Music with a Conducting Emphasis (Instrumental or Choral)

Code	Title	Credit Hours
A. 9 semester credit hours in music history, music theory, and research:		
MUS 5133	Topics in Music Theory	9
MUS 5233	Introduction to Music Research	
MUS 5263	Topics in Music History	

B. 16 semester credit hours of studies in music selected according to the area of emphasis and approved by the student's advisor:

MUS 5523	Rehearsal Techniques
MUS 5542	Music Performance (4 semesters)
MUS 6941	Recital
MUS 5711	Graduate Chamber Ensemble (4 semesters) or MUS 5811 Graduate Large Ensemble

C. 4 semester credit hours of music electives, approved by the student's advisor

MUS 5223	Ensemble Repertoire	4
MUS 6911	Recital Project	

D. 6 semester credit hours of additional electives, approved by the student's advisor. Non-music electives may be used with consent and approval of the student's advisor.

**Total Credit Hours** **35**

### Master of Music with a Music Education Emphasis

Code	Title	Credit Hours
A. 9 semester credit hours in music history, music theory, and research:		
MUS 5133	Topics in Music Theory	9
MUS 5233	Introduction to Music Research	
MUS 5263	Topics in Music History	

B. 12 semester credit hours of studies in music selected according to the area of emphasis and approved by the student's advisor:

MUS 5403	Psychological Foundations of Music Education
MUS 5423	Foundations of Music Education
MUS 5523	Rehearsal Techniques or MUS 5593 Elementary Music
MUS 6423	Seminar in Music Education

C. 12 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.

**Total Credit Hours** **33**

### Master of Music with a Performance Emphasis (Instrumental or Vocal)

Code	Title	Credit Hours
A. 9 semester credit hours in music history, music theory, and research:		
MUS 5133	Topics in Music Theory	9
MUS 5233	Introduction to Music Research	
MUS 5263	Topics in Music History	

B. 16 semester credit hours of studies in music selected according to the area of emphasis and approved by the student's advisor:

MUS 5432	Topics in Performance Literature
MUS 5431	Applied Performance Literature
MUS 5542	Music Performance (4 semesters)
MUS 5711	Graduate Chamber Ensemble (4 semesters) or MUS 5811 Graduate Large Ensemble
MUS 6941	Recital

C. 4 semester credit hours of music electives, approved by the student's advisor	4
MUS 5522 Graduate Pedagogy I	
MUS 5521 Pedagogy Practicum I	
MUS 6911 Recital Project	
D. 6 semester credit hours of additional electives. Non-music electives may be used with advisor approval.	6
<b>Total Credit Hours</b>	<b>35</b>

### Master of Music with a Performance and Pedagogy Emphasis (Piano or Vocal)

Code	Title	Credit Hours
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. 10 semester credit hours of studies in music selected according to the area of emphasis and approved by the student's advisor:		10
MUS 5522	Graduate Pedagogy I	
MUS 5521	Pedagogy Practicum I	
MUS 5532	Graduate Pedagogy II	
MUS 5531	Pedagogy Practicum II	
MUS 5541	Advanced Pedagogy Practicum	
MUS 5572	Pedagogy of Classroom Instruction	
MUS 6901	Project in Music Pedagogy	
C. 12 semester credit hours of music electives, approved by the student's advisor		12
MUS 5542	Music Performance (4 semesters)	
MUS 5432	Topics in Performance Literature	
MUS 5431	Applied Performance Literature	
MUS 6941	Recital	
D. 5 semester credit hours of additional electives, approved by the student's advisor. Non-music electives may be used with consent and approval of the student's advisor.		5
<b>Total Credit Hours</b>		<b>36</b>

- Graduate Certificate in Instrumental Performance (p. 283)
- Graduate Certificate in Music Pedagogy (p. 283)

## Graduate Certificate in Instrumental Performance

The Certificate in Instrumental 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 Instrumental Performance requires the following 12 semester credit hours:

Code	Title	Credit Hours
Required Courses (8 semester credit hours):		8
MUS 5542	Music Performance (2 semesters)	
MUS 5811	Graduate Large Ensemble (two semesters for a total of 2 credit hours)	
	or MUS 5711 Graduate Chamber Ensemble	
MUS 6941	Recital (two recitals – one solo, one chamber – for a total of 2 credit hours)	
4 semester credit hours of related music electives with student's advisor approval		4
<b>Total Credit Hours</b>		<b>12</b>

Individuals interested in pursuing the Certificate in Instrumental Performance should contact the Department of Music Keyboard Area or Instrumental Performance Area Coordinator.

## Graduate Certificate in Music Pedagogy (Voice or Keyboard)

The Certificate in Music Pedagogy is designed for the active private voice or piano teacher with interest 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 Music Pedagogy requires the following 14 semester credit hours:

Code	Title	Credit Hours
Required Courses (10 semester credit hours):		10
MUS 5522	Graduate Pedagogy I	
MUS 5521	Pedagogy Practicum I	
MUS 5532	Graduate Pedagogy II	
MUS 5531	Pedagogy Practicum II	
MUS 5541	Advanced Pedagogy Practicum	
MUS 5572	Pedagogy of Classroom Instruction	
MUS 6901	Project in Music Pedagogy	
4 semester credit hours in related music electives with student's advisor approval.		4
MUS 5542	Music Performance	
MUS 6971	Special Topics (2 semesters)	
	or MUS 5541 Advanced Pedagogy Practicum	
	or MUS 5542 Music Performance	
	or MUS 6972 Special Topics	
<b>Total Credit Hours</b>		<b>14</b>

Individuals interested in pursuing the Certificate in Music Pedagogy (Voice emphasis) should contact the Department of Music Voice Area Coordinator. Individuals interested in pursuing the Certificate in Music Pedagogy (Keyboard emphasis) should contact the Department of Music Keyboard Area Coordinator.

## Music (MUS) Courses

### **MUS 5002. Graduate Music Theory Review. (2-1) 2 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. (Formerly MUS 5003. Credit cannot be earned for both MUS 5002 and MUS 5003.) Course Fee: GL01 \$60.

### **MUS 5013. Graduate Music History Survey. (3-0) 3 Credit Hours.**

Designed to satisfy deficiencies indicated by the Graduate Music History Placement Examination. Alternatively, this course may be used as a music elective credit for students not pursuing a Master of Music degree. 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. Course Fee: GL01 \$90.

### **MUS 5042. Graduate Aural Skills Review. (2-1) 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. Course Fee: GL01 \$60.

### **MUS 5123. Introduction to Electronic and Computer Music. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. Lecture course serving as a conceptual and practical introduction to digital audio workstation software, synthesizers, sequencers, and other audio hardware and software for the purpose of creating original compositions, with an emphasis on sound-processing techniques and timbral manipulation. Includes a survey of the history and literature of electronic music. Generally offered: Spring.

### **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. Course Fee: GL01 \$90.

### **MUS 5143. Advanced Compositional Techniques. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. A study of selected techniques of composition from the post-common practice, post-tonal era. Topics will focus on counterpoint, texture, orchestration and timbre. May be repeated for credit when topics vary.

### **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. Course Fees: GL01 \$90; M001 \$300.

### **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. Course Fee: GL01 \$90.

### **MUS 5233. Introduction to Music Research. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. 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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **MUS 5313. Music Theory Pedagogy. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. The exploration of techniques and materials relevant to teaching music theory at the secondary and college levels.

### **MUS 5323. Aural Skills Pedagogy. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. Exploration of techniques and materials relevant to teaching aural skills at the secondary and college levels.

### **MUS 5342. Keyboard Skills for Music Theory. (2-0) 2 Credit Hours.**

Prerequisite: Graduate standing in music. This course will focus on the development of keyboard skills necessary to demonstrate music theory concepts and perform musical excerpts.

### **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. Course Fee: GL01 \$90.

### **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. Course Fee: GL01 \$90.

### **MUS 5431. Applied Performance Literature. (0-0) 1 Credit Hour.**

Prerequisite: Graduate standing in music. Corequisite: MUS 5432. A focused study of the solo, chamber, and/or orchestral repertoire. Specific literature will be assigned in support of topic in MUS 5432 and will vary by instrument or voice. May be repeated for credit when topics vary.

### **MUS 5432. Topics in Performance Literature. (2-0) 2 Credit Hours.**

Prerequisite: Graduate standing in music. A study of a representative composer, group of composers, or major musical genre. Individuals and musical works are considered within the contexts of historical, social and cultural identities and the frameworks of intellectual history and institutional practices. Concurrent enrollment in MUS 5431 required. May be repeated for credit when topics vary.

**MUS 5463. Introduction to Music Industry. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. The Introduction to the Music Industry course will present a broad overview of the recording and music industry, and explains how the various segments operate on a day-to-day basis: where monies are generated, who the key players are, how deals are made and broken, how interests are protected, and what the new developments in digital technology are that are changing the way that music is marketed, promoted, distributed, and heard. This course will have several hands-on opportunities aligned with students' interests. Several emerging business models including arts administration and non-profit opportunities will also be discussed. Students will be encouraged via the assignments to think as entrepreneurs as well as marketers.

**MUS 5473. Introduction to Music and Arts Nonprofit Organizations. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. The introduction to the Music and Arts Nonprofit Organizations course will focus on strategies of management, financial structuring, artistic direction, the use of technology, and marketing, primarily within the context of opera companies, symphony orchestras, ballet companies, theatres and other performing arts venues, museums and chamber music organizations. The course includes an examination of the challenges of audience development and discussion of the role of art in contemporary society.

**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. Course Fees: GL01 \$30; M001 \$100.

**MUS 5521. Pedagogy Practicum I. (0-0) 1 Credit Hour.**

Prerequisite: Graduate standing in music. Corequisite: MUS 5522. Survey of techniques, practices and materials related to the development and execution of one-on-one music instruction. Specific course content will vary based upon the individual student's principal instrument or voice.

**MUS 5522. Graduate Pedagogy I. (2-0) 2 Credit Hours.**

Prerequisite: Graduate standing in music. Corequisite: MUS 5521. The exploration of topics and concepts relevant to the pedagogy of one-on-one music instruction. Topics may vary based upon instrument or voice.

**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. Course Fee: GL01 \$90.

**MUS 5531. Pedagogy Practicum II. (0-0) 1 Credit Hour.**

Prerequisite: Graduate standing in music. A continuation of MUS 5521. Applications of topics covered in MUS 5532. These may include observations, instructional activities, and/or supervised teaching of level-appropriate students (varies by instrument or voice). Concurrent enrollment in MUS 5532 required.

**MUS 5532. Graduate Pedagogy II. (2-0) 2 Credit Hours.**

Prerequisite: Graduate Standing in music. A continuation of MUS 5522. Concurrent in enrollment in MUS 5531 required.

**MUS 5541. Advanced Pedagogy Practicum. (0-0) 1 Credit Hour.**

Prerequisite: Graduate Standing in music. Assigned observations of cooperating instructors and student teaching under faculty supervision. May be repeated for credit. Course Fee: GL01 \$30.

**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. Course Fees: GL01 \$60; M001 \$200.

**MUS 5554. Music Performance. (0-0) 4 Credit Hours.**

Prerequisites: Graduate standing in music and successful audition and permission from the Graduate Advisor of Record and program advisor. 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. Course Fees: GL01 \$120; M001 \$400.

**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.") Course Fee: GL01 \$60.

**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. Course Fee: GL01 \$90.

**MUS 5613. Entrepreneurship in Music. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in music. The Entrepreneurship Music course will present an advanced study of the startup culture in the business of music, including historical examinations of social trends, technological advances, legal issues, and commercial practices that have influenced the development of the music industry in both the fine arts and popular culture. Strategies for career building in music business are explored with an emphasis on knowledge and skills that support entrepreneurial activities in music.

**MUS 5711. Graduate Chamber Ensemble. (0-3) 1 Credit Hour.**

The study of selected ensemble works through participation in rehearsal and performance. May be repeated for credit. Course Fees: GL01 \$30; MC01 \$25.

**MUS 5811. Graduate Large Ensemble. (0-5) 1 Credit Hour.**

The study of selected large ensemble works through participation in rehearsal and performance. May be repeated for credit. Course Fees: GL01 \$30; MC01 \$25.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**MUS 6803. Seminar in Music Marketing. (3-0) 3 Credit Hours.**

Prerequisite: Graduate Standing in music. A seminar style course addressing some of the most recent development in the Music Industry. This is an upper level course that will be reading and writing intensive and have heavy experiential, skill-building, and project-based components.

**MUS 6901. Project in Music Pedagogy. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing in music. 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. Course Fees: GL01 \$30, M001 \$150, STLF \$6.

**MUS 6903. Project in Music Pedagogy. (0-0) 3 Credit Hours.**

Prerequisites: Permission from 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. Course Fees: GL01 \$90, STLF \$18.

**MUS 6911. Recital Project. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing in music, MUS 5233, or consent of instructor. The recital project is a substantial performance-based project designed to further the professional development of students in performance and conducting emphases. The project can consist of an additional recital (lecture, chamber, or solo), a significant opera, oratorio, or concerto performance, or a document addressing historical, cultural, and analytical aspects of the student's performance repertoire. May be repeated for credit. Course Fee: GL01 \$30.

**MUS 6913. Thesis in Music Education. (0-0) 3 Credit Hours.**

Prerequisites: Permission from 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. Course Fee: GL01 \$90.

**MUS 6941. Recital. (0-0) 1 Credit Hour.**

Prerequisites: Permission from the Graduate Advisor of Record and music performance instructor; for students with a pedagogy and performance emphasis and music performance emphasis: concurrent registration required in MUS 5542 or MUS 5554. A recital approximately one hour in length; required of all students in the performance, conducting, or pedagogy and performance emphases. Course Fee: GL01 \$30.

**MUS 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Permission in writing (form available) from 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. Course Fee: GL01 \$30.

**MUS 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Permission in writing (form available) from 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. Course Fee: GL01 \$60.

**MUS 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$30.

**MUS 6971. Special Topics. (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. Course Fee: GL01 \$30.

**MUS 6972. Special Topics. (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. Course Fee: GL01 \$60.

**MUS 6973. Special Topics. (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. Course Fee: GL01 \$90.

## 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 Masters of Arts program in Philosophy and must also submit 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, and writing sample (optional). Admission is competitive. Satisfying minimum requirements does not guarantee admission.

**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 or special graduate student. A graduate degree-seeking applicant admitted to the program may receive unconditional, conditional, or probationary admission status. Special graduate student status may be limited in the courses they are permitted. Admission with 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:

#### Thesis Option

The minimum number of semester credit hours required for this degree is 30 (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:

Code	Title	Credit Hours
<b>A. 6 semester credit hours of required basic courses:</b>		<b>6</b>
PHI 5003	Logic	
	or PHI 5013 Advanced Logic	
PHI 5033	Philosophical Writing and Research	
<b>B. Select one of the following history courses, depending on the student's area of interest:</b>		<b>3</b>
PHI 5113	Ancient Philosophy	
PHI 5123	Modern Philosophy	
PHI 5133	Nineteenth Century Philosophy	
PHI 6143	Contemporary Analytic Philosophy	
PHI 6153	Contemporary Continental Philosophy	
<b>C. Select one of the following general philosophy electives, depending on the student's area of interest:</b>		<b>3</b>
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	
<b>D. Select one of the following specialized advanced topics in philosophy, depending on the student's area of interest:</b>		<b>3</b>
PHI 6033	Advanced Topics in Applied Ethics	
PHI 6973	Special Studies in Philosophy	
<b>E. 9 semester credit hours of electives selected in consultation with Graduate Advisor</b>		<b>9</b>
<b>F. Master's Thesis:</b>		<b>6</b>
PHI 6983	Master's Thesis	
<b>Total Credit Hours</b>		<b>30</b>



### Non-Thesis Option

The minimum number of semester credit hours required for this degree is 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:

Code	Title	Credit Hours
<b>A. 6 semester credit hours of required basic courses:</b>		<b>6</b>
PHI 5003	Logic	
	or PHI 5013 Advanced Logic	
PHI 5033	Philosophical Writing and Research	
<b>B. Select one of the following history courses, depending on the student's area of interest:</b>		<b>3</b>
PHI 5113	Ancient Philosophy	
PHI 5123	Modern Philosophy	
PHI 5133	Nineteenth Century Philosophy	
PHI 6143	Contemporary Analytic Philosophy	
PHI 6153	Contemporary Continental Philosophy	
<b>C. Select one of the following general philosophy electives, depending on the student's area of interest:</b>		<b>3</b>
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	
<b>D. Select one of the following specialized advanced topics in philosophy, depending on the student's area of interest:</b>		<b>3</b>
PHI 6033	Advanced Topics in Applied Ethics	
PHI 6973	Special Studies in Philosophy	
<b>E. 12 semester credit hours of electives selected in consultation with Graduate Advisor</b>		<b>12</b>
<b>F. Internship:</b>		<b>6</b>
PHI 6943	Internship	
<b>Total Credit Hours</b>		<b>33</b>

### 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 prior to enrollment in either thesis or internship credits.

### 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. Course Fee: GL01 \$90.

#### 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. Course Fee: GL01 \$90.

#### 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. Course Fee: GL01 \$90.

#### 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. Course Fee: GL01 \$90.

#### 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. Course Fee: GL01 \$90.

#### 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. Course Fee: GL01 \$90.

#### 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**PHI 6931. Comprehensive Examination Preparation. (0-0) 1 Credit Hour.**

This course is designed to prepare students for their comprehensive examinations. Students will master the seminal works in their chosen sub-disciplines while building self-directed learning habits. By the end of the course students will have laid a foundation of content knowledge and academic skills upon which they can build as they pursue the final stages of their M.A. in philosophy.

**PHI 6932. Comprehensive Examination Preparation. (0-0) 2 Credit Hours.**

This course is designed to prepare students for their comprehensive examinations. Students will master the seminal works in their chosen sub-disciplines while building self-directed learning habits. By the end of the course students will have laid a foundation of content knowledge and academic skills upon which they can build as they pursue the final stages of their M.A. in philosophy.

**PHI 6933. Comprehensive Examination Preparation. (0-0) 3 Credit Hours.**

This course is designed to prepare students for their comprehensive examinations. Students will master the seminal works in their chosen sub-disciplines while building self-directed learning habits. By the end of the course students will have laid a foundation of content knowledge and academic skills upon which they can build as they pursue the final stages of their M.A. in philosophy.

**PHI 6943. Internship. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing from 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 6 hours will apply to the Master's degree. Course Fee: GL01 \$90.

**PHI 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**PHI 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$30.

**PHI 6982. Master's Thesis. (0-0) 2 Credit Hours.**

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$60.

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

Prerequisites: Permission from the Graduate Advisor of Record and thesis director. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$90.

## Department of Political Science and Geography

The Department of Political Science and Geography offers a Master of Arts degree in Geography, a Master of Arts degree in Global Affairs, and a Master of Arts degree in Political Science.

- M.A. in Geography (p. 290)
- M.A. in Global Affairs (p. 292)
- M.A. in Political Science (p. 293)

## Master of Arts Degree in Geography

The M.A. in Geography degree is designed to give graduate students the opportunity to analyze social processes and the physical environment across a range of cultures and historical periods, using appropriate methodologies and data management techniques. The degree gives students the chance to explore the many challenges of achieving more just sustainability through a critical overview of environmentally and socially sustainable countries, regions, cities, and communities. 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 (<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 one full year 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 (<http://catalog.utsa.edu/policies/generalacademicregulations/grades/>)", General Academic Regulations, in Student Policies).

Students who wish to take courses in the program without earning credit toward a Master's degree may apply as a special graduate (non-degree-seeking) student. 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 non-thesis option, and 33 for the thesis option. To be able to graduate in the minimum time period (two years), students should plan ahead and take all the GRG courses as they are offered each semester.

All degree candidates must complete the following requirements:

Code	Title	Credit Hours
<b>Non-Thesis Option</b>		
<b>A. 9 semester credit hours of required courses:</b>		<b>9</b>
GRG 5003	Research Design and Spatial Analysis	
GRG 5013	Geographic Thought	
GRG 5913	Design and Management of Geographic Information Systems	
<b>B. 18 semester credit hours of prescribed elective courses in geography from the following:</b>		<b>18</b>
GRG 5203	Global Migration in Local Context	
GRG 5253	Applied Climatology in the Urban Environment	
GRG 5233	Geographies of Gentrifications	
GRG 5323	Seminar in Urban Geography	
GRG 5403	Seminar in Biogeography	
GRG 5413	Climatology	
GRG 5423	Physiography and Landscape Appreciation	
GRG 5443	Seminar in Critical GIS	
GRG 5433	Environmental Landscape Management	
GRG 5513	Geography and Culture	
GRG 5543	Gender and Cities: An introduction to Feminist Geography	
GRG 5553	Global Urban Sustainability	
GRG 5653	Designing Better Maps: Seminar in GIS Cartography	
GRG 5563	Applied Sustainability	
GRG 5753	The Geography of Development and Underdevelopment	

GRG 5903	Seminar in Political Geography	
GRG 6973	Special Problems	
<b>C. 9 hours of free electives (inside or outside geography) that may include the following:</b>		<b>9</b>
ANT 5483	Landscape and Settlement	
ANT 6653	Spatial Techniques in Anthropology	
ANT 6723	Seminar in Culture, Environment, and Conservation	
GEO 6513	Advanced GIS	
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.		
<b>D. Comprehensive Examination</b>		
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.		
<b>Total Credit Hours</b>		<b>36</b>
<b>Code</b>	<b>Title</b>	<b>Credit Hours</b>
<b>Thesis Option</b>		
<b>A. 9 semester credit hours of required courses:</b>		<b>9</b>
GRG 5003	Research Design and Spatial Analysis	
GRG 5013	Geographic Thought	
GRG 5913	Design and Management of Geographic Information Systems	
<b>B. 12 semester credit hours of prescribed elective courses in geography from the following:</b>		<b>12</b>
GRG 5323	Seminar in Urban Geography	
GRG 5403	Seminar in Biogeography	
GRG 5413	Climatology	
GRG 5423	Physiography and Landscape Appreciation	
GRG 5433	Environmental Landscape Management	
GRG 5513	Geography and Culture	
GRG 5543	Gender and Cities: An introduction to Feminist Geography	
GRG 5553	Global Urban Sustainability	
GRG 5563	Applied Sustainability	
GRG 5753	The Geography of Development and Underdevelopment	
GRG 5903	Seminar in Political Geography	
<b>C. 6 hours of free electives (inside or outside geography) that may include the following:</b>		<b>6</b>
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	
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.

**D. Thesis 6**

GRG 6893	Master's Thesis Proposal
GRG 6983	Master's Thesis

**E. Comprehensive Examination**

GRG 6961	Comprehensive Examination
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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 (non-thesis option) or 33 hours (thesis option) required for the Master's degree.

**Master of Arts Degree in Global Affairs**

The M.A. in Global Affairs offers students the opportunity to develop and expand their understanding of how globalization impacts world politics and societies. The program is designed to provide graduate students with a global perspective to realize the opportunities available to them in an increasingly globalized world. Among others, these include careers in state and non-state agencies, many of which deal with cross-border dynamics and issues, and assuming leadership positions to make a difference in the world. Students may choose to specialize in either Global Security or Global Development and Human Rights, programs that are theoretically and conceptually rigorous as well as practically meaningful. In order to facilitate placement, faculty will encourage students to make conscious decisions about their specialization and career planning. This includes becoming involved in professional networks through pertinent internships, conference participation, publication, and extracurricular activities that enrich student experience at UTSA.

**Program Admission Requirements**

Students wishing to apply to the M.A. in Global Affairs must submit the following materials to the Graduate Admissions office:

1. Completed application (<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. Official transcripts from all collegiate institutions attended, including community colleges
5. A statement of purpose (at least 500 words or two typed pages) indicating interests and goals in studying global affairs, including a summary of academic and professional experience in the field

6. Three letters of recommendation from references who can speak to your qualifications for the graduate program (at least two of these must be academic. Letters should address the applicant's qualifications for succeeding in an advanced degree program.)

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, International Relations, or directly related fields in the social and/or behavioral sciences. An overall grade point average of 3.0 in Political Science, International Relations, and related courses is also required. As with our other M.A. programs in the Department, no GRE is required. All applications are evaluated by an internal review committee to determine compliance with University and program requirements. Admission is competitive; satisfying the requirements does not guarantee admission.

**Returning Students**

Master's students who have not been in attendance for one full year 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 (<http://catalog.utsa.edu/policies/generalacademicregulations/grades/>)", General Academic Regulations, in Student Policies).

Upon admission to the Graduate Program, all students must meet with the Graduate Advisor of Record for the department as well as the Program Coordinator before enrolling in coursework.

**Degree Requirements**

The minimum number of semester credit hours required for the degree is 36 for both the non-thesis option and the thesis option. Degree candidates must complete the following requirements:

Code	Title	Credit Hours
<b>Non-Thesis Option</b>		
<b>A. 18 semester credit hours of required courses:</b>		<b>18</b>
GLA 5043	International Relations and World Politics	
GLA 5873	Governance in a Globalized World	
GLA 5003	Political Inquiry	
GLA 5013	Research Methods	
GLA 5783	Global Security	
GLA 5883	Global Development and Human Rights	
<b>B. 12 semester credit hours in either Global Security or Global Development and Human Rights</b>		<b>12</b>
Students specializing in Global Security choose from the following list of courses:		
GLA 5303	Topics in Global Affairs	
GLA 5723	International Organizations	
GLA 5773	Foreign Policy Analysis	
GLA 5953	Terrorism	
GLA 5983	Deterrence and Coercion in International Politics	
GLA 5993	Globalization and Protest Politics	

Students specializing in Global Development and Human Rights choose from the following list of courses:

GLA 5303	Topics in Global Affairs
GLA 5723	International Organizations
GLA 5753	The Geography of Development and Underdevelopment
GLA 5793	International Political Economy
GLA 5893	Human Rights and Humanitarian Politics

GLA or POL graduate courses not listed may be applied to program of study after approval by Graduate Advisor of Record.

**C. 6 semester credit hours of additional electives. Upon consultation with the Graduate Advisor of Record, students may take these semester credit hours outside the department.** 6

#### D. Comprehensive Exam

GLA 6961	Comprehensive Examination
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If registered for no other courses that semester, enrollment in GLA 6961 Comprehensive Examination will be required in the semester the comprehensive examination is taken.

**Total Credit Hours** 36

Code	Title	Credit Hours
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#### Thesis Option

**A. 18 semester credit hours of required courses:** 18

GLA 5043	International Relations and World Politics
GLA 5873	Governance in a Globalized World
GLA 5003	Political Inquiry
GLA 5013	Research Methods
GLA 5783	Global Security
GLA 5883	Global Development and Human Rights

**B. 9 semester credit hours in either Global Security or Global Development and Human Rights** 9

Students specializing in Global Security choose from the following list of courses:

GLA 5303	Topics in Global Affairs
GLA 5723	International Organizations
GLA 5773	Foreign Policy Analysis
GLA 5953	Terrorism
GLA 5983	Deterrence and Coercion in International Politics
GLA 5993	Globalization and Protest Politics

Students specializing in Global Development and Human Rights choose from the following list of courses:

GLA 5303	Topics in Global Affairs
GLA 5723	International Organizations
GLA 5753	The Geography of Development and Underdevelopment
GLA 5793	International Political Economy
GLA 5893	Human Rights and Humanitarian Politics

**C. 3 semester credit hours of additional electives. Upon consultation with the Graduate Advisor of Record, students may take these semester credit hours outside the department.** 3

**D. 6 semester credit hours Master's Thesis in the sequence outlined below. Students must complete core course requirements within the first 18 hours of coursework and immediately thereafter participate in a mid-program progress meeting. Enrollment in POL/GLA 6893, Research Proposal, will only be approved upon successful completion of the progress meeting.** 6

GLA 6893	Research Proposal
GLA 6983	Master's Thesis
<b>Total Credit Hours</b>	
<b>36</b>	

## Comprehensive Exam

Students will prepare for the Comprehensive Examination under faculty supervision and in consultation with their Faculty Advisor and Graduate Advisor of Record. In consultation with the Faculty 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 focus on the respective student specialization and 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.

## 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 (<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. Official transcripts from all collegiate institutions attended including community colleges
5. A statement of purpose (roughly 500 words or two typed pages) indicating your interests and goals in studying political science
6. Three letters of recommendation from references who can speak to your qualifications for the graduate program (at least two of these must be from a college or university professor who can discuss and evaluate specifically your academic qualifications and potential for graduate-level study).

Applicants must satisfy all University requirements and must have completed 18 semester credit hours in upper-division undergraduate or graduate-level courses in Political Science or directly related fields in the social and/or behavioral sciences. 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 one full year 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 (<http://catalog.utsa.edu/policies/generalacademicregulations/grades/>)", General Academic Regulations, in Student Policies). GRE or LSAT scores will be waived for returning students who have GRE scores on file with the department.

Students who wish to take courses in the program without earning credit toward a Master's degree may apply as a special graduate (non-degree-seeking) student.

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 for the M.A. in Political Science and M.A. in Political Science Political Analysis track, and 30 for the M.A. in Political Science Teaching track. Students must declare their track (traditional or teaching) in their application material.

Degree candidates for the M.A. in Political Science must complete the following requirements:

Code	Title	Credit Hours
<b>A. 6 semester credit hours of methodological core courses:</b>		<b>6</b>
POL 5003	Political Inquiry	
POL 5013	Research Methods	
Plus 6 semester credit hours of breadth core courses from the following:		6
POL 5043	International Relations & World Politics	
POL 5063	Political Philosophy	
POL 5153	American Government and Politics	
<b>B. 18 semester credit hours of designated elective courses in consultation with the faculty advisor</b>		<b>18</b>
Students may receive up to 6 semester credit hours for courses taken outside of political science after consultation with their advisor. Students specializing in American Government must complete:		
POL 5153	American Government and Politics	
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	Gender and Elections	
POL 5163	American Political Development	
POL 5183	Congress	

POL 5193	Presidency
POL 5233	Political Creativity
POL 5413	Seminar in Political Psychology
POL 5423	Data Science for Politics
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 Relations & World Politics
Select at least 9 semester credit hours from the following:	
POL 5303	Topics in Comparative and International Politics
POL 5333	European Politics
POL 5363	Mexican Politics
POL 5703	American Foreign Policy
POL 5713	Comparative Political Systems
POL 5723	International Organizations
POL 5733	Political Actors and Systems in Latin America
POL 5773	Foreign Policy Analysis
POL 5783	Global Security
POL 5793	International Political Economy
POL 5853	Economic Geography
POL 5873	Governance in a Globalized World
POL 5903	Seminar in Political Geography
POL 5984	Cyber Warfare and International Politics
POL 5993	Globalization and Protest Politics

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 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 mid-program progress meeting. Enrollment in POL/GLA 6893, Research Proposal, will only be approved upon successful completion of the progress meeting.**

### D. Research Proposal **3**

POL 6893 Research Proposal (if POL 6893 is not offered, thesis students may enroll in POL 6983)

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	
<b>Total Credit Hours</b>		<b>36</b>

**Degree candidates for the M.A. in Political Science Political Analysis Track must complete the following requirements:**

Code	Title	Credit Hours
<b>A. Required Core Courses</b>		<b>9</b>

POL 5003	Political Inquiry	
POL 5013	Research Methods	
POL 5153	American Government and Politics	

**Plus 3 hours of methodological core courses from the following** **3**

POL 5423	Data Science for Politics	
or		
GRG 5913	Design and Management of Geographic Information Systems	

**B. 18 Credit Hours of designated elective courses** **18**

POL 5023	Political Economy	
POL 5033	Political Communications and Behavior	
POL 5063	Political Philosophy	
POL 5103	Topics in American Politics	
POL 5113	Latino/a Politics	
POL 5133	Gender and Elections	
POL 5163	American Political Development	
POL 5183	Congress	
POL 5193	Presidency	
POL 5233	Political Creativity	
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	
POL 5773	Foreign Policy Analysis	
POL 6963	Internship	

**C. Students must complete core course requirements within the first 18 hours of coursework and immediately thereafter participate in a mid-program progress meeting. Enrollment in POL 6893, Research Proposal, will only be approved upon successful completion of the progress meeting.**

**D. Research Proposal** **3**

POL 6893	Research Proposal (if POL 6893 is not offered, thesis students may enroll in POL 6983)	
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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	
POL 6993	Master's Research Project	

**Total Credit Hours** **36**

**Degree candidates for the M.A. in Political Science Teaching Track must complete the following requirements:**

Code	Title	Credit Hours
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**A. Required Courses** **9**

POL 5153	American Government and Politics	
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Select 2 from the following list:

POL 5003	Political Inquiry	
POL 5043	International Relations & World Politics	
POL 5063	Political Philosophy	

**B. Breadth Courses: select four courses from the list below** **12**

POL 5023	Political Economy	
POL 5033	Political Communications and Behavior	
POL 5103	Topics in American Politics	
POL 5113	Latino/a Politics	
POL 5163	American Political Development	
POL 5183	Congress	
POL 5193	Presidency	
POL 5433	Electoral Behavior	
POL 5503	Law and Courts	
POL 5623	Federalism	
POL 5703	American Foreign Policy	
CI 5003	Theory of Curriculum and Instruction	

**C. Electives: select 2 courses in GRG, HIS, ECO, or POL** **6**

**D. Teaching Practicum** **3**

POL 6953	Independent Study (Teaching Practicum)	
Students will be working with faculty teaching introductory level courses (POL 1013 and POL 1133). Course to be taken concurrently or subsequent to Comprehensive Exam		

**E. Comprehensive Exam**

Students take exam over subject area and general knowledge of American institutions, political processes, and policy		
Enrollment in POL 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** **30**

## 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 development of theory and formulation of hypotheses, sampling, and the testing of hypotheses with techniques appropriate to the level of measurement. The calculation and interpretation of central tendency and dispersion and the use of bivariate techniques such as Chi-square, Spearman and Personian correlation and regression will be covered. Students will use standard statistical packages such as SPSS to gain first-hand experience in research design and problem-solving with exemplary data sets offering them the opportunity to investigate their interests. Course Fee: GL01 \$90.



**GRG 5013. Geographic Thought. (3-0) 3 Credit Hours.**

A topical course emphasizing theories and concepts at the frontier of human or physical geography. The content of this course will vary. Consult with the Instructor or the Graduate Advisor of Record for information on content in a given semester. Course may be repeated for credit when topics vary. Course Fee: GL01 \$90.

**GRG 5203. Global Migration in Local Context. (3-0) 3 Credit Hours.**

This course investigates the global flows of labor and refugee migration in the contemporary world, and their impact on both origins and destinations at the level of country, state, and locality. These flows sustain or burden economics, transform culture and societies, and re-orient politics in ways that profoundly shape their future. Students will study the patterns, underlying causes, and consequences of these flows, and report on specific examples of them. They will learn how this migration affects local labor needs, entrepreneurship, cultural mores, social integration, spatial segregation, political power and representation, and other foundations of local society. They will be introduced to the latest books and articles on these topics. Course Fee: GL01 \$90.

**GRG 5233. Geographies of Gentrifications. (3-0) 3 Credit Hours.**

The material expression of the 'American Dream' is in a dramatic state of change: a single-family detached house in a park-like setting has come under substantial scrutiny since the end of the 20th century. Often called the middle-class re-urbanization of the inner city, "gentrification" is seen by many to be a response to the multiple critiques of 'suburbia' in terms of uniformity, sterility, alienation and racism; giving rise to what many believe is an alternative model of city living. But gentrification itself has evolved rapidly in concert with outstanding social ills that it has failed to address, and the globalizing capitalist world economy has imposed new actors with differing agendas in the inner city. This course examines the rise and evolution of gentrification and the array of social implications of class-conscious urban renewal. Course Fee: GL01 \$90.

**GRG 5253. Applied Climatology in the Urban Environment. (3-0) 3 Credit Hours.**

This course explores the various mechanisms through which cities influence climate across local, regional and global scales. The class introduces the individual aspects of the urban climate system as well as the observational and modeling strategies used to study it. Many of the sustainability challenges facing urban environments will be discussed, including the urban heat island effect, urban flooding, air quality issues, and climate justice. Course Fee: GL01 \$90.

**GRG 5323. Seminar in Urban Geography. (3-0) 3 Credit Hours.**

An investigation of urbanity and urbanization to provide an understanding of the physical, historical, social, political, cultural, and economic forces that shape cities and public spaces in the context of globalization. The course begins with the origin and evolution of urban geography as a discipline. It proceeds to address three principal themes: social and environmental (in) justice, comparative urbanism, and 'sense of place' from international perspectives. Other topics may include social area analysis, residential segregation, migration, urban transportation, the urban economic base, and consumer shopping behavior in cities. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**GRG 5423. Physiography and Landscape Appreciation. (3-0) 3 Credit Hours.**

An advanced study of landforms, including the analysis of relief features at the surface of the earth, and the processes and materials that form them and change them over time. Students will be given the opportunity to examine the impacts of human intervention in landscape-shaping processes. Emphasis is placed on sustaining and conserving the physical landscape by understanding how different forces and landscape systems overlap, interact and evolve. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**GRG 5443. Seminar in Critical GIS. (3-0) 3 Credit Hours.**

This course explores the concepts, techniques and histories in Geographic Information Systems (GIS) that enable mapping as a creative and artistic practice, with particular attention to critical and qualitative interventions into the GISciences. We examine the innovative applications of maps and spatial visualization in everyday life, emphasizing the changing role of the map-makers as society becomes increasingly saturated by digital information technologies. Students will be introduced to the more recent innovative application of GIS and mapping in representing social groups and community building through feminist, participatory, and voluntary mapping practices. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**GRG 5543. Gender and Cities: An introduction to Feminist Geography. (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, and how space is socially produced and consequently, is gendered. A wide range of interdisciplinary literatures enable an understanding of how women and men experience cities differently in relation to transportation choices, housing preferences, employment opportunities, and feelings toward urban public spaces. The class goes beyond the Anglo-American discourses to consider case studies in non-Western contexts. Course Fee: GL01 \$90.

**GRG 5553. Global Urban Sustainability. (3-0) 3 Credit Hours.**

Cities, as engines of financial and human capital accumulation, have often been seen as environmental sacrifice zones. Current processes of rapid urbanization throughout the globe emphasize quantitative material increase rather than qualitative growth and improvement. This course is an intensive seminar for graduate students in geography, urban planning, architecture, urban public policy, environmental sciences, and other fields interested in exploring the potential for sustainable urbanism. A wide range of sustainable programs and practices from around the world will be presented and discussed. Course Fee: GL01 \$90.

**GRG 5563. Applied Sustainability. (3-0) 3 Credit Hours.**

This course focuses on current trends in the developing field of sustainability practice. Students will examine case studies of environmentally and socially sustainable, and economically resilient, societies. Topics for case study may include land use planning/development, energy systems, infrastructure, waste management, food systems, building construction, biodiversity, and economics as related to sustainability. This class is appropriate for individuals seeking to become professionals who can help guide their organizations toward a sustainable future in strategic, realistic, and competitive ways. Course Fee: GL01 \$90.

**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. Same as GLA 5603 and POL 5603. Credit can only be earned for one course: GRG 5603, GLA 5603, or POL 5603. Course Fee: GL01 \$90.

**GRG 5653. Designing Better Maps: Seminar in GIS Cartography. (3-0) 3 Credit Hours.**

Maps, printed or digital, have become a popular and (in) effective way of communication in our digital world. In this course, students learn to create and design high-quality digital maps, using Geographic Information System (GIS). The course examines the fundamental concepts and techniques of digital mapmaking and the broader field of geographic visualization. Students will practice Geodesy, statistical mapping and graphing, as well as developing basic graphic design skills. Topics will include a variety of aesthetics and geospatial themes from how generalization, symbology, and color affect maps to how coordinate systems, transformations, and projections affect the messages behind the maps. Course Fee: GL01 \$90.

**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 GLA 5753. Credit cannot be earned for both GRG 5753 and GLA 5753. Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**GRG 5913. Design and Management of Geographic Information Systems. (3-0) 3 Credit Hours.**

Prerequisite: GRG 3314 or permission from the instructor. A course for graduate students wishing to gain expertise in advanced topics and applications in GIS and related environmental informatics, as applied in the Geosciences and Social Sciences. The course covers advanced ArcGIS functions; advanced GIS applications; and student GIS projects. Students are encouraged and guided in developing research projects related to their MA thesis and/or professional goals. They will learn how to download both spatial and non-spatial data from available sources and how to use such data in their research. (Same as POL 5913. Credit cannot be earned for both GRG 5913 and POL 5913.) Course Fee: GL01 \$90.

**GRG 6893. Master's Thesis Proposal. (0-0) 3 Credit Hours.**

Prerequisites: Permission from 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. Course Fee: GL01 \$90.

**GRG 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**GRG 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$60.

**GRG 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$180.

**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. Course Fee: GL01 \$90.

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

Prerequisites: GRG 6893 or permission of the Graduate Advisor of Record and Thesis Chair. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$30.

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

Prerequisites: GRG 6893 and permission of Graduate Advisor of Record and Thesis 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. Course Fee: GL01 \$90.

## Global Affairs (GLA) Courses

**GLA 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 introduces 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. Same as POL 5003. Credit cannot be earned for both GLA 5003 and POL 5003. Course Fee: GL01 \$90.

**GLA 5013. Research Methods. (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 introduces 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. Same as POL 5013. Credit cannot be earned for both GLA 5013 and POL 5013. Course Fee: GL01 \$90.

**GLA 5043. International Relations and World Politics. (3-0) 3 Credit Hours.**

This course introduces both academic discussions and real-world practices that have defined and continue to define international relations. It thus provides students with the opportunity to analyze theories and issues of world politics, discover how major theoretical paradigms and methodological approaches have been used to study this field, and discuss how it might change in a world of advancing globalization. Topics may include security, economics, the environment, and human rights as well as the theories, history and development of the field as such. Same as POL 5043. Credit cannot be earned for both GLA 5043 and POL 5043. Course Fee: GL01 \$90.

**GLA 5303. Topics in Global Affairs. (3-0) 3 Credit Hours.**

An examination of an individual topic or set of issues pertaining to global affairs. May be repeated for credit when topics vary. Course Fee: GL01 \$90.

**GLA 5603. Geopolitics. (3-0) 3 Credit Hours.**

This course investigates the links between political power and the effects of space and geography (both human and physical). It examines seminal works on geopolitics from political science, international relations, and geography. It thus provides students with the opportunity to study factors that are relevant for explaining conflict and cooperation in global politics such as access to and management of scarce resources, the ability to project or contain power, and the development of local, national and global economies. Further topics may include security and geopolitics, geopolitics and globalization, great power politics and deterrence, collective identities, as well as critical geopolitics. Same as GRG 5603 and POL 5603. Credit can only be earned for one course: GLA 5603, GRG 5603, or POL 5603. Course Fee: GL01 \$90.

**GLA 5723. International Organizations. (3-0) 3 Credit Hours.**

This course provides an overview of the theories and practices of international organizations. Focused on intergovernmental organizations, their role and impact in global governance is discussed and assessed in theoretical as well as empirical terms. Topics may include theories of alliance systems, regional development, common markets, environmental and human rights as well as specific organizations such as the United Nations, IMF, the World Bank, and other regional organizations. Same as POL 5723. Credit cannot be earned for both GLA 5723 and POL 5723. Course Fee: GL01 \$90.

**GLA 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 GRG 5753. Credit cannot be earned for both GLA 5753 and GRG 5753. Course Fee: GL01 \$90.

**GLA 5773. Foreign Policy Analysis. (3-0) 3 Credit Hours.**

This course compares 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 in particular on security issues in Europe, the Middle East, Asia, Africa and/or Latin America. Same as POL 5773. Credit cannot be earned for both GLA 5773 and POL 5773. Course Fee: GL01 \$90.

**GLA 5783. Global Security. (3-0) 3 Credit Hours.**

This course critically examines circumstances and issues leading to violence and war and the conditions necessary to return to stability and security in the world community. Topics may include causes of intra- and interstate war, dynamics and implications of militarization and securitization, deterrence, nuclear and conventional weapons, terrorism, cybersecurity, and strategies for conflict prevention and resolution. Same as POL 5783. Credit cannot be earned for both GLA 5783 and POL 5783. Course Fee: GL01 \$90.

**GLA 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. Same as POL 5793. Credit cannot be earned for both GLA 5793 and POL 5793. Course Fee: GL01 \$90.

**GLA 5873. Governance in a Globalized World. (3-0) 3 Credit Hours.**

This course explores the structures, actors and processes of providing order and rules in the international system. This includes both state and non-state actors, public and private institutions, as well as the many ways in which they interact in managing common affairs. Topics include, but are not limited to, key debates among different theoretical and analytical approaches as well as systems of rule-making in areas of security, development, trade and finance, human rights and the environment. Same as POL 5873. Credit cannot be earned for both GLA 5873 and POL 5873. Course Fee: GL01 \$90.

**GLA 5883. Global Development and Human Rights. (3-0) 3 Credit Hours.**

This course provides understanding of the principles and theories of development and human rights as applied in global contexts. It considers development, human rights and issues of social justice as they encounter economic, political, and social realities of conflict and governance. Topics may include sustainable development, the role of colonialism and race, politics of financial and trade institutions, rights and capabilities of indigenous people, environmental challenges, and effectiveness of global and local regimes in balancing development and individual rights. Same as POL 5883. Credit cannot be earned for both GLA 5883 and POL 5883. Course Fee: GL01 \$90.

**GLA 5893. Human Rights and Humanitarian Politics. (3-0) 3 Credit Hours.**

The course introduces students to the interdisciplinary study of human rights and humanitarianism in global contexts. It addresses the history of human rights and humanitarianism, principles and motivations for humanitarian action, humanitarian organizations and human rights advocacy, humanitarian crises and need for humanitarian interventions. It also explores ethical, political, and legal issues of human rights and humanitarian action. Same as POL 5893. Credit cannot be earned for both GLA 5893 and POL 5893. Course Fee: GL01 \$90.

**GLA 5953. Terrorism. (3-0) 3 Credit Hours.**

This course introduces students to advanced theories and issues of contemporary terrorism and the use of physical and psychological violence to impact policies and behavior. Students will analyze and evaluate domestic and global terrorist incidents and consider the underlying ideological and non-ideological factors promoting this specific form of violence. Topics may include identification, comparison and understanding of various definitions of terrorism and perpetrators of these acts, state responses to terrorism, strategies developed by policy-makers to prevent their reoccurrence, and cyberterrorism. Same as POL 5953. Credit cannot be earned for both GLA 5953 and POL 5953. Course Fee: GL01 \$90.

**GLA 5973. International Politics and Cyber Security. (3-0) 3 Credit Hours.**

This course addresses emerging international relations, policy, doctrine, strategy, and operational issues associated with Computer Network Attack (CNA), Computer Network Defense (CND), and Computer Network Exploitation (CNE)—collectively referred to as cyber warfare. It provides students with a comprehensive perspective and enhances their knowledge of cyber warfare conducted by both state and non-state actors, as well as deterrence of cyber-attack. Same as POL 5973. Credit cannot be earned for both GLA 5973 and POL 5973. Course Fee: GL01 \$90.

**GLA 5983. Deterrence and Coercion in International Politics. (3-0) 3 Credit Hours.**

This seminar examines the major schools of thought regarding the causes and application of deterrence of state and non-state actors in international politics. Emphasis is placed on the political variables that influence effective conventional and nuclear deterrence of great power adversaries such as the Soviet Union during the Cold War, and Russia and China today. Similarly, the causes of coercion and its application to historical and present cases, such as China, are addressed, with a focus on the political variables that impact effective coercive strategies. Same as POL 5983. Credit cannot be earned for both GLA 5983 and POL 5983. Course Fee: GL01 \$90.

**GLA 5993. Globalization and Protest Politics. (3-0) 3 Credit Hours.**

This seminar examines the workings of democratic politics and international institutions against the background of the failures of globalization to bridge the gap between economic affluence, political change, and the advancement of the human condition. It studies evolving theoretical perspectives and topics pertaining to the global dynamics of liberalism and democracy, markets and state capitalism, social movements and protest behavior, nationalism and cosmopolitanism, and great power politics and institutionalism, among others. Same as POL 5993. Credit cannot be earned for both GLA 5993 and POL 5993. Course Fee: GL01 \$90.

**GLA 6873. Study Abroad. (3-0) 3 Credit Hours.**

Prerequisite: Permission from the instructor. A lecture course associated with a study abroad program. Involves international travel and field trips. May be repeated for credit when the destination country varies. Course Fee: GL01 \$90.

**GLA 6893. Research Proposal. (3-0) 3 Credit Hours.**

Prerequisites: Permission from the Subfield Advisor, Course Instructor, and Graduate Advisor of Record. A course to assist students in developing a research proposal for a study in Global Affairs 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 methodical assumptions that characterize subfields in Global Affairs. 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 GLA 6983. Same as POL 6893. Course Fee: GL01 \$90.

**GLA 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**GLA 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 GLA 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). Course Fee: GL01 \$30.

**GLA 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. Course Fee: GL01 \$90.

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

Prerequisites: GLA 6893 or permission from the Graduate Advisor of Record and Thesis Chair. Thesis research and preparation. May be repeated for credit, but not more than 6 hours will apply to the Master's degree. Credit will be awarded upon completion of the thesis. Enrollment is required each term in which the thesis is in progress. Course Fee: GL01 \$30.

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

Prerequisites: GLA 6983 or permission from the Graduate Advisor of Record and Thesis 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. Course Fee: GL01 \$90.

## 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. Same as GLA 5003. Credit cannot be earned for both POL 5003 and GLA 5003. Course Fee: GL01 \$90.

**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. Same as GLA 5013. Credit cannot be earned for both POL 5013 and GLA 5013. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**POL 5043. International Relations and World Politics. (3-0) 3 Credit Hours.**

This course introduces both academic discussions and real-world practices that have defined and continue to define international relations. It thus provides students with the opportunity to analyze theories and issues of world politics, discover how major theoretical paradigms and methodological approaches have been used to study this field, and discuss how it might change in a world of advancing globalization. Topics may include security, economics, the environment, and human rights as well as the theories, history and development of the field as such. Same as GLA 5043. Credit cannot be earned for both POL 5043 and GLA 5043. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**POL 5133. Gender and Elections. (3-0) 3 Credit Hours.**

This course examines gender dynamics in electoral politics, asking what barriers women as candidates and minorities may face when running for office. It is designed to provide students with a critical examination of gender in the political system. Still too often political scientists have equated gender with biological sex, downplaying the variety of ways in which gender issues shape American politics. The central premise of this course is that politics cannot be fully understood without including gender as an analytic construct. This course sets out to discover how gender "matters" in U.S. politics. (Formerly POL 5123. Credit cannot be earned for both POL 5133 and POL 5123.) Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**POL 5423. Data Science for Politics. (3-0) 3 Credit Hours.**

This course is designed to provide students with skills in data analysis relevant for working in politics, government, and the private sector. Topics the course may cover include methods for collecting, organizing and analyzing Big Data and data visualization techniques. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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.") Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**POL 5603. Geopolitics. (3-0) 3 Credit Hours.**

This course investigates the links between political power and the effects of space and geography (both human and physical). It examines seminal works on geopolitics from political science, international relations, and geography. It thus provides students with the opportunity to study factors that are relevant for explaining conflict and cooperation in global politics such as access to and management of scarce resources, the ability to project or contain power, and the development of local, national and global economies. Further topics may include security and geopolitics, geopolitics and globalization, great power politics and deterrence, collective identities, as well as critical geopolitics. Same as GRG 5603 and GLA 5603. Credit can only be earned for one course: POL 5603, GRG 5603, or GLA 5603. Course Fee: GL01 \$90.

**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.") Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Same as GLA 5723. Credit cannot be earned for both POL 5723 and GLA 5723. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$90.

**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. Same as GLA 5773. Credit cannot be earned for both POL 5773 and GLA 5773. Course Fee: GL01 \$90.

**POL 5783. Global Security. (3-0) 3 Credit Hours.**

This course critically examines circumstances and issues leading to violence and war and the conditions necessary to return to stability and security in the world community. Topics may include causes of intra- and interstate war, dynamics and implications of militarization and securitization, deterrence, nuclear and conventional weapons, terrorism, cybersecurity, and strategies for conflict prevention and resolution. Same as GLA 5783. Credit cannot be earned for both POL 5783 and GLA 5783. Course Fee: GL01 \$90.

**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. Same as GLA 5793. Credit cannot be earned for both POL 5793 and GLA 5793. Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**POL 5873. Governance in a Globalized World. (3-0) 3 Credit Hours.**

This course explores the structures, actors and processes of providing order and rules in the international system. This includes both state and non-state actors, public and private institutions, as well as the many ways in which they interact in managing common affairs. Topics include, but are not limited to, key debates among different theoretical and analytical approaches as well as systems of rule-making in areas of security, development, trade and finance, human rights and the environment. Same as GLA 5873. Credit cannot be earned for both POL 5873 and GLA 5873. Course Fee: GL01 \$90.

**POL 5883. Global Development and Human Rights. (3-0) 3 Credit Hours.**

This course provides understanding of the principles and theories of development and human rights as applied in global contexts. It considers development, human rights and issues of social justice as they encounter economic, political, and social realities of conflict and governance. Topics may include sustainable development, the role of colonialism and race, politics of financial and trade institutions, rights and capabilities of indigenous people, environmental challenges, and effectiveness of global and local regimes in balancing development and individual rights. Same as GLA 5883. Credit cannot be earned for both POL 5883 and GLA 5883. Course Fee: GL01 \$90.

**POL 5893. Human Rights and Humanitarian Politics. (3-0) 3 Credit Hours.**

The course introduces students to the interdisciplinary study of human rights and humanitarianism in global contexts. It addresses the history of human rights and humanitarianism, principles and motivations for humanitarian action, humanitarian organizations and human rights advocacy, humanitarian crises and need for humanitarian interventions. It also explores ethical, political, and legal issues of human rights and humanitarian action. Same as GLA 5893. Credit cannot be earned for both POL 5893 and GLA 5893. Course Fee: GL01 \$90.

**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.) Course Fee: GL01 \$90.

**POL 5953. Terrorism. (3-0) 3 Credit Hours.**

This course introduces students to advanced theories and issues of contemporary terrorism and the use of physical and psychological violence to impact policies and behavior. Students will analyze and evaluate domestic and global terrorist incidents and consider the underlying ideological and non-ideological factors promoting this specific form of violence. Topics may include identification, comparison and understanding of various definitions of terrorism and perpetrators of these acts, state responses to terrorism, strategies developed by policy-makers to prevent their reoccurrence, and cyberterrorism. Same as GLA 5953. Credit cannot be earned for both POL 5953 and GLA 5953. Course Fee: GL01 \$90.

**POL 5973. International Politics and Cyber Security. (3-0) 3 Credit Hours.**

This course addresses emerging international relations, policy, doctrine, strategy, and operational issues associated with Computer Network Attack (CNA), Computer Network Defense (CND), and Computer Network Exploitation (CNE)—collectively referred to as cyber warfare. It provides students with a comprehensive perspective and enhances their knowledge of cyber warfare conducted by both state and non-state actors, as well as deterrence of cyber-attack. Same as GLA 5973. Credit cannot be earned for both POL 5973 and GLA 5973. Course Fee: GL01 \$90.

**POL 5983. Deterrence and Coercion in International Politics. (3-0) 3 Credit Hours.**

This seminar examines the major schools of thought regarding the causes and application of deterrence of state and non-state actors in international politics. Emphasis is placed on the political variables that influence effective conventional and nuclear deterrence of great power adversaries such as the Soviet Union during the Cold War, and Russia and China today. Similarly, the causes of coercion and its application to historical and present cases, such as China, are addressed, with a focus on the political variables that impact effective coercive strategies. Same as GLA 5983. Credit cannot be earned for both POL 5983 and GLA 5983. Course Fee: GL01 \$90.

**POL 5984. Cyber Warfare and International Politics. (4-1) 4 Credit Hours.**

This course addresses at the graduate level emerging international relations, policy, doctrine, strategy, and operational issues associated with Computer Network Attack (CNA), Computer Network Defense (CND), and Computer Network Exploitation (CNE)—collectively referred to as cyber warfare. It provides students with a comprehensive perspective and enhances their knowledge of cyber warfare conducted by both state and non-state actors, as well as deterrence of cyber-attack. May not be repeated for credit. This course will have a required lab hosted by Computer Science. Course Fee: GL01 \$120.

**POL 5993. Globalization and Protest Politics. (3-0) 3 Credit Hours.**

This seminar examines the workings of democratic politics and international institutions against the background of the failures of globalization to bridge the gap between economic affluence, political change, and the advancement of the human condition. It studies evolving theoretical perspectives and topics pertaining to the global dynamics of liberalism and democracy, markets and state capitalism, social movements and protest behavior, nationalism and cosmopolitanism, and great power politics and institutionalism, among others. Same as GLA 5993. Credit cannot be earned for both POL 5993 and GLA 5993. Course Fee: GL01 \$90.

**POL 6893. Research Proposal. (3-0) 3 Credit Hours.**

Prerequisites: Permission from 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. Same as GLA 6893. Students must complete this course before enrolling in POL 6993 or POL 6983. (Formerly titled "Master's Thesis Proposal.") Course Fee: GL01 \$90.



**POL 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$30.

**POL 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$60.

**POL 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Course Fee: GL01 \$90.

**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). Course Fee: GL01 \$30.

**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. Course Fee: GL01 \$90.

**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. Course Fee: GL01 \$180.

**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. Course Fee: GL01 \$90.

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

Prerequisites: POL 6893 or permission from the Graduate Advisor of Record and Thesis Chair. 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 thesis is in progress. Course Fee: GL01 \$30.

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

Prerequisites: POL 6893 or permission from the Graduate Advisor of Record and Thesis 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. Course Fee: GL01 \$90.

**POL 6993. Master's Research Project. (0-0) 3 Credit Hours.**

Prerequisites: POL 6893 and permission from 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. Course Fee: GL01 \$90.

# COLLEGE OF SCIENCES

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The College of Sciences offers the following graduate degrees and certificate programs:

## Department of Chemistry (p. 305)

- Master of Science in Chemistry (p. 305)
- Doctor of Philosophy in Chemistry (p. 305)

## Department of Computer Science (p. 311)

- Master of Science in Computer Science (p. 311)
- Master of Science in Cybersecurity Science (p. 311)
- Doctor of Philosophy in Computer Science (p. 311)
- Graduate Certificate in Cloud Computing (p. 313)

## Department of Earth and Planetary Sciences (p. 318)

- Master of Science in Geosciences (p. 318)
- Master of Science in Geoinformatics (p. 318)
- Certificate of Professional Development in Geographic Information Science (p. 322)

## Department of Integrative Biology (p. 326)

- Master of Science in Biology (p. 326)
- Master of Science in Biotechnology (p. 326)
- Master of Science in Environmental Science (p. 326)
- Doctor of Philosophy in Environmental Science and Engineering (p. 326)
- Graduate Certificate in Environmental Science (p. 330)
- Graduate Certificate in Environmental Sustainability (p. 330)

## Department of Mathematics (p. 339)

- Master of Science in Applied Mathematics-Industrial Mathematics (p. 339)
- Master of Science in Mathematics (p. 339)
- Master of Science in Mathematics Education (p. 339)

## Department of Molecular Microbiology and Immunology (p. 344)

- Doctor of Philosophy in Molecular Microbiology and Immunology (p. 344)

## Department of Department of Neuroscience, Developmental and Regenerative Biology (p. 349)

- Doctor of Philosophy in Cell and Molecular Biology (p. 349)
- Doctor of Philosophy in Neuroscience (p. 349)

## Department of Physics and Astronomy (p. 355)

- Master of Science in Physics (p. 355)
  - Doctor of Philosophy in Physics (p. 355)
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## 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.

- M.S. in Chemistry (p. 305)
- Ph.D. in Chemistry (p. 306)

## 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 on the department website (<https://chemistry.utsa.edu/>).

## 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 60 and 65 (paper version) or 79 and 100 (Internet version). See Student Policies, Admission Policies, 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:

Code	Title	Credit Hours
A. Required courses (27 semester credit hours):		27
CHE 5263	Advanced Analytical Chemistry	
CHE 5313	Advanced Biochemistry	
CHE 5453	Advanced Inorganic Chemistry	
CHE 5643	Advanced Organic Chemistry	
CHE 5843	Advanced Physical Chemistry	
Graduate Seminar in Chemistry (3 semester credit hours):		
CHE 5981	Graduate Seminar in Chemistry (repeated for a total of 3 hours) <sup>1</sup>	
Master's Thesis (6 semester credit hours):		
CHE 6983	Master's Thesis (including an oral defense of the written thesis, repeated for a total of 6 hours)	
Directed Research (3 semester credit hours):		
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 M.S. and Ph.D. Programs Committee.		6
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.		
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> 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.

## Non-Thesis 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:

Code	Title	Credit Hours
A. Required courses (27 semester credit hours):		27
CHE 5263	Advanced Analytical Chemistry	
CHE 5313	Advanced Biochemistry	
CHE 5453	Advanced Inorganic Chemistry	
CHE 5643	Advanced Organic Chemistry	
CHE 5843	Advanced Physical Chemistry	
CHE 5981	Graduate Seminar in Chemistry (repeated for a total of 3 hours) <sup>1</sup>	
Directed Research (repeated for a total of 9 semester credit hours):		
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. A minimum of 6 required semester credit hours of electives in chemistry, as approved by M.S. the Research Advisor and the M.S. and Ph.D. Programs Committee.		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.		
<b>Total Credit Hours</b>		<b>33</b>

<sup>1</sup> 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 (<https://chemistry.utsa.edu/>). The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

### 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 60 and 65 (paper version) or 79 and 100 (Internet version). See Student Policies, Admission Policies, for details.

## Degree Requirements

The Ph.D. degree requires a minimum of 75 semester credit hours beyond the baccalaureate degree. The curriculum consists of 18 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 45 semester credit hours in doctoral research, including 10 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

Code	Title	Credit Hours
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 45 semester credit hours required):		45
Directed Research (Select a minimum of 12 semester credit hours of the following):		
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	
Doctoral Research (Select a minimum of 21 hours of the following):		
CHE 7921	Doctoral Research	
CHE 7922	Doctoral Research	
CHE 7923	Doctoral Research	
CHE 7926	Doctoral Research	
CHE 7927	Doctoral Research	
CHE 7928	Doctoral Research	
Doctoral Dissertation (Select a minimum of 10 hours of the following):		
CHE 7931	Doctoral Dissertation	
CHE 7932	Doctoral Dissertation	
CHE 7933	Doctoral Dissertation	
CHE 7936	Doctoral Dissertation	
CHE 7937	Doctoral Dissertation	
CHE 7938	Doctoral Dissertation	
D. A minimum of 9 semester credit hours of electives in chemistry, as approved by the Ph.D. Research Advisor and the M.S. and Ph.D. Programs Committee.		9
<b>Total Credit Hours</b>		<b>75</b>

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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 5653. Structure Determination Using Spectroscopic Methods. (3-0) 3 Credit Hours.**

Prerequisite: CHE 3643 or equivalent. An introduction to the techniques of multinuclear (<sup>1</sup>H, <sup>13</sup>C) NMR spectroscopy, infrared spectroscopy, and mass spectrometry as powerful tools for structure elucidation in organic chemistry. A brief introduction to the principles of NMR spectroscopy, infrared spectroscopy, and mass spectrometry will be followed by extensive analysis and discussion of NMR parameters such as chemical shift, coupling constants, splitting patterns, etc. The course will also describe the use of multi-pulse experiments (spin decoupling, NOE, APT, INEPT, DEPT etc.) and 2-dimensional techniques (COSY, NOESY, ROESY, etc.) along with mass spectrometry in the structure elucidation of natural products and organic small molecules. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$100. Course Fees: GS01 \$60.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 6623. Advanced 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 6643. Chemistry of Heterocyclic Compounds. (3-0) 3 Credit Hours.**

The course gives a broad introduction to cyclic organic compounds that include heteroatoms, especially nitrogen, oxygen and sulfur, in their ring structures. Emphasis is given to aromatic heterocyclic systems, such as pyridines, quinolines, isoquinolines, pyrroles, furanes, thiophenes, indoles, pyrimidines, purines, and imidazoles. For each group, ring synthesis, chemical properties and characteristic reactions will be discussed, as will be the biological effects of representative structures. Aromaticity applied to heterocyclic compounds, general methods for ring synthesis, and different systems for nomenclature will be presented. This course requires a firm understanding of the principles of organic chemistry. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 6673. Advanced Catalysis in Organic Synthesis. (3-0) 3 Credit Hours.**

Prerequisite: CHE 5643 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. (Formerly CHE 7633. Credit cannot be earned for both CHE 6673 and 7633.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUC1 \$15; L001 \$30.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 6991. Directed Research. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**CHE 6992. Directed Research. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**CHE 6993. Directed Research. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 6994. Directed Research. (0-0) 4 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$200. Course Fees: GS01 \$120.

**CHE 6995. Directed Research. (0-0) 5 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$250. Course Fees: GS01 \$150.

**CHE 6996. Directed Research. (0-0) 6 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$300. Course Fees: GS01 \$180.

**CHE 6997. Directed Research. (0-0) 7 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. 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. Differential Tuition: \$350. Course Fees: GS01 \$210.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**CHE 7921. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisite: Graduate standing in Chemistry. Doctoral research and preparation. May be repeated for credit, but not more than 26 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$50. Course Fees: GS01 \$30.

**CHE 7922. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisite: Graduate standing in Chemistry. Doctoral research and preparation. May be repeated for credit, but not more than 26 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$100. Course Fees: GS01 \$60.

**CHE 7923. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisite: Graduate standing in Chemistry. Doctoral research and preparation. May be repeated for credit, but not more than 26 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 7926. Doctoral Research. (0-0) 6 Credit Hours.**

Prerequisite: Graduate standing in Chemistry. Doctoral research and preparation. May be repeated for credit, but not more than 26 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$300. Course Fees: GS01 \$180.

**CHE 7927. Doctoral Research. (0-0) 7 Credit Hours.**

Prerequisite: Graduate standing in Chemistry. Doctoral research and preparation. May be repeated for credit, but not more than 26 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$350. Course Fees: GS01 \$210.

**CHE 7928. Doctoral Research. (0-0) 8 Credit Hours.**

Prerequisite: Graduate standing in Chemistry. Doctoral research and preparation. May be repeated for credit, but not more than 26 hours will apply to the Doctoral degree. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$400. Course Fees: GS01 \$240.

**CHE 7931. 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. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$50. Course Fees: GS01 \$30.

**CHE 7932. 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. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$100. Course Fees: GS01 \$60.

**CHE 7933. 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. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CHE 7936. Doctoral Dissertation. (0-0) 6 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. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$300. Course Fees: GS01 \$180.

**CHE 7937. Doctoral Dissertation. (0-0) 7 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. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$350. Course Fees: GS01 \$210.

**CHE 7938. Doctoral Dissertation. (0-0) 8 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. Enrollment in either CHE 7921-8 or CHE 7931-8, depending on progress, is required each term in which the dissertation is in progress. Differential Tuition: \$400. Course Fees: GS01 \$240.

**CHE 7973. 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 Doctoral degree. Differential Tuition: \$150. Course Fees: GS01 \$90.

## Department of Computer Science

The Department of Computer Science offers a Master of Science degree in Computer Science, a Master of Science degree in Cybersecurity Science, and a Doctor of Philosophy degree in Computer Science.

- M.S. in Computer Science (p. 311)
- M.S. in Cybersecurity Science (p. 312)
- Ph.D. in Computer Science (p. 312)

## 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 Concentrations in Cybersecurity, Software Engineering, and Data Science as part of the Master of Science degree.

The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and Chapter 4, Master's Degree Regulations).

### Admission Requirements

The minimum requirements for admission to the Master of Science degree program in Computer Science, in addition to University-wide graduate admission requirements, are as follows:

- A B.A. or B.S. degree in computer science equivalent to that offered by UTSA
- Two letters of recommendation attesting to the applicant's readiness for graduate study
- Professional résumé or curriculum vitae
- Statement of purpose

Satisfying the minimum requirements does not guarantee admission. 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 30 semester credit hours of graduate coursework as described in the program of study.

#### Program of Study

Code	Title	Credit Hours
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:		12

Students must complete at least 12 semester credit hours of additional eligible graduate courses. 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 or CS 6983 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** 30

#### Concentration in Cybersecurity

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:

Code	Title	Credit Hours
CS 5323	Principles of Cyber 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	
<b>Total Credit Hours</b>		<b>9</b>

#### 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:

Code	Title	Credit Hours
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	
<b>Total Credit Hours</b>		<b>9</b>

#### Concentration in Data Science

This concentration provides students with the fundamental knowledge in data management, machine learning, data mining, statistics, data visualization, and communicating data. Students will have opportunities to specialize in applications such as health and life sciences as well as to learn critical, generalizable skills. 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 courses:

Code	Title	Credit Hours
CS 5163	Data Science	3
Select two of the following courses (must include at least one of the courses marked with an *):		6
CS 5443	Database Management Systems *	
CS 5493	Large-Scale Data Management *	
CS 5473	Data Mining *	
CS 5483	Topics in Data Science	
CS 5263	Bioinformatics	
CS 6243	Machine Learning	
<b>Total Credit Hours</b>		<b>9</b>

## Master of Science Degree in Cybersecurity Science

The Master of Science (M.S.) degree in Cybersecurity Science offers a comprehensive and hands-on education in the area of Cybersecurity. The program provides students with a broad exposure to the highly dynamic Cybersecurity discipline along with a deep technical and scientific understanding of the related concepts, tools and techniques.

The regulations for this degree comply with the general University regulations (refer to Student Policies, General Academic Regulations, and Chapter 4, Master's Degree Regulations).

### Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, a Bachelor degree in Computer Science or related majors 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 (or bridge) courses as conditions offer 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 30 semester credit hours of graduate coursework as described in the program of study below.

## Program of Study

Code	Title	Credit Hours
A. Core courses:		6
CS 5323	Principles of Cyber Security	
CS 5713	Practical Attack and Defense Techniques	
B. Required Computer Science courses		6
Students must complete at least 6 credit hours of Computer Science graduate courses from the list below.		
CS 5233	Artificial Intelligence	
CS 5363	Programming Languages and Compilers	
CS 5443	Database Management Systems	
CS 5513	Computer Architecture	

CS 5523	Operating Systems	
CS 5573	Cloud Computing	
CS 5633	Analysis of Algorithms	
CS 6243	Machine Learning	
CS 6543	Networks	
C. Required Electives:		6
Students must complete 6 credit hours from the elective courses listed below.		
CS 5343	Developing Secure Systems and Software	
CS 6353	Unix and Network Security	
CS 6373	Applied Cryptography	
D. Other Electives:		6
Students must complete at least 6 credit hours from the elective courses listed below.		
CS 5723	Crypto Currencies and Bitcoins	
CS 6323	Cybersecurity Models and Systems	
CS 6333	Cybersecurity Data Analytics	
CS 6343	Cyber Risk Management	
CS 5733	Privacy Enhancing Techniques	
CS 5933	Internship in Computer Science	
IS 6363	Digital Forensics	
E. 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 or CS 6983 Master's Thesis, or complete 6 hours of additional graduate coursework from the courses listed in D.		
F. Final oral examination:		
Students must pass a final comprehensive oral examination for completion of the degree program.		
<b>Total Credit Hours</b>		<b>30</b>

## 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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, quantitative, and analytical sections. When GRE scores are used to determine admission, applicants will be compared to applicants with similar socioeconomic backgrounds
- Three letters of recommendation attesting to the applicant's readiness for doctoral study

- Professional résumé or curriculum vitae
- Statement of research experience and interest

Admission is competitive. Satisfying the minimum requirements does not guarantee admission. 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 72 semester credit hours of graduate coursework as described in the program of study.

### Program of Study

Code	Title	Credit Hours
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:		12
Students must complete at least 12 semester credit hours of additional eligible, organized graduate courses in the Department of Computer Science.		
C. Other Requirements:		48
Students must complete at least 48 semester credit hours of additional courses including		
A minimum of 3 semester credit hours of the following:		
CS 7123	Research Methods	
A minimum of 18 semester credit hours of the following:		
CS 7211	Doctoral Research	
CS 7212	Doctoral Research	
CS 7213	Doctoral Research	
CS 7216	Doctoral Research	
A minimum of 9 semester credit hours of the following:		
CS 7311	Doctoral Dissertation	
CS 7312	Doctoral Dissertation	
CS 7313	Doctoral Dissertation	
CS 7316	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.		
<b>Total Credit Hours</b>		<b>72</b>

## 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.

## Admission to Candidacy

Students seeking a doctoral degree must be admitted to candidacy. The requirements for admission to candidacy are as follows:

- Achieve a grade point average of 3.3 or better in three required core courses, which include CS 5633 Analysis of Algorithms, CS 5523

Operating Systems, and one of CS 5513 Computer Architecture and CS 5363 Programming Languages and Compilers

- Pass written qualifying examinations on Algorithms and Operation Systems. Students should consult the Computer Science Ph.D. Program Handbook for additional details.
- Pass the Doctoral Dissertation Proposal Examination

Students should consult the University's Doctoral Degree Regulations in the Graduate Catalog for other requirements.

## Doctoral Dissertation Proposal Examination

The Doctoral Dissertation Proposal Examination is an oral examination administered and evaluated by the student's Dissertation Committee and covers the proposal of a dissertation research. The student must submit a written proposal prior to the examination. The Doctoral Dissertation Proposal Examination consists of a formal presentation of the dissertation proposal followed by an oral examination. Unanimous approval of the Dissertation Committee is required to pass the examination.

## Doctoral Dissertation and Final Oral Examination

Students seeking a doctoral degree must submit a Doctoral Dissertation and pass a 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 Doctoral Dissertation must be unanimously approved by the Dissertation Committee.

## Graduate Certificate in Cloud Computing

The graduate certificate in Cloud Computing is a 12-semester-credit-hour program designed to equip technical professionals with the knowledge and technical skills necessary for a career in an organization that leverages cloud computing. The wide-range of use of cloud computing in today's business, government and academic environments requires a broad range of competencies and understanding of how cloud computing influences a particular area. This certificate is designed to give a common framework of understanding cloud computing, as well as allow for specialization in specific areas, such as, cyber-security, cloud-infrastructure, and applications in cloud.

The certificate is administered by the College of Engineering in conjunction with the College of Business and the College of Sciences. The course requirements for each program focus may be found under the College of Engineering (<http://catalog.utsa.edu/graduate/engineering/#certificatetext>), the Department of Computer Science, and the Department of Information Systems and Cyber Security (p. 44).

## Certificate Requirements

To satisfy the requirements for the Graduate Certificate in Cloud Computing, students must complete 12 semester credit hours as follows:

Code	Title	Credit Hours
<b>A. Required Course</b>		<b>3</b>
Select one entry course:		
CS 5573	Cloud Computing	

Or a cross-listed course in EE and IS. The entry course is taught through team teaching in which instructor from each college contributes to the subjects outlined in the course syllabus.

**B. Track Electives** **6**

Select two courses from one of the following tracks:

**Applications Track**

CS 5233	Artificial Intelligence
CS 5263	Bioinformatics
CS 5443	Database Management Systems
CS 5463	Topics in Computer Science
CS 5473	Data Mining
CS 5493	Large-Scale Data Management
CS 6243	Machine Learning

**Security Track**

CS 5323	Principles of Cyber Security
CS 6353	Unix and Network Security
CS 6393	Advanced Topics in Computer Security
IS 6363	Digital Forensics

**Infrastructure Track**

CS 5103	Software Engineering
CS 5123	Software Testing and Quality Assurance
CS 6463	Advanced Topics in Computer Science
CS 6463	Advanced Topics in Computer Science (Topic: Parallel and Distribute Systems Software)
CS 6543	Networks
CS 6553	Performance Evaluation
CS 6643	Parallel Processing

**C. Capstone Project** **3**

Select one course from the following (topics should be in the field of Cloud Computing):

CS 5973	Directed Research
CS 6953	Independent Study

**Total Credit Hours** **12**

**Computer Science (CS) Courses**

**CS 5013. Fundamentals of Software. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in Computer Science or consent of instructor. This course is a bridge course for graduate students who do not have a bachelor degree in Computer Science. It cannot be applied to the graduate degrees in computer science. Topics include discrete math, advanced data structure and basic algorithms, such as binary tree and stack, as well as system programming basics and concepts of compilation. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5023. Fundamentals of Systems. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing in Computer Science or consent of instructor. This course is a bridge course for graduate students who do not have a bachelor degree in Computer Science. It cannot be applied to the graduate degrees in computer science. Topics include basic concepts and knowledge in computer organization, architecture, operating systems and compilers. Differential Tuition: \$150. Course Fee: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5113. Computer Graphics. (3-0) 3 Credit Hours.**

Prerequisites: CS 3343 and MAT 2233. Topics include display device coordinate system, 2D and 3D geometric transformations, scene interaction and animation, algorithms for drawing primitives such as lines, circles, curves and polygons, perspectives in 3D, hidden-line elimination, interactive lighting models, shadow generation, rendering and global illumination. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5133. Introduction to Artificial Intelligence for All. (3-0) 3 Credit Hours.**

Prerequisites: Graduate standing in Computer Science or consent of instructor. This course provides a gentle introduction to the fundamental AI concepts including machine learning and neural networks, hands-on programming of AI systems, and ethics of AI at build, train, and deploy phases. Differential Tuition: \$150. Course Fee: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5163. Data Science. (3-0) 3 Credit Hours.**

Prerequisite: CS 3343 or consent of instructor. This course covers the fundamentals of data science. Topics include data management, data pre-processing, data visualization, data dissemination, and the mathematical and statistical foundations for data modeling. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5233. Artificial Intelligence. (3-0) 3 Credit Hours.**

Prerequisite: CS 3343. This course covers the construction of programs that exhibit intelligence in solving problems. Major topics include searching, game playing, constraint satisfaction, decisions and probabilistic reasoning, machine learning, neural networks, computer vision and natural language understanding. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5243. Computer Vision. (3-0) 3 Credit Hours.**

Prerequisites: CS 3343 and MAT 2233 or an equivalent. Topics include image formation, geometry and transformations, multi-view geometry and 3D reconstruction, camera calibration, feature detection and matching, estimation and tracking, image classification, object detect ion and scene understanding. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5273. Penetration Testing. (3-0) 3 Credit Hours.**

Prerequisite: CS 3873. Introduction to the principles and techniques associated with the cybersecurity practice known as penetration testing or ethical hacking. Topics include planning, reconnaissance, scanning, exploitation, post-exploitation, and result reporting. The student learns to use penetration testing tools, discover system vulnerabilities, and avoid exploitation of vulnerabilities. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5323. Principles of Cyber 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. (Formerly titled Principles of Computer and Information Security.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5453. Penetration Testing. (3-0) 3 Credit Hours.**

Prerequisite: CS 3873. Introduction to the principles and techniques associated with the cybersecurity practice known as penetration testing or ethical hacking. Topics include planning, reconnaissance, scanning, exploitation, post-exploitation, and result reporting. The student learns to use penetration testing tools, discover system vulnerabilities and avoid exploitation of vulnerabilities. Differential Tuition: \$150. Course Fees: \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5483. Topics in Data Science. (3-0) 3 Credit Hours.**

Prerequisite: CS 5163. Specialized topics in an area of data science. May be repeated for credit when topics vary. (Credit cannot be earned for both CS 5483 and CS 4973 on the same topic). Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5493. Large-Scale Data Management. (3-0) 3 Credit Hours.**

Prerequisite: Graduate student standing in Computer Science or permission of instructor. Modern big data systems managing 3 Vs of big data (variety, volume, and velocity). Topics include, but not limited to overview of classic data management, web search, information retrieval, MapReduce, data integration, natural language processing at scale. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS: \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5583. Kernel Concepts and Programming. (3-0) 3 Credit Hours.**

Prerequisite: CS 3733. Topics include system booting, memory management, process and scheduling, interrupt handling, system calls, file systems, networking, device drivers and module programming, runtime systems. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5593. Multi-Agent Systems. (3-0) 3 Credit Hours.**

Prerequisite: CS 5233. This course covers the theory and the approaches where more than one autonomous agent interacts with each other either in a cooperative or competitive manner. Topics include agent theory, agent architecture, agent communication, agent interaction, team organization, distributed rational decision making, and learning in multi-agent environment. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5713. Practical Attack and Defense Techniques. (3-0) 3 Credit Hours.**

Prerequisite: CS 5323. This course will provide a comprehensive hands-on experience on various open-source software tools and techniques for conducting information gathering, vulnerability analysis, web application analysis, password cracking, wireless attacks, network sniffing and spoofing, software exploits and reverse engineering, social engineering, forensics and post-exploitation services. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5723. Crypto Currencies and Bitcoins. (3-0) 3 Credit Hours.**

Prerequisites: CS 5323 or any introductory graduate level information/cybersecurity course. Study of public permission-less blockchains and its applications with an emphasis on Bitcoins. Topics include Blockchain fundamentals, Operation of the Bitcoin cryptocurrency, Bitcoin security, User privacy and anonymity in Bitcoin, Bitcoin as a distributed application platform, Bitcoin and cryptocurrency regulation, Future of Bitcoins and cryptocurrencies, Ethereum and Smart Contracts. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 5733. Privacy Enhancing Techniques. (3-0) 3 Credit Hours.**

Prerequisites: CS 5323 or permission of instructor. This course will introduce theoretical foundations and practical implementations of the various state-of-the-art privacy enhancing techniques (PETS) that provide web anonymity, location privacy, data privacy, social network privacy and other forms of contextual privacy in traditional web, mobile, internet of things (IoT) and cyber-physical system (CPS) applications. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 5971. Directed Research. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing in Computer Science and permission in writing (form available) from 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, CS 5973, and CS 6953, regardless of discipline, will apply to a degree. This course will not apply to the Ph.D. degree. Differential Tuition: \$50. Course Fees: GS01 \$30; IUCS \$15.

**CS 5972. Directed Research. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing in Computer Science and permission in writing (form available) from 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, CS 5972, CS 5973, and CS 6953, regardless of discipline, will apply to a degree. This course will not apply to the Ph.D. degree. Differential Tuition: \$100. Course Fees: GS01 \$60; IUCS \$30.

**CS 5973. Directed Research. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing in Computer Science and permission in writing (form available) from 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, CS 5973, and CS 6953, regardless of discipline, will apply to a degree. This course will not apply to the Ph.D. degree. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 6253. Parallel Algorithms. (3-0) 3 Credit Hours.**

Study of various design techniques and representative algorithms on shared memory and network models of parallel computation, and possibly, a few emerging topics in distributed and network computing arena. Topics may include algorithms for sorting, searching, selection, trees, graphs, data structures, etc., and new and emerging models and applications. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6263. Natural Language Processing. (3-0) 3 Credit Hours.**

Prerequisites: CS 5233 or consent of the instructor. This course covers the basic concepts and algorithms in natural language processing, including but not limited to string algorithms, language models, and machine learning for text classification and machine translation. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6273. Parallel Algorithms. (3-0) 3 Credit Hours.**

Prerequisite: CS 3343. Study of various design techniques and representative algorithms on shared memory and network models of parallel computation, and possibly, a few emerging topics in distributed and network computing arena. Topics may include algorithms for sorting, searching, selection, trees, graphs, data structures, etc., and new and emerging models and applications. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6323. Cybersecurity Models and Systems. (3-0) 3 Credit Hours.**

Prerequisites: CS 5323 or permission of instructor. Advanced coverage of core cybersecurity and privacy principles, models and technologies, and their applications in designing and building practical scalable systems. Emphasis on recently deployed and emerging cyber technologies and applications. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6333. Cybersecurity Data Analytics. (3-0) 3 Credit Hours.**

Prerequisite: CS 4373. Study on analyzing cybersecurity data to extract useful cybersecurity intelligence and information. Topics may include intrusion detection methods, anomaly detection methods, adversarial machine learning, malware detection methods, adversarial malware detection methods, and time series methods. Emphasis is on explaining cybersecurity meanings of phenomena and properties exhibited by cybersecurity data. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6343. Cyber Risk Management. (3-0) 3 Credit Hours.**

Prerequisite: CS 5323. Real-world cyber defenders and chief information/cybersecurity officers often need to make decisions in both operations and investments. This course aims to prepare next generation cyber defenders and chief information/cybersecurity officers with the-way-of-thinking in coping with cyber risks and the state-of-the-art in cyber risk management and decision-making. This course aims to prepare students with the body of knowledge that is needed for accomplishing such tasks and understanding and managing cyber risks. The course systematically describes the various kinds of cyber risks, strategies for mitigating these cyber risks, methodologies for qualitative and quantitative cyber risk management, and principles and approaches for making cost-effective (if not optimal) decisions. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 6663. Advanced Parallel Processing and Systems. (3-0) 3 Credit Hours.**

Prerequisites: CS 5513 and CS 5523. An advanced parallel computing course focusing on large-scale data processing. Topics may include parallel processing with non-CPU processors (such as GPUs, FPGAs, Application-specific Circuits), large-scale Non-Uniform Memory Access architectures, parallel data-processing frameworks, non-volatile memory chips and large-scale public clouds. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6723. Image Processing. (3-0) 3 Credit Hours.**

Prerequisites: CS 3343 and MAT 2233 or an equivalent. Topics include image acquisition, image transformations, filters, enhancement and restoration, compression, segmentation and edge detection, morphology, and recognition. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing in Computer Science and permission in writing (form available) from 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, CS 5973, and CS 6953, regardless of discipline, will apply to a degree. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30; IUCS \$15.

**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. Course Fees: GS01 \$30; LRS1 \$5; STSI \$5.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**CS 7211. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisite: Doctoral Student standing and consent of Doctoral Advisor. May be repeated, a minimum of 18 hours is required for the Doctoral degree. Differential Tuition: \$50. Course Fees: GS01 \$30; IUCS \$15.

**CS 7212. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisite: Doctoral Student standing and consent of Doctoral Advisor. May be repeated, a minimum of 18 hours is required for the Doctoral degree. Differential Tuition: \$100. Course Fees: GS01 \$60; IUCS \$30.

**CS 7213. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisite: Doctoral Student standing and consent of Doctoral Advisor. May be repeated, a minimum of 18 hours is required for the Doctoral degree. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**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. Differential Tuition: \$300 Course Fees: GS01 \$180; IUCS \$90.

**CS 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 9 hours is required for the Doctoral degree. Differential Tuition: \$50. Course Fees: GS01 \$30; IUCS \$15.

**CS 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 9 hours is required for the Doctoral degree. Differential Tuition: \$100. Course Fees: GS01 \$60; IUCS \$30.

**CS 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 9 hours is required for the Doctoral degree. Differential Tuition: \$150. Course Fees: GS01 \$90; IUCS \$45.

**CS 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.**

Prerequisite: Admission to candidacy for the Doctoral degree. May be repeated, a minimum of 9 hours is required for the Doctoral degree. Differential Tuition: \$300. Course Fees: GS01 \$180; IUCS \$90.

## Department of Earth and Planetary Sciences

The Department of Earth and Planetary Sciences offers a Master of Science Degree in Geosciences, a Master of Science Degree in Geoinformatics, 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 School of Civil and Environmental Engineering, and Construction Management.

Note: The M.S. degree in Geology was renamed to Geosciences starting fall 2021.

- M.S. in Geosciences (p. 318)
- M.S. in Geoinformatics (p. 320)

## Master of Science Degree in Geosciences (formerly Geology)

The Master of Science degree program in Geosciences 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 two letters of recommendation from persons familiar with the applicant's academic record, a personal statement of research interest, and undergraduate transcripts. 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. The GAR will take the lead in advising students until an academic advisor is identified. A limited number of teaching assistantships are available, and the application form can be found on the departmental webpage. 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 non-thesis 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 Geosciences

### Degree Requirements

The Master of Science degree in Geosciences requires the successful completion of a minimum of 30 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 Geosciences with thesis option must complete a minimum of 30 semester credit hours of the following:

Code	Title	Credit Hours
A. 8 semester credit hours of required courses:		8
GEO 5103	Current Topics in the Geosciences	
GEO 5113	Research Design in the Geosciences	
GEO 5991	Graduate Seminar in Geology (repeat for a total of 2 hours)	
B. A minimum of 16 semester credit hours of electives in consultation with Graduate Advisor of Record:		16
A minimum of 16 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. If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals.		
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

30

## Non-Thesis Option in Geosciences

### Degree Requirements

The Master of Science degree in Geosciences requires the successful completion of a minimum of 36 semester credit hours (exclusive of coursework or other study required to remove academic or admission deficiencies).

### Non-Thesis Option Requirements

A non-thesis option is available for those who want the opportunity to earn the Master of Science degree in Geosciences primarily through organized coursework. Non-thesis 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 36 semester credit hours of the following:

Code	Title	Credit Hours
A. 11 semester credit hours of required courses:		11
GEO 5103	Current Topics in the Geosciences	
GEO 5113	Research Design in the Geosciences	
GEO 5973	Directed Research	
GEO 5991	Graduate Seminar in Geology (Repeated for a total of 2 semester credit hours)	
B. A minimum of 25 semester credit hours of electives in consultation with the Graduate Advisor of Record:		25
An additional 25 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. If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals.		
C. Comprehensive Examination:		
GEO 6961	Comprehensive Examination	
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 36-semester-credit-hour minimum.

**Total Credit Hours**

**36**

## Master of Science Degree in Geoinformatics

The Master of Science degree program in Geoinformatics offers opportunities for advanced study and research designed to prepare students for roles in industry, government, research and/or academic institutions. The educational objective of this program is to produce graduates who are capable of applying geospatial technology for 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 Department of Geological Sciences. It encompasses faculty and facilities from the College of Sciences, College of Liberal and Fine Arts, College of Engineering, College of Public Policy, College of Architecture, Construction and Planning, as well as individual faculty from other UTSA departments.

### Program Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, applicants are expected to have completed either a bachelor of science degree, with emphases in geological, biological, physical, environmental, or computational sciences, or a bachelor of arts degree, with emphases in geography, social sciences, humanities, or business. Five required background classes or equivalents are: algebra (MAT 1073), computer programming (CS 1063), physics (PHY 1603 or PHY 1943), statistics (STA 1053), and world geography (GES 1023). 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. Background with GIS and/or remote sensing courses is a plus, but not required. Applicants' evaluations will be considered on a case-by-case basis.

Applicant must submit two letters of recommendation from persons familiar with the applicant's academic record, a personal statement of research or career interest and undergraduate transcripts. All supporting documents should be submitted through the Graduate School website. 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.

Geoinformatics Graduate Studies Committee comprised of five graduate faculty members elected from the involved departments and colleges, and Graduate Advisor of Record (GAR) will be responsible for recommending acceptance into the program. A limited number of teaching assistantships are available and application should be submitted to the Department Chair. Individual faculty members may have opportunities for research assistantships or research fellowships 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 graduate advisor and will consist of a minimum of two other members. Each student must decide if they are going to complete the thesis or non-thesis 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 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. 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 Geoinformatics Degree Requirements

The Master of Science degree in Geoinformatics requires the successful completion of a minimum of 32 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 Geoinformatics with thesis option must complete a minimum of 32 semester hours of the following:

Code	Title	Credit Hours
A. 17 semester credit hours of required courses:		17
One of the following:		
GEO 5033	Geographical Information Systems	
CE 5093	Geographic Information Systems (GIS)	
All of the following:		
GEO 5063	Applied Statistics for Geoinformatics	
GEO 6011	Seminar in Geospatial Science and Applications (Repeated for a total of 2 semester credit hours or use another graduate seminar in this student's application speciality)	
GEO 6053	Remote Sensing	
GEO 6513	Advanced GIS	
GEO 6533	Programming for Geospatial Application	
B. A minimum of 9 semester credit hours of electives in consultation with Graduate Advisor of Record:		9
An additional 9 semester credit hours of graduate credit as approved by the Graduate Advisor of Record is required, which includes a minimum of two prescribed courses in a candidate's substantive area of interest from the following:		
ANT 6653	Spatial Techniques in Anthropology	

CE 5303	Hydrometeorology
CS 5443	Database Management Systems
CS 5573	Cloud Computing
CS 5633	Analysis of Algorithms
CS 6243	Machine Learning
DEM 7093	GIS for Population Science
DEM 7263	Spatial Demography
ES 5023	Environmental Statistics
GEO 6063	Ocean Remote Sensing
GEO 6083	Remote Sensing Image Processing and Analysis
GEO 6093	Remote Sensing in Hydrology
GEO 6543	Web GIS
GRG 5913	Design and Management of Geographic Information Systems
IS 5003	Introduction to Information Systems
IS 5143	Information Technology
IS 6703	Introduction to Data Mining
IS 6733	Deep Learning on Cloud Platforms
STA 5093	Introduction to Statistical Inference
STA 5103	Applied Statistics
STA 6863	Spatial Statistics
URP 5233	GIS for Urban Studies
Or other courses if course descriptions are appropriate.	
C. Master's Thesis:	6
GEO 6983	Master's Thesis
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 one to two 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.	
<b>Total Credit Hours</b>	<b>32</b>

## Non-Thesis Option in Geoinformatics Degree Requirements

The Master of Science degree in Geoinformatics requires the successful completion of a minimum of 32 semester credit hours (exclusive of coursework or other study required to remove academic or admission deficiencies).

### Non-Thesis Option Requirements

The non-thesis option is available for those who want the opportunity to earn the Master of Science degree in Geoinformatics primarily through organized coursework. Non-thesis students should consult the Graduate Advisor of Record on their program of study during the first semester of residence. For the independent study course, the candidate must work on a project that applies geospatial technology to the candidate's area of specialty and must write a final project report and present to the candidate's Graduate Committee as the final oral comprehensive examination. This is scheduled in the last semester before the degree requirements are to be completed.

Candidates are required to complete a minimum of 32 semester credit hours of the following:

Code	Title	Credit Hours
A. 20 semester credit hours of required courses: 20		
One of the following:		
CE 5093	Geographic Information Systems (GIS)	
GEO 5033	Geographical Information Systems	
All of the following:		
GEO 5063	Applied Statistics for Geoinformatics	
GEO 6011	Seminar in Geospatial Science and Applications (Repeated for a total of 2 semester credit hours or use another graduate seminar in this student's application specialty)	
GEO 6053	Remote Sensing	
GEO 6513	Advanced GIS	
GEO 6533	Programming for Geospatial Application	
GEO 6953	Independent Study	
B. A minimum of 12 semester credit hours of electives in consultation with Graduate Advisor of Record: 12		
An additional 12 hours of graduate credit as approved by the Graduate Advisor of Record is required, which includes a minimum of two prescribed courses in a candidate's substantive area of interest from the following:		
ANT 6653	Spatial Techniques in Anthropology	
CE 5303	Hydrometeorology	
CS 5443	Database Management Systems	
CS 5573	Cloud Computing	
CS 5633	Analysis of Algorithms	
CS 6243	Machine Learning	
DEM 7093	GIS for Population Science	
DEM 7263	Spatial Demography	
ES 5023	Environmental Statistics	
GEO 6063	Ocean Remote Sensing	
GEO 6083	Remote Sensing Image Processing and Analysis	
GEO 6093	Remote Sensing in Hydrology	
GEO 6543	Web GIS	
GRG 5913	Design and Management of Geographic Information Systems	
IS 5003	Introduction to Information Systems	
IS 5143	Information Technology	
IS 6703	Introduction to Data Mining	
IS 6733	Deep Learning on Cloud Platforms	
STA 5103	Applied Statistics	
STA 6863	Spatial Statistics	
STA 6973	Special Problems	
URP 5233	GIS for Urban Studies	
Or other courses if course descriptions are appropriate.		
<b>Total Credit Hours</b>		<b>32</b>

## 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 or special graduate 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 must complete 15 semester credit hours of graduate courses addressing Geographic Information Science and Technology as follows:

Code	Title	Credit Hours
A. 3 hours selected from the following:		3
ANT 6653	Spatial Techniques in Anthropology	
CE 5093	Geographic Information Systems (GIS)	
DEM 7093	GIS for Population Science	
GEO 5033	Geographical Information Systems	
GRG 5913	Design and Management of Geographic Information Systems	
B. 6 hours selected from the following:		6
GEO 5063	Applied Statistics for Geoinformatics	
GEO 6053	Remote Sensing	
GEO 6063	Ocean Remote Sensing	
GEO 6083	Remote Sensing Image Processing and Analysis	
GEO 6093	Remote Sensing in Hydrology	
GEO 6523	GIS for Water Resources	
GEO 6543	Web GIS	
C. 6 hours of required courses:		6
GEO 6513	Advanced GIS	
GEO 6533	Programming for Geospatial Application	
<b>Total Credit Hours</b>		<b>15</b>

## Geology (GEO) Courses

### GEO 5013. Volcanology. (3-0) 3 Credit Hours.

Prerequisite: GEO 3043 or consent of instructor. A survey of volcanoes and volcanic processes, including historically important volcanic eruptions and the prediction and mitigation of volcanic hazards. Field trips may be required. Differential Tuition: \$150. Course Fees: GS01 \$90.

### GEO 5023. Big Data Analysis for Extreme Environments. (3-0) 3 Credit Hours.

This course will touch on three basic aspects of data science and technology: geospatial data, data assimilation and modeling, and cloud computation and dig data analytics. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. (Same as CE 5293. Credit cannot be earned for both CE 5293 and GEO 5033.) Differential Tuition: \$150. Course Fees: GS01 \$90.

### GEO 5043. Introduction to Earth System Science and Remote Sensing. (3-0) 3 Credit Hours.

This course is designed for students in sciences or engineering to get basic knowledge about the earth system and some compelling science problems related to ice, snow, water, atmosphere, and ocean. The second part of the course will include some basic knowledge of remote sensing and how different remote sensing technology can be used to sense these different types of earth environments. Differential Tuition: \$150. Course Fees: \$90.

### GEO 5063. Applied Statistics for Geoinformatics. (3-0) 3 Credit Hours.

Prerequisites: CS 1063, MAT 1073, and STA 1053, or consent of instructor. This course will cover both the basic statistics and in depth coverage of analytical methods used in the analysis of geospatial data. Descriptive clustering methods for spatial data and in depth coverage of linear models used in the analysis of geospatial data will also be covered. Variogram models and kriging techniques will also be covered. All course materials will be taught using the programming language R. Differential Tuition: \$150. Course Fees: GS01 \$90.

### GEO 5073. Mountain Environments and Climate Change. (3-0) 3 Credit Hours.

Prerequisite: ES 2113, GEO 2113 or GEO 3343, or consent of instructor. In-depth survey on current scientific questions and methods applied to study mountain environments, with a special focus on glaciers, snow, permafrost and streamflow. Application of remote sensing, GIS, modeling, and fieldwork techniques commonly utilized to study these regions. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### GEO 5113. Research Design in the Geosciences. (3-0) 3 Credit Hours.

Prerequisite: GEO 5103 or consent of instructor. Development of research projects, including literature review, methodology, and data analysis. Elements of project management will also be covered. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 5213. Aqueous Geochemistry. (3-0) 3 Credit Hours.**

Prerequisite: GEO 3374 or consent of instructor. This course will facilitate to understand in detail the fundamental (primarily thermodynamic) controls on the composition of natural waters and the response of natural waters to variations in various physico-chemical parameters. Characterization of dissolved organic matter in natural waters will be introduced. This course will explore applications to environmental problems like contaminants migration in waters (ground waters, surface waters), weathering, etc., and students will be given the opportunity to learn to solve numerical problems related to the behavior of chemical components in natural waters, and gain familiarity with simple analytical techniques for the characterization of natural waters. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 GEO 5414. Same as CE 5323. Credit can be earned for only one of the following: CE 5323, CE 5653, GEO 5414, or GEO 5413.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 5434. Fluvial Processes and Deposits. (3-3) 4 Credit Hours.**

Prerequisite: GEO 4113 or GES 3723, or consent of instructor. An in-depth examination of the interface between fluvial geomorphology and sedimentology. Differential Fee: \$200. Course Fees: GS01 \$120.

**GEO 5454. Advanced Paleontology. (3-3) 4 Credit Hours.**

Prerequisite: 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: Paleocology. Study of fossil organisms in relation to their past environments, and their interactions in extinct ecological communities. Topic 3: Micropaleontology. Study of microscopic fossil organisms that commonly produced a fossil record. Emphasis on taxonomy, evolution, and processing methods. May be repeated for credit when topics vary. Field trips may be required. Differential Tuition: \$200. Course Fees: GS01 \$120.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$200. Course Fees: GS01 \$120.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 5803. Planetary Geology. (3-0) 3 Credit Hours.**

Prerequisite: PHY 1963 or consent of instructor. This course is designed for students in the Sciences or Engineering and no prior Geological knowledge is assumed, although Earth will be our point of reference. Survey of the interior and surface geology of solid bodies in our Solar System and beyond (planets, moons, asteroids, comets, Kuiper Belt Objects and exoplanets). Topics will include bulk composition and differentiation of planetary interiors, surface processes such as (cryo-)volcanism and meteorite impacts, erosion and sedimentation by fluids and wind, and heat transfer styles. There will be an emphasis on how we know things and what we do not know, quantifying uncertainties in measurements and models, and the nature of planetary scientific inquiry. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$200. Course Fees: GS01 \$120.

**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. Differential Tuition: \$200. Course Fees: GS01 \$120.

**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. Differential Tuition: \$200. Course Fees: GS01 \$120.

**GEO 5971. Directed Research. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**GEO 5972. Directed Research. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**GEO 5973. Directed Research. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. The grade report for the course is either "CR" (satisfactory performance) or "NC" (unsatisfactory performance). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**GEO 6021. Welcome to the Anthropocene. (1-0) 1 Credit Hour.**

A reading seminar to understand how the Anthropocene and its collateral concepts (e.g., planetary boundaries) have become ubiquitous denominations to encompass all the consequences of human impacts on the global environment. Select theoretical and applied case studies from the peer-review literature will be analyzed in order to understand the implications for Geoscience practitioners. Differential Tuition: \$50. Course Fees: \$30.

**GEO 6043. 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. (Same as CE 6113 and ES 5043. Formerly GEO 5043. Credit can be earned for only one of the following: CE 6113, ES 5043, GEO 5043, or GEO 6043.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6053. 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 GEO 5053. Credit cannot be earned for both GEO 5053 and GEO 6053.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6063. Ocean Remote Sensing. (3-0) 3 Credit Hours.**

Prerequisites: MAT 1073 or equivalent, and PHY 1603 or PHY 1943 or equivalent. This course provides an overview of applications of satellite remote sensing to the study of the physics and biology of the oceans. The physical principles behind each type of ocean observing satellite system is presented as well as the various possible satellite orbits and sampling patterns. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6083. Remote Sensing Image Processing and Analysis. (2-2) 3 Credit Hours.**

Prerequisite: GEO 4093 or GEO 6053, 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 GEO 5083. Credit cannot be earned for both GEO 5083 and GEO 6083.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6093. Remote Sensing in Hydrology. (2-2) 3 Credit Hours.**

Prerequisite: GEO 4093 or GEO 6053, 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 GEO 5093. Credit cannot be earned for GEO 5093 and GEO 6093.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$200. Course Fees: GS01 \$120.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6543. Web GIS. (2-2) 3 Credit Hours.**

Prerequisites: ES 2113, GEO 2113, or GEO 3343; and GEO 5033, or consent of instructor. This course will focus upon developing GIS applications to be served out via the Internet or a local Area Network (LAN). Additional topics include the use of Web authoring software. The course presents and introductory level skill set for the creation and publishing of Web mapping applications using the ESRI ArcGIS Online resources and available tools. (Formerly EES 6543. Credit cannot be earned for both EES 6543 and GEO 6543.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6623. Rheology of Earth Materials. (3-0) 3 Credit Hours.**

Prerequisite: PHY 1963 or consent of instructor. This course is designed for graduate students in the Sciences or Engineering and no prior Geological knowledge is assumed. Survey of the rheological behavior of solid Earth materials (rocks and ices) and fluids (brines, hydrocarbons, magma and lava). The course will include empirical and thermodynamic models for the viscosity of fluids, three-phase suspension rheology (solid+liquid+gas), and statistical fitting of experimental data. Examples of applied rheology will include lava flows and the deformation of continents, and various foods will be studied as analog materials. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**GEO 6952. Independent Study. (0-0) 2 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**GEO 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

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

Prerequisites: Permission from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**GEO 6982. Master's Thesis. (0-0) 2 Credit Hours.**

Prerequisites: Permission from 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

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

Prerequisites: Permission from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**GEO 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**GEO 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**GEO 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**GEO 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**GEO 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

## Department of Integrative Biology

The Department of Integrative Biology offers Master of Science degrees in Biology, Biotechnology, and Environmental Science. The department also offers graduate certificates in Environmental Science and Environmental Sustainability .

- M.S. in Biology (p. 326)
- M.S. in Biotechnology (p. 328)
- M.S. in Environmental Science (p. 329)
- Ph.D. in Environmental Science and Engineering (p. 330)

## 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 extended opportunity to develop expertise in research techniques and data analysis. There are three emphases within which to conduct a thesis; cell and molecular biology, microbiology and immunology, and neuroscience. The thesis option is recommended for students who plan a career in research or contemplate pursuing a doctorate in one of the life sciences. A non-thesis option is offered for those who want an extended opportunity to earn the Master of Science degree primarily through organized coursework. The non-thesis option allows students to take a wider variety of elective courses to provide a more expansive knowledge of several areas in the life sciences.

Graduate faculty research interests include biochemistry, cellular biology, developmental biology, genetics, microbiology, neuroscience, physiology, and plant sciences. The multidisciplinary nature of the program 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.

### 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 Option

Code	Title	Credit Hours
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#### 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 may also be transferable with committee approval if it was not used to fulfill requirements for the M.S. degree. Core and elective coursework must have a grade of B or higher in order to transfer to the Ph.D. program.

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5123	Principles of Molecular Biology	
BIO 5133	Principles of Cell Biology	
BIO 5213	Principles of Chemical 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 5000-7000 BIO courses as approved by the Graduate Advisor of Record are required. 12

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 may also be transferable if it was not used to fulfill requirements for the M.S. degree. Core and elective coursework must have a grade of B or higher in order to transfer to the Ph.D. program.

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5123	Principles of Molecular Biology	
BIO 5133	Principles of Cell Biology	
BIO 5213	Principles of Chemical 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 5000-7000 BIO courses as approved by the Graduate Advisor of Record are required: 12

Total Credit Hours 36

#### C. Emphasis in Neuroscience

The emphasis in Neuroscience is a thesis-track degree program designed for students who may wish to pursue a Ph.D. in Biology with an emphasis in Neuroscience at UTSA. The Master's level Neuroscience emphasis provides a prospective student with the coursework and preliminary research background found in a successful Neuroscience 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). Elective coursework may also be transferable, with the doctoral studies committee approval, if it was not used to fulfill requirements for the M.S. degree. Core and elective coursework must have a grade of B or higher in order to transfer to the Ph.D. program.

1. 6 semester credit hours of the following core lecture courses are required: 6

BIO 5433	Systems Neuroscience	
BIO 5443	Molecular Neurobiology	

2. 6 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 5000-7000 BIO courses as approved by the Graduate Advisor of Record are required: 12

Total Credit Hours 36

### II. Non-Thesis Option

Code	Title	Credit Hours
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#### 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. Students may take a total of 3 semester credit hours of BIO 5971-3 Directed Research or BIO 6951-3 Independent Study as electives.

1. 3 semester credit hours of the following core lecture courses are required: 3

BIO 5123	Principles of Molecular Biology	
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BIO 5133	Principles of Cell Biology	
BIO 5213	Principles of Chemical Biology	
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)	
BIO 5033	Biotechnology Laboratory	
3. 24 credit hours can be selected from 5000–7000 level courses offered in Biology. Up to 6 credit hours of electives may be taken outside of the discipline in related UTSA graduate programs with approval of the Graduate Advisor of Record (GAR).		24
<b>Total Credit Hours</b>		<b>36</b>

### 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 (which has oral and written components) 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 retake the comprehensive exam after consultation with the student’s graduate committee. 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 from UTSA can chair these committees, and no more than one member of either committee can be a fixed-term 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, and can include up to 9 hours of biomedical engineering lectures, or 12 hours on aspects of management of biotechnology. The opportunity to gain research experience or develop further technical expertise is also possible through an internship in a biotechnology-based company or by conducting a Master’s thesis.

### 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 undergraduate coursework in microbiology and immunology is recommended. Students whose undergraduate preparation is deficient in one of these areas of requirements but who meet the remaining standards for admission may be conditionally admitted and required to complete specific undergraduate course(s) 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.

### 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

Code	Title	Credit Hours
A. Biotechnology lectures – core curriculum:		12
BIO 5001	Ethical Conduct in Research	
BIO 5123	Principles of Molecular Biology	
BIO 5133	Principles of Cell Biology	
BIO 5213	Principles of Chemical Biology	
BIO 5762	Fundamentals of Immunology for Biotechnology	
B. 3 semester credit hours in basic laboratory techniques are required:		3
BIO 5033	Biotechnology Laboratory	
C. A minimum of 3 semester credit hours of additional organized laboratory experience are required from the following:		3
BIO 5143	Advanced Nucleic Acids Laboratory	
BIO 5163	Recombinant Protein Biotechnology Laboratory	
D. Applications of Biotechnology electives. 18 hours of Biotechnology electives are required. These can be from 5000-7000 BIO courses. Alternatively, up to 9 hours of electives can be 5000-7000 Biomedical Engineering (BME) courses, or up to 12 hours of electives can be 5000-7000 Management of Technology (MOT) courses. All non-BIO courses must be approved by the Graduate Advisor of Record.		18
<b>Total Credit Hours</b>		<b>36</b>

### Biotechnology Internship

(Subject to availability.) The internship (Practicum in Biotechnology BIO 7563) will require prior arrangement with biotechnology-based companies and approval of the Graduate Advisor of Record. May be repeated for credit, but no more than 9 hours will be approved and applied toward program of study. Students may not take an internship if they select the thesis option.

### Thesis Option

Students electing the thesis option must complete 6 semester credit hours of BIO 5973 Directed Research and 6 semester credit hours of BIO 6983 Master’s Thesis.

## Comprehensive Examination

As specified by University regulations, degree candidates must pass a comprehensive examination administered by the student's Graduate Committee. For non-thesis students, this examination (which has oral and written components) must be given in the semester prior to the semester during which degree requirements are to be completed. Students electing to do a thesis 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. Certain rules must be adhered to concerning the composition of the Master's Comprehensive Examination Committee and the Master's Thesis Committee. Only tenured or tenure-track faculty members from UTSA can chair the Committee, and no more than one member of the Committee may be fixed-term track faculty or from another institution. Students who do not achieve the criteria (or necessary expectations) to pass the Comprehensive Examination can retake the comprehensive exam one additional time.

## 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 Integrative Biology, Chemistry, Civil and Environmental Engineering, & Construction management, and Earth and Planetary Sciences. Specific information about faculty research can be found through departmental websites 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 60 (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, and a résumé. All supporting documents should

be sent to the Graduate School. Incomplete applications will not be considered until all required items are in an applicant's file.

The Graduate 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 (non-thesis) 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

Code	Title	Credit Hours
A. Required Organized Courses		12
ES 5011	Graduate Studies in Env. Scien	
ES 5013	Survey Topics in Environmental Science <sup>1</sup>	
ES 5023	Environmental Statistics	
ES 5503	Policy and Principles of Environmental Law	
ES 5981	Graduate Seminar in Environmental Science and Engineering (may be repeated) <sup>2</sup>	
ES 6941	Environmental Science Colloquium (may be repeated) <sup>2</sup>	
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. If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals.		
C. 12 semester credit hours of research:		12
ES 6953	Independent Study <sup>3</sup>	
	or ES 6951 Independent Study	
ES 6983	Master's Thesis (A total of 6 hours of Master's Thesis is required.)	
<b>Total Credit Hours</b>		<b>36</b>

<sup>1</sup> This course must be taken in the first two semesters of the program.

- <sup>2</sup> A maximum of 2 semester credit hours in graduate seminar or 2 semester credit hours in colloquium are required. It may be any combination of hours from these courses.
- <sup>3</sup> 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 (Non-Thesis) Option**

Code	Title	Credit Hours
A. Required Organized Courses		24
ES 5011	Graduate Studies in Env. Scien	
ES 5013	Survey Topics in Environmental Science <sup>1</sup>	
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 2 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. <sup>2</sup>		12
<b>Total Credit Hours</b>		<b>36</b>

- <sup>1</sup> This course must be taken in the first two semesters of the program.
- <sup>2</sup> If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals.

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 non tenure-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 School of Civil and Environmental Engineering, & Construction Management. Most of the participating graduate faculty are in the College of Sciences (including Department of Earth and Planetary Sciences) and College of Engineering and Integrated Design (School of Civil and Environmental Engineering, & Construction Management); additional faculty in this interdisciplinary program are from other colleges. Please refer to the School of Civil and Environmental Engineering, & Construction Management (p. 191) section of this catalog for details about this program.

- Graduate Certificate in Environmental Science (p. 330)
- Graduate Certificate in Environmental Sustainability (p. 331)

**Graduate Certificate in Environmental Science**

This 15-hour certificate in Environmental Science is designed to meet the needs of prospective students interested in developing skills in environmental science. The purpose of this certificate is to provide professionals who already have undergraduate degrees with graduate instruction in environmental science as a means of maintaining and promoting their professional development. Environmental science is an interdisciplinary subject; therefore, the certificate program is designed to provide graduates with coursework in environmental science in appropriate areas outside of their undergraduate major. The certificate provides students with a post-baccalaureate educational opportunity that is narrower in scope and shorter in duration than its associated master's graduate degree program in the Environmental Science Academic Programs.

## Description of Certificate Program

The certificate in Environmental Science is a 15-semester-credit-hour program. The prerequisites for this program are a bachelor's degree with a current status as a degree-seeking or special student in a graduate-level program. To maintain enrollment in the certificate program, students should maintain a 3.0 grade point average throughout tenure in the program. No more than 3 semester credit hours may be transferred from another institution.

### Program Requirements

To earn the Environmental Science certificate, students must complete 15 semester credit hours of required courses:

Code	Title	Credit Hours
<b>Required Courses (15 semester credit hours):</b>		<b>15</b>
ES 5013	Survey Topics in Environmental Science	
ES 5103	Applied Ecology	
ES 5133	Fundamentals of Environmental Law	
or ES 5503	Policy and Principles of Environmental Law	
ES 5143	Technical Writing for Environmental Scientists	
ES 6103	Environmental Assessment	
<b>Total Credit Hours</b>		<b>15</b>

## Graduate Certificate in Environmental Sustainability

This 15-hour certificate in Environmental Sustainability is designed to meet the needs of prospective students interested in developing knowledge in environmental sustainability. The purpose of this certificate is to provide professionals who already have undergraduate degrees with graduate instruction in environmental sustainability as a means of maintaining and promoting their professional development. The goal of this certificate is to fill specific gaps in knowledge for environmental professionals who are seeking advanced knowledge and skills in environmental sustainability. The certificate also builds a strong foundation for participants to obtain a master's degree at a future date.

### Description of Certificate Program

The certificate in Environmental Sustainability is a 15-semester-credit-hour program. The prerequisites for this program are a bachelor's degree with a current status as a degree-seeking or special student in a graduate-level program. To maintain enrollment in the certificate program, students should maintain a 3.0 grade point average throughout tenure in the program. No more than 3 semester credit hours may be transferred from another institution.

### Program Requirements

To earn the Environmental Sustainability certificate, students must complete 15 semester credit hours of required courses:

Code	Title	Credit Hours
<b>Required Courses (15 semester credit hours):</b>		<b>15</b>
ES 5043	Global Change	
ES 5133	Fundamentals of Environmental Law	
or ES 5503	Policy and Principles of Environmental Law	
ES 5153	Urban Environmental Planning and Sustainability	
ES 5753	Conservation and Restoration Ecology	

ES 6053	Sustainability and Renewable Energy
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**Total Credit Hours**

**15**

## 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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

### BIO 5003. Epigenetics and Metabolism. (3-0) 3 Credit Hours.

Scientific overview and discussion course related topics including stem cells, diseases, and interaction between metabolism and different epigenetic mechanisms. Differential Tuition: \$150. Course Fees: GS01 \$90.

### BIO 5033. Biotechnology Laboratory. (0-6) 3 Credit Hours.

Prerequisite: Graduate standing. Concurrent enrollment in BIO 5323 is strongly recommended for M.S. in Biotechnology students. An organized course offering an introduction to routine procedures employed in the modern research laboratory. Differential Tuition: \$150. Course Fees: GS01 \$90; IUB1 \$10; L001 \$30.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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.") Differential Tuition: \$150. Course Fees: GS01 \$90; IUB1 \$10; L001 \$30.

### 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.) Differential Tuition: \$150. Course Fees: GS01 \$90; IUB1 \$10; L001 \$30.

**BIO 5213. Principles of Chemical Biology. (3-0) 3 Credit Hours.**

Prerequisites: BIO 3513 and BIO 3813, or equivalents. The role of chemistry in prokaryotic and eukaryotic biological systems. Topics will cover the probing and controlling biological systems using chemical methods and the manipulation of biological systems via novel chemistries to advance fundamental knowledge which serve as a basis for translational approaches. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5343. Proteins and Nucleic Acids. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513 or equivalent. Protein sequences, domains, folding, proteomics, glycoproteins, protein-DNA interaction, RNA conformations. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5423. Neuroanatomy. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. The anatomy of the vertebrate nervous system. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5433. Systems Neuroscience. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3422 or an equivalent. The fundamentals of neurophysiology are presented from the cellular to the systems level. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5443. Molecular Neurobiology. (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. (Formerly titled "Neurochemistry.") Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5613. Neurodegenerative Disease. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513, BIO 3813, or consent of instructor; BIO 5433 or BIO 5443 is recommended. The pathogenesis of neurodegenerative diseases will be covered with an emphasis on the molecular mechanisms and experimental approaches. Current research progress will be covered. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.") Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**BIO 5783. Introduction to Good Manufacturing Practices and Good Laboratory Practices. (3-0) 3 Credit Hours.**

Review of FDA and U.S. Pharmacopoeia 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5813. Frontiers in Human Pluripotent Stem Cells. (3-0) 3 Credit Hours.**

Integrates the fundamental aspects of developmental biology with emerging concepts in embryonic and adult stem cells and regenerative medicine. A discussion of various stem cell applications in industry, military, medicine, and ethics of regenerative medicine is presented. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5873. Plant Biotechnology. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513 or equivalent, BIO 5123 is recommended. The principles of plant physiology and genetics, and techniques used in plant modification, and principles of plant breeding and quantitative genetics as applied to plant biotechnology. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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) from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 6513. Drug Development. (3-0) 3 Credit Hours.**

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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 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 in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: \$50. Course Fees: GS01 \$30.

**BIO 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 in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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 in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**BIO 7113. Principles of Biological Scientific Teaching. (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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 7211-3. May be repeated for credit. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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 7211-3. May be repeated for credit. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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 7211-3. May be repeated for credit. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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 5572.) Differential Tuition: \$100. Course Fees: GS01 \$60.

**Environmental Sciences (ES) Courses****ES 5011. Graduate Studies in Environmental Science. (1-0) 1 Credit Hour.**

This course offers an orientation to graduate study, introducing students to the professional standards and practices of our discipline. The course also offers a survey of environmental science. Development of a tentative program of studies and other relevant requirements will be discussed. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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.) Differential Tuition: \$150 Course Fees: GS01 \$90.

**ES 5023. Environmental Statistics. (3-0) 3 Credit Hours.**

Prerequisites: ES 1314 and MAT 1133 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 and CE 5043. Credit can be earned for only one of the following: EES 5023, ES 5023, GEO 5023, or CE 5043.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 6383 and GEO 5043. Credit can be earned for only one of the following: CE 6113, CE 6383, EES 5043, ES 5043, or GEO 5043.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 5673. Credit can be earned for only one of the following: BIO 5063, CE 5203, CE 5673, EES 5063, or ES 5063). Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150 Course Fees: GS01 \$90.

**ES 5093. Herpetology. (3-0) 3 Credit Hours.**

Prerequisite: Graduate Standing. An advanced course covering various aspects of the biology of herpetofaunal, including anatomy, physiology, systematics, evolution, behavior, ecology, and biogeography. Field trips may be required. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.



**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.") Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 5153. Urban Environmental Planning and Sustainability. (3-0) 3 Credit Hours.**

This course examines how the concept of sustainable development applies to buildings, cities and urban regions and gives students insight into a variety of contemporary urban planning and green building issues through the sustainability lens. Ways to coordinate goals of environmental, economic, and social equity at different scales of planning are addressed, including the region, the city, the neighborhood, the site, and buildings. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 5513. Aquatic Ecology. (3-0) 3 Credit Hours.**

Study of aquatic ecosystems including streams, wetlands, and lakes. Topics include watershed processes, biological communities, physical habitats, nutrient cycling, energy flow, and management issues. The course culminates with individual research projects focused on local watersheds. Field trips may be required. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 5523. Watershed Processes. (3-0) 3 Credit Hours.**

This course focuses on watershed processes, watershed assessment, and watershed management. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 5533. Planning and Response to Environmental Disasters. (3-0) 3 Credit Hours.**

This course will focus on planning, response and recovery from large, complex environmental disasters and the roles and implications for Response Managers and Environmental Scientists. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 5743. Ichthyology. (3-0) 3 Credit Hours.**

Study of fishes, and includes a wide range of topics including taxonomy, systematics, and biogeography, anatomy and physiology, and behavior and ecology. This course will focus on form and function, behavior, life history, ecology, and key taxonomic characteristics of most of the orders of fishes. Field trips may be required. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 ecosystems services is often ignored, yet also important in sustaining human well-being. This course will explore methods to evaluate and value these ecosystem services. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 5971. Directed Research. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**ES 5973. Directed Research. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Same as CE 6621.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**ES 6013. Instrumental Environmental Methods for R Coding in Environmental Science and Ecology. (3-0) 3 Credit Hours.**

This course will teach the management of environmental and ecological data using Program R. The focus will be on the structure and linguistics of data in R and how to integrate R in a data science workflow. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 6023. Plant Ecophysiology. (3-0) 3 Credit Hours.**

A survey of physiological approaches to understanding plant-environment interactions from the functional perspective. Lectures cover physiological adaptation; limiting factors; resources acquisition/allocation; photosynthesis, carbon, energy balance; water use relations nutrient relations; linking ecophysiology and stable isotopes; stress physiology; life history physiology; evolution of physiological performance; ecophysiology at the population, community, ecosystem levels. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 6033. Applied Multivariate Statistics for Ecological Data. (3-0) 3 Credit Hours.**

Prerequisite: ES 5023. This course provides students with a conceptual and practical understanding of the application of multivariate statistics in environmental science and ecology. Course will include analysis such as classification (creating discrete groups) and dimension reduction, as well as visualization techniques such as ordination. Applications include habitat classification, clustering (i.e., community classification), and exploring community-environment relationships. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 conventional energy sources and systems, and then focus on alternate, renewable energy sources and how they can lead to sustainability. Differential Tuition: \$150. Course Fees: GS01 \$90.

**ES 6063. Human Dimensions of Wildlife. (3-0) 3 Credit Hours.**

This course will focus on the human dimensions of wildlife and will introduce students to how people's knowledge, values, opinions, and behaviors influence wildlife management. We will explore the ways that economics, politics, culture, and society shape wildlife management decisions and we will learn about conservation strategies that consider human dimensions. This course will have an emphasis on the human dimensions of wildlife management and conservation on private lands in Texas. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Credit can be earned for only for one of the following: EES 6813, ES 6813, or GEO 6813.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**ES 6951. Independent Study. (0-0) 1 Credit Hour.**

Prerequisites: Graduate standing and permission in writing (form available) from 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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**ES 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

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

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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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.) Differential Tuition: \$100. Course Fees: GS01 \$60.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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.) Differential Tuition: \$100. Course Fees: GS01 \$60.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

## Department of Mathematics

The Department of Mathematics offers Master of Science degrees in Applied Mathematics-Industrial Mathematics, Mathematics, and Mathematics Education.

- M.S. in Applied Mathematics–Industrial Mathematics (p. 339)
- M.S. in Mathematics (p. 340)
- M.S. in Mathematics Education (p. 340)

## 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:

Code	Title	Credit Hours
A. 6 semester credit hours of required courses:		6
AIM 5113	Introduction to Industrial Mathematics	
MAT 5283	Linear Algebra	
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	
<b>Total Credit Hours</b>		<b>36</b>

**\* 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.

Code	Title	Credit Hours
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
<b>Mathematics Concentration</b>		
MAT 5173	Algebra I	
MAT 5283	Linear Algebra	
MAT 5403	Functional Analysis I	
<b>Applied Mathematics Concentration</b>		
MAT 5293	Numerical Linear Algebra or MAT 5603 Numerical Analysis	
MAT 5553	Harmonic Analysis or MAT 5673 Partial Differential Equations I	
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. If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals. All required courses must be taken in scheduled classes. Approval of Graduate Review Committee is imperative if any required course is to be substituted or taken as an Independent Study.		18
D. Students are required to pass an advanced comprehensive examination or successfully defend their thesis research results.		
<b>Total Credit Hours</b>		<b>36</b>

**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. The applicant must submit two letters of reference, preferably from those who can speak to the applicant's mathematical abilities. Applicants must submit a personal statement describing how an M.S. in Mathematics Education will advance the applicant's personal and professional goals. All required courses must be taken in scheduled classes. Approval of Graduate Review Committee is imperative if any required course is to be substituted or taken as an Independent study.

**Degree Requirements**

Degree candidates are required to successfully complete 36 semester credit hours.

Code	Title	Credit Hours
A. Students must complete the following courses:		18
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	
MAT 5963	Introduction to Mathematics Education Research	
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 12 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, MAT 6963 Topics in Mathematics Education, or a combination thereof, as approved by the Graduate Advisor of Record.		12
D. Students are required to pass an advanced comprehensive examination or successfully defend their thesis research results.		
<b>Total Credit Hours</b>		<b>36</b>

## 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

## 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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 may include monoids, semigroups, groups, isomorphism theorems, free groups, group extensions and group actions, Sylow theorems, group chains and composition series, nilpotent and solvable groups, cohomology of groups. Differential Tuition: \$150. Course Fees: GS01 \$90.

### MAT 5183. Algebra II. (3-0) 3 Credit Hours.

Prerequisite: MAT 5173. Areas of study may include: Theory of rings, ideals, chain conditions, Artin and Nother rings, Ore conditions and ring of fractions, Jacobson radicals, group rings, modules, module homomorphisms, free modules, tensor products, modules over principal ideal domains, algebras, Galois theory. Formerly MAT 5313. Credit cannot be earned for both MAT 5313 and MAT 5183. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5283. Linear Algebra. (3-0) 3 Credit Hours.**

Prerequisite: MAT 2233 or an equivalent. A study of linear algebraic structures that may include linear transformations, inner product spaces, eigenvalues, Cayley-Hamilton theorem, similarity, the Jordan canonical form, spectral theorem for normal transformation and applications. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5343. Differential Geometry. (3-0) 3 Credit Hours.**

Prerequisites: MAT 4223 and MAT 4273, or equivalents. Multilinear algebra, differentiable manifolds, exterior differential forms, affine connections, Riemannian geometry, and curvature equations. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5353. Mathematics of Image Processing. (3-0) 3 Credit Hours.**

Prerequisite: MAT 5613 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5413. Functional Analysis II. (3-0) 3 Credit Hours.**

Prerequisite: MAT 5403. Riesz representation theorem, spectral theory, Banach algebras, and C\*-algebras. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5553. Harmonic Analysis. (3-0) 3 Credit Hours.**

Prerequisites: MAT 3223 and MAT 4223, or consent of the instructor. Topics may include properties of Fourier series, convergence and summability, Hardy spaces, boundary behavior and harmonic functions, and other topics at the discretion of the instructor. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5673. Partial Differential Equations I. (3-0) 3 Credit Hours.**

Prerequisites: MAT 3623 and MAT 5663, or consent of instructor. Classical theory of initial value and boundary value problems for partial differential equations, including the heat equation, wave equation, and Laplace equation, et al., and non-linear first and second order partial differential equations and calculus of variation. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5683. Partial Differential Equations II. (3-0) 3 Credit Hours.**

Prerequisite: MAT 5673. Modern topics in partial differential equations. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5963. Introduction to Mathematics Education Research. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. An introduction to important research and findings in mathematics education. Students will gain experience with interpreting education research and translating it into practice. Students will work on projects designed to help them investigate their own teaching practice. Topics include: mathematical learning theories, philosophical perspectives of mathematics, explorations of mathematical content, and research on student learning. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 5973. Directed Research. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from the instructor and the student's Graduate Advisor of Record. The directed research course may involve either a laboratory or a theoretical problem. May be repeated for credit, but not more than 6 hours, regardless of discipline, will apply to the Master's degree. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**MAT 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

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

Prerequisites: Permission from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.



# Department of Molecular Microbiology and Immunology

## Mission Statement

The Department of Molecular Microbiology and Immunology connects outstanding research programs to the academic mission of preparing students for professional careers in microbiology and immunology, medical and public health service fields, education, research, and industry. The department of Molecular Microbiology and Immunology is committed to providing students with foundations to link their educational experience to basic and translational biomedical research activities built by department faculty with expertise in the areas of vaccine development, microbial pathogenesis, and molecular mechanisms that determine immune responses in health and disease.

The Department of Molecular Microbiology and Immunology offers a Doctor of Philosophy (Ph.D.) degree in Molecular Microbiology and Immunology. The program of study is structured around a comprehensive core curriculum that includes Principles of Immunology and Principles of Microbiology, and a "primer" core class named Genes, Microbes and Disease, that intends to bridge areas of research at the molecular and cellular level with various research topics currently pursued by members of the Department. Core courses on Principles of Scientific Writing and Teaching in Life Sciences are structured to provide formal training in writing grants/ research publications and effective tools for developing learning environments in life sciences, respectively. Supporting prescribed electives include specialized courses that focus on advanced topics in immunology, mycology, bacteriology, virology, and informatics, among others, designed to provide in-depth knowledge at the frontiers of the areas of research to be pursued by prospective students. The collective goal of core and elective courses in the curriculum is to provide both foundational and specialized knowledge in areas of Molecular Microbiology and Immunology to guide doctoral students towards a field of their choice. Doctoral and Dissertation Research courses are intended to provide robust hands-on and minds-on, research-based training to generate significant findings advancing the student's field of study and resulting in peer-reviewed publications.

The mission of the Department of Molecular Microbiology and Immunology is to conduct outstanding research and provide exceptional educational experiences in a collegial, diverse, and inclusive environment. At the same time, we transform academic experiences from classroom to careers by merging scholarly activities with practical skills in fundamental and translational aspects of science in conjunction with a general and discipline-specific Professional Development Program intended to guide students into various career paths.

## Core Values

Integrity in academic studies and research.

Respect, diversity, and inclusion.

Responsibility and accountability.

Foster a culture of community and communication.

## Doctor of Philosophy Degree in Molecular Microbiology and Immunology

The Department of Molecular Microbiology and Immunology offers opportunities for advanced study and research leading to the Doctor of Philosophy degree.

The goals of the program are:

- To educate, mentor, and sponsor the next generation of scientists specialized in the study of mechanisms leading to diseases caused by microorganisms, host immune response to infectious and non-pathogenic microorganisms, and diseases arising from immune dysfunction.
- To advance multi-disciplinary training and research portfolios within UTSA and other research entities in San Antonio.
- To meet the workforce needs of academic institutions and also of industries specialized in biotechnology, biodefense, and healthcare.
- To guide students towards a variety of career paths with general and discipline-specific Professional Development Plans.

## Student Learning Outcomes

Upon completion of the Molecular Microbiology and Immunology Degree, students will be proficient in:

- Demonstrating knowledge and comprehension of the foundations of the immune systems in various hosts, microbial pathogenesis, host-pathogen interactions, microbial and host genomics, and biology of diseases of the immune system.
- Designing and executing experiments and applying the scientific method.
- Applying cutting-edge knowledge and experimental tools in microbiology and immunology to solve current health challenges.
- Effectively communicating molecular microbiology and immunology concepts, methods, and results from basic research in written and oral forms.

## Admission Requirements

Applicants must satisfy the University-wide graduate admission requirements described in the graduate catalog. In addition, they must satisfy one of the following MMI Ph.D. Program-specific requirements.

1. Hold a Bachelor of Arts or a Bachelor of Science degree in STEM with a minimum grade point average of 3.0 in upper-division courses in Microbiology or Biosciences with course curriculum including but not limited to, biology, genetics, microbiology, or immunology.
2. A Master's degree in STEM, preferably in Biology, Microbiology and Immunology, Biotechnology, or related field is preferable.

Admission to the program is decided based on a holistic approach that includes the applicant's personal statement, course work, letters of reference, evidence of research experience, and one or more online or in-person interviews.

Complete applications must include:

1. Official transcripts.
2. Three letters of recommendation from persons familiar with the applicant's academic potential.
3. A statement of research/specialization interest and description of prior research experience.

- Resumé/curriculum vita with a list of publications or scholarly products.
- For International Applicants only: Test of English as a Foreign Language (TOEFL) with minimum scores of 100 or 550 for Internet or paper versions are recommended.

## Degree Requirements

The degree requires 75 semester credit hours (SCH) for students entering with a Bachelor of Arts or a Bachelor of Science degree, or 66 SCH for students entering with a Master's Degree. The curriculum consists of core courses, courses in scientific writing and scientific teaching, elective courses, seminars, and dissertation research. Any grade lower than "B" in graduate courses or in leveling coursework at the undergraduate level will not count toward the Ph.D. degree.

### A. Core Curriculum (15 semester credit hours required) 15

MMI 5513	Genes, Microbes and Disease
MMI 5553	Principles of Immunology
MMI 5573	Principles of Microbiology
MMI 7113	Teaching in Life Sciences
MMI 7143	Principles of Scientific Writing

### B. Electives (15 semester credit hours selected from the courses below) 15

MMI 6323	Biostatistics
MMI 6643	Introduction to Bioinformatics
MMI 6513	Drug Development
MMI 6543	Vaccine Development
MMI 6613	Introduction to Clinical Medicine and Pathology
MMI 6713	Advanced Clinical Medicine and Pathology
MMI 6743	Advanced Virology
MMI 6803	Advanced Immunology
MMI 6883	Bacterial Pathogenesis
MMI 6733	Advanced Medical Mycology
MMI 6923	Advanced Microbial Bioinformatics
MMI 6933	Data Analysis and Visualization for Biologists
MMI 6973	Special Topics

Students can alternatively take any 5000-7000 level course offered at UTSA with approval from the Molecular Microbiology and Immunology Doctoral Studies Committee.

### C. Colloquia (5 semester credit hours selected from the courses below) 5

MMI 7001	Professional and Leadership Development
MMI 7031	Graduate Student Seminar: Acquiring Presentation Skills
MMI 7041	Molecular Microbiology and Immunology Colloquium (Microbiology)
MMI 7041	Molecular Microbiology and Immunology Colloquium (Highlights in Immunology)
MMI 7041	Molecular Microbiology and Immunology Colloquium (Neuroimmunology)
MMI 7041	Molecular Microbiology and Immunology Colloquium (Vector-Borne diseases)
MMI 7041	Molecular Microbiology and Immunology Colloquium (Biofilms)
MMI 7041	Molecular Microbiology and Immunology Colloquium (Antifungal Drugs)

MMI 7051	Molecular Microbiology and Immunology Seminar
<b>D. Doctoral Research (40 semester credit hours required) 40</b>	
MMI 7571 or MMI 7572	Doctoral Rotation
MMI 7211 – MMI 7216	Doctoral Research
MMI 7311 – MMI 7316	Doctoral Dissertation
<b>Total Credit Hours 75</b>	

## Advancement to Candidacy

Advancement to candidacy requires a student to complete all the program requirements and to pass written and oral qualifying examinations following completion of core and a majority of elective courses. The written qualifying exam is administered in connection with the Principles of Immunology and Principles of Microbiology core courses. The oral qualifying exam is based on the dissertation research proposal and is administered by a five-member Oral Qualifying Exam Committee made up of tenured, tenure-track, or adjunct faculty. The qualifying exam is conducted as outlined in the Handbook of Academic Policies and Procedures for the Ph.D. Program. in Molecular Microbiology and Immunology. Students are allowed two additional attempts to pass their oral qualifying examination. Results of the written and oral examinations must be reported to the 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 following guidelines of the UTSA 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 the 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.

## Molecular Microbiology and Immunology (MMI) Courses

### MMI 5513. Genes, Microbes and Disease. (3-0) 3 Credit Hours.

Prerequisite: BIO 3513 or equivalent. Primer course that bridges molecular and cell biology, molecular structure and function of genes and nucleic acids, in the focused area of host-pathogen interactions. Genome projects, functional genomics, and the genetic control of development will also be covered. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 5553. Principles of Immunology. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513 or equivalent. A study of cellular and molecular interaction between cells and molecules of the immune system and principles of immune system function. Topics include immune system development, humoral and cell-mediated immunity, disease and treatments, immunization, immunodeficiency, and autoimmunity. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 5573. Principles of Microbiology. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513 and BIO 3713, or equivalents. A study of the cellular and molecular mechanisms by which bacterial, eukaryotic, parasitic and viral pathogens cause disease and the host immune responses against these pathogens. (Credit cannot be earned for both MMI 5573 and BIO 6573.) This course is available to Master and Doctoral students. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 5971. Directed Research. (0-0) 1 Credit Hour.**

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 MMI 6951, MMI 6952, and MMI 6953 (Independent Study), will apply to the Master's degree. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 5972. Directed Research. (0-0) 2 Credit Hours.**

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 MMI 6951, MMI 6952, and MMI 6953 (Independent Study), will apply to the Master's degree. Differential Tuition: \$100. Course fee: GS01 \$60.

**MMI 5973. Directed Research. (0-0) 3 Credit Hours.**

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 MMI 6951, MMI 6952, and MMI 6953 (Independent Study), will apply to the Master's degree. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6323. Biostatistics. (3-0) 3 Credit Hours.**

This course involves basic, intermediate, and advanced statistical vocabulary, concepts, and methods commonly used in the biomedical research. 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, and receiver operating characteristic curves. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6513. Drug Development. (3-0) 3 Credit Hours.**

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. (Same as BIO 6513. Credit cannot be earned for both MMI 6513 and BIO 6513.) This course is available to Master and Doctoral students. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6543. Vaccine Development. (3-0) 3 Credit Hours.**

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. (Same as BIO 6543. Credit cannot be earned for both MMI 6543 and BIO 6543.) This course is available to Master and Doctoral students. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6613. Introduction to Clinical Medicine and Pathology. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing. Introduction to concepts of human disease, diagnosis, and underlying pathology. This course is available to Master and Doctoral students. Generally offered: Fall. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6643. Introduction to Bioinformatics. (3-0) 3 Credit Hours.**

The ability to sequence and analyze genomes has transformed biology. The genomic revolution has been made possible by the development of bioinformatics tools that combine computation with principles of molecular biology. In this course, students will learn how to use some of the major bioinformatics tools and will examine a few genomes to understand the vast amount of information present in them. This course is available to Master and Doctoral students. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6713. Advanced Clinical Medicine and Pathology. (3-0) 3 Credit Hours.**

Prerequisite: MMI 3013 or MMI 6613. Advanced concepts of human disease, diagnosis, and underlying pathology. This course is available to Master and Doctoral students. Generally offered: Spring. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6733. Advanced Medical Mycology. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3522 and BIO 3722 or equivalents. A comprehensive study of the etiological agents and host factors that lead to fungal disease in humans. This course is available to Master and Doctoral students. (Same as BIO 5733. Credit cannot be earned for both MMI 6733 and BIO 5733.) Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6743. Advanced Virology. (3-0) 3 Credit Hours.**

Prerequisite: Graduate standing. A study of the diversity of animal viruses with emphasis on the molecular details of genome replication, gene expression, and pathogenesis. (Same as BIO 5743. Credit cannot be earned for both MMI 5743 and BIO 5743.) This course is available to Master and Doctoral students. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6803. Advanced Immunology. (3-0) 3 Credit Hours.**

Prerequisite: BIO 4743 or consent of instructor. Advanced applications of current molecular and cellular concepts of humoral and cell-mediated immunity, with emphasis on host-pathogen interactions, experimental design, and immunological technologies. This course is available to Master and Doctoral students. (Same as BIO 6803. Credit cannot be earned for both MMI 6803 and BIO 6803.) Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6883. Bacterial Pathogenesis. (3-0) 3 Credit Hours.**

Prerequisite: 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. (Same as BIO 6883. Credit cannot be earned for both MMI 6883 and BIO 6883.) Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6923. Advanced Microbial Bioinformatics. (3-0) 3 Credit Hours.**

Prerequisite: BIO 2313 or equivalent; MMI 6643, enrollment in Molecular Microbiology and Immunology Ph.D. program required, or permission of the Molecular Microbiology and Immunology Department or instructor. With the advent of next generation sequencing (NGS), genomes and transcriptomes are being added at ever growing rates to the public sequence repositories, which poses challenges for comprehensive data analyses and mining. In this course, students will learn and apply bioinformatics tools and strategies - from the profiling of individual genomes to large-scale multi-isolate comparisons - to harvest the rich information content that can be found in big sequence data. This course focuses on microbial genomics/transcriptomics/evolution with focus on pathogens. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6933. Data Analysis and Visualization for Biologists. (3-0) 3 Credit Hours.**

An introduction to modern techniques used by data scientists; including data organization, manipulation, analysis, visualization, and in silico experimentation. Students will be taught how to use an open-source data science platform (KNIME) to design a workflow specific to their research project. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 6951. Independent Study. (0-0) 1 Credit Hour.**

This course involves independent reading, research, discussion, and/or writing under the direction of a faculty member. This course is 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 MMI 5971, MMI 5972, and MMI 5973 (Independent Study), will apply to the Master's degree. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 6952. Independent Study. (0-0) 2 Credit Hours.**

This course involves independent reading, research, discussion, and/or writing under the direction of a faculty member. This course is 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 MMI 5971, MMI 5972, and MMI 5973 (Independent Study), will apply to the Master's degree. Differential Tuition: \$100. Course fee: GS01 \$60.

**MMI 6953. Independent Study. (0-0) 3 Credit Hours.**

This course involves independent reading, research, discussion, and/or writing under the direction of a faculty member. This course is 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 MMI 5971, MMI 5972, and MMI 5973 (Independent Study), will apply to the Master's degree. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 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 if the topics vary. Differential Tuition: \$150. Course fee: GS01 \$90.

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

Corequisites: Enrollment in MMI 6981, MMI 6982, or MMI 6983 is required each term in which the thesis is in progress. 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. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 6982. Master's Thesis. (0-0) 2 Credit Hours.**

Corequisites: Enrollment in MMI 6981, MMI 6982, or MMI 6983 is required each term in which the thesis is in progress. 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. Differential Tuition: \$100. Course fee: GS01 \$60.

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

Corequisites: Enrollment in MMI 6981, MMI 6982, or MMI 6983 is required each term in which the thesis is in progress. 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. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 7001. Professional and Leadership Development. (1-0) 1 Credit Hour.**

This course focuses on building individual development plans and integration of professional and leadership skills. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7031. Graduate Student Seminar: Acquiring Presentation Skills. (1-0) 1 Credit Hour.**

This course includes oral presentations, discussions, critical evaluation of students' research in progress, or support preparation of manuscripts/reviews by students to publish their data sets. May be repeated for credit. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7041. Molecular Microbiology and Immunology Colloquium. (1-0) 1 Credit Hour.**

Prerequisite: Graduate standing. This course includes 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 if topic varies. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7051. Molecular Microbiology and Immunology Seminar. (1-0) 1 Credit Hour.**

Prerequisite: Graduate standing. This course includes formal presentations of research by outside authorities in the biological sciences. May be repeated for credit. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7113. Teaching in Life Sciences. (3-0) 3 Credit Hours.**

Prerequisite: Admission to candidacy for the Doctoral degree. Required course for Molecular Microbiology and Immunology doctoral students. The student will be responsible for all aspects of leading a discussion section or laboratory course. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 7143. Principles of Scientific Writing. (3-0) 3 Credit Hours.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree. 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. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 7211. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisite: Admission to Molecular Microbiology and Immunology Doctoral program. May be repeated for credit, but no more than 27 hours may be applied to the Doctoral degree. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7212. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisite: Admission to Molecular Microbiology and Immunology Doctoral program. May be repeated for credit, but no more than 27 hours may be applied to the Doctoral degree. Differential Tuition: \$100. Course fee: GS01 \$60.

**MMI 7213. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisite: Admission to Molecular Microbiology and Immunology Doctoral program. May be repeated for credit, but no more than 27 hours may be applied to the Doctoral degree. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 7214. Doctoral Research. (0-0) 4 Credit Hours.**

Prerequisite: Admission to either the Molecular Microbiology and Immunology, Neuroscience, or Cell and Molecular Biology Doctoral program. May be repeated for credit, but no more than 27 hours may be applied to the Doctoral degree. Differential Tuition: \$200. Course fee: GS01 \$120.

**MMI 7215. Doctoral Research. (0-0) 5 Credit Hours.**

Prerequisite: Admission to either the Molecular Microbiology and Immunology, Neuroscience, or Cell and Molecular Biology Doctoral program. May be repeated for credit, but no more than 27 hours may be applied to the Doctoral degree. Differential Tuition: \$250. Course fee: GS01 \$150.

**MMI 7216. Doctoral Research. (0-0) 6 Credit Hours.**

Prerequisite: Admission to Molecular Microbiology and Immunology Doctoral program. May be repeated for credit, but no more than 27 hours may be applied to the Doctoral degree. Differential Tuition: \$300. Course fee: GS01 \$180.

**MMI 7311. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree and completion of at least 1-6 semester credit hours of MMI 7211, MMI 7212, MMI 7213, MMI 7214, MMI 7215, or MMI 7216. May be repeated for credit, but no more than 45 hours may be applied to the Doctoral degree. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7312. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree and completion of at least 1-6 semester credit hours of MMI 7211, MMI 7212, MMI 7213, MMI 7214, MMI 7215, or MMI 7216. May be repeated for credit, but no more than 45 hours may be applied to the Doctoral degree. Differential Tuition: \$100. Course fee: GS01 \$60.

**MMI 7313. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree and completion of at least 1-6 semester credit hours of MMI 7211, MMI 7212, MMI 7213, MMI 7214, MMI 7215, or MMI 7216. May be repeated for credit, but no more than 45 hours may be applied to the Doctoral degree. Differential Tuition: \$150. Course fee: GS01 \$90.

**MMI 7314. Doctoral Dissertation. (0-0) 4 Credit Hours.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree and completion of at least 1-6 semester credit hours of MMI 7211, MMI 7212, MMI 7213, MMI 7214, MMI 7215, or MMI 7216. May be repeated for credit, but no more than 45 hours may be applied to the Doctoral degree. Differential Tuition: \$200. Course fee: GS01 \$120.

**MMI 7315. Doctoral Dissertation. (0-0) 5 Credit Hours.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree and completion of at least 1-6 semester credit hours of MMI 7211, MMI 7212, MMI 7213, MMI 7214, MMI 7215, or MMI 7216. May be repeated for credit, but no more than 45 hours may be applied to the Doctoral degree. Differential Tuition: \$250. Course fee: GS01 \$150.

**MMI 7316. Doctoral Dissertation. (0-0) 6 Credit Hours.**

Prerequisite: Admission to candidacy for the Molecular Microbiology and Immunology Doctoral degree and completion of at least 1-6 semester credit hours of MMI 7211, MMI 7212, MMI 7213, MMI 7214, MMI 7215, or MMI 7216. May be repeated for credit, but no more than 45 hours may be applied to the Doctoral degree. Differential Tuition: \$300. Course fee: GS01 \$180.

**MMI 7571. Doctoral Rotation. (0-0) 1 Credit Hour.**

Prerequisite: Admission to the Molecular Microbiology and Immunology Ph.D. program. This course allows students to perform laboratory-based research under the direction of a Molecular Microbiology and Immunology faculty member. Students will receive mentoring and training in the areas of experimental design, experimentation, data acquisition, data analysis, and presentation (oral/written). May be repeated for credit, but no more than 6 hours may be applied to the Doctoral degree. Differential Tuition: \$50. Course fee: GS01 \$30.

**MMI 7572. Doctoral Rotation. (0-0) 2 Credit Hours.**

Prerequisite: Admission to the Molecular Microbiology and Immunology Ph.D. program. This course allows students to perform laboratory-based research under the direction of a Molecular Microbiology and Immunology faculty member. Students will receive mentoring and training in the areas of experimental design, experimentation, data acquisition, data analysis, and presentation (oral/written). May be repeated for credit, but no more than 6 hours may be applied to the Doctoral degree. Differential Tuition: \$100. Course fee: GS01 \$60.

## Department of Neuroscience, Developmental and Regenerative Biology

The Department of Neuroscience, Developmental and Regenerative Biology offers the Doctor of Philosophy degree in Cell and Molecular Biology and the Doctor of Philosophy degree in Neuroscience.

- Ph.D. in Cell and Molecular Biology (p. 349)
- Ph.D. in Neuroscience (p. 350)

### Doctor of Philosophy Degree in Cell and Molecular Biology

The Department of Neuroscience, Developmental and Regenerative Biology offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Cell and Molecular Biology. In addition, the Cell and Molecular Biology degree offers specialized tracks in Molecular Microbiology and Immunology and Stem Cell Biology. The Ph.D. in Cell and Molecular 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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 or graduate work. Applicants must submit, along with the application, transcripts describing previous undergraduate and graduate coursework, three letters of recommendation, and a Statement of Future Plans. Applicants whose native language is not English must score at least 60 on the Test of English as a Foreign Language (TOEFL) paper version or 79 on the Internet version. Admission is accompanied by appointment to a teaching assistantship, research assistantship, or research fellowship. The Doctoral Studies Committees is comprised of members selected from the graduate faculty who are responsible for reviewing applications for admission.

#### Degree Requirements

The degree requires a minimum of 79 semester credit hours beyond the baccalaureate degree for the Ph.D. in Cell and Molecular Biology. The curriculum consists of core courses, courses in scientific writing and scientific teaching, elective courses, seminars, 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 Ph.D. degree. Students matriculating with a Master's degree may transfer up to 30 semester credit hours toward the Ph.D. degree provided the courses are comparable to required core or elective courses and are approved by the appropriate Doctoral Studies Committee.

Code	Title	Credit Hours
A. Core curriculum (19 semester credit hours required):		19
BIO 5123	Principles of Molecular Biology	
BIO 5133	Principles of Cell Biology	
BIO 5213	Principles of Chemical Biology	
BIO 7113	Principles of Biological Scientific Teaching	
BIO 7143	Principles of Biological Scientific Writing	
BIO 7572	Experimental Techniques in Biology	
B. Colloquia (1 credit hour each semester for a minimum of 10 semesters):		10
BIO 7041	Biology Colloquium <sup>1</sup>	
C. Doctoral research (41 semester credit hours minimum):		41
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 (9 semester credit hours minimum):		9
These can be selected from any 5000–7000 level lecture courses offered in Biology or from any 5000–7000 level lecture courses offered in other departments with the approval of the Cell and Molecular Biology Doctoral Studies Committee.		
<b>Total Credit Hours</b>		<b>79</b>

<sup>1</sup> Enrollment in BIO 7041 Biology Colloquium Biology Colloquium is required every semester through the fifth year.

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. Similarly, students are also encouraged to select the majority of their elective courses and colloquia from those offered that are broadly related to the fields of Microbiology or Immunology. The overall program of study for this track 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. In addition, students are encouraged to take elective courses closely related to stem cell biology. 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 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 written qualifying exam is administered in connection with the Principles of Cell Biology and Principles of Molecular Biology core courses. The oral qualifying exam is based on the dissertation research proposal and is administered by a five-member Oral Qualifying Exam Committee made up of tenured, tenure-track or adjunct faculty. The qualifying exam is conducted as outlined in the Handbook of Academic Policies and Procedures for the Cell and Molecular Biology concentration. 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 and the Dean of the Graduate School. Admission into the Doctoral program does not guarantee advancement to candidacy.

## Dissertation

Candidates must demonstrate their ability to conduct independent research by completing and defending an original dissertation. The research topic is determined by the student in consultation with their supervising professor and a Dissertation Committee. The Dissertation Committee is selected by the student and supervising professor and approved by 1) the Doctoral Studies committee; 2) the Department Chair; 3) the Dean of the College; and 4) the Dean of the Graduate School. The Dissertation Committee guides and critiques the candidate's research. The Committee is composed of four program faculty and one outside member. The Dissertation Committee must approve the completed dissertation.

## Final Oral Examination

Following an open presentation of the dissertation findings, the Dissertation Committee conducts a closed oral examination dealing primarily with the relation of the dissertation to the general field of specialty. Results of the oral examination must be reported to the Dean of the Graduate School. Awarding of the degree is based on the approval of the Dissertation Committee, which is approved by relevant Doctoral Studies Committee, the Department Chair, and the Dean of the Graduate School. The Dean of the Graduate School certifies the completion of all University-wide requirements.

## Doctor of Philosophy Degree in Neuroscience

The Department of Neuroscience, Developmental and Regenerative Biology offers opportunities for advanced study and research leading to the Doctor of Philosophy degree in Neuroscience. The Ph.D. in Neuroscience 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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, and a Statement of Future Plans. Applicants whose native language is not English must score at least 60 on the Test of English as a Foreign Language (TOEFL) paper version or 79 on the Internet version. The Doctoral Studies Committees is comprised of members selected from the graduate faculty and are responsible for reviewing applications for admission.

## Degree Requirements

The degree requires a minimum of 79 semester credit hours beyond the baccalaureate degree for the Ph.D. in Neuroscience. 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 Doctoral Studies Committee.

Code	Title	Credit Hours
A. Core curriculum (17 semester credit hours required):		17
BIO 5433	Systems Neuroscience	
BIO 5443	Molecular Neurobiology	
BIO 6233	Quantitative Biology	
BIO 7113	Principles of Biological Scientific Teaching	
BIO 7143	Principles of Biological Scientific Writing	
Select 2 semester credit hours of the following:		
BIO 7571	Experimental Techniques in Biology <sup>1</sup>	

B. Colloquia (8 semester hours minimum):	8
BIO 7041 Biology Colloquium	
C. Doctoral research (45 semester credit hours minimum):	45
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 (9 semester credit hours minimum):	9
These can be selected from any 5000–7000 level lecture courses offered in Biology or from any 5000–7000 level lecture courses offered in other departments with the approval of the Neuroscience Doctoral Studies Committee.	
<b>Total Credit Hours</b>	<b>79</b>

<sup>1</sup> Enrollment in BIO 7571 Experimental Techniques in Biology Experimental Techniques in Biology is required in the Fall and Spring semesters of the first year.

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.

## 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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

### BIO 5003. Epigenetics and Metabolism. (3-0) 3 Credit Hours.

Scientific overview and discussion course related topics including stem cells, diseases, and interaction between metabolism and different epigenetic mechanisms. Differential Tuition: \$150. Course Fees: GS01 \$90.

### BIO 5033. Biotechnology Laboratory. (0-6) 3 Credit Hours.

Prerequisite: Graduate standing. Concurrent enrollment in BIO 5323 is strongly recommended for M.S. in Biotechnology students. An organized course offering an introduction to routine procedures employed in the modern research laboratory. Differential Tuition: \$150. Course Fees: GS01 \$90; IUB1 \$10; L001 \$30.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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.") Differential Tuition: \$150. Course Fees: GS01 \$90; IUB1 \$10; L001 \$30.

### 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.) Differential Tuition: \$150. Course Fees: GS01 \$90; IUB1 \$10; L001 \$30.



**BIO 5213. Principles of Chemical Biology. (3-0) 3 Credit Hours.**

Prerequisites: BIO 3513 and BIO 3813, or equivalents. The role of chemistry in prokaryotic and eukaryotic biological systems. Topics will cover the probing and controlling biological systems using chemical methods and the manipulation of biological systems via novel chemistries to advance fundamental knowledge which serve as a basis for translational approaches. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5343. Proteins and Nucleic Acids. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513 or equivalent. Protein sequences, domains, folding, proteomics, glycoproteins, protein-DNA interaction, RNA conformations. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5423. Neuroanatomy. (3-0) 3 Credit Hours.**

Prerequisite: Consent of instructor. The anatomy of the vertebrate nervous system. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5433. Systems Neuroscience. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3422 or an equivalent. The fundamentals of neurophysiology are presented from the cellular to the systems level. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5443. Molecular Neurobiology. (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. (Formerly titled "Neurochemistry.") Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5613. Neurodegenerative Disease. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513, BIO 3813, or consent of instructor; BIO 5433 or BIO 5443 is recommended. The pathogenesis of neurodegenerative diseases will be covered with an emphasis on the molecular mechanisms and experimental approaches. Current research progress will be covered. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.") Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**BIO 5783. Introduction to Good Manufacturing Practices and Good Laboratory Practices. (3-0) 3 Credit Hours.**

Review of FDA and U.S. Pharmacopoeia 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5813. Frontiers in Human Pluripotent Stem Cells. (3-0) 3 Credit Hours.**

Integrates the fundamental aspects of developmental biology with emerging concepts in embryonic and adult stem cells and regenerative medicine. A discussion of various stem cell applications in industry, military, medicine, and ethics of regenerative medicine is presented. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 5873. Plant Biotechnology. (3-0) 3 Credit Hours.**

Prerequisite: BIO 3513 or equivalent, BIO 5123 is recommended. The principles of plant physiology and genetics, and techniques used in plant modification, and principles of plant breeding and quantitative genetics as applied to plant biotechnology. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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) from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 6513. Drug Development. (3-0) 3 Credit Hours.**

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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**BIO 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 in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: \$50. Course Fees: GS01 \$30.

**BIO 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 in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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 in BIO 6981, BIO 6982, or BIO 6983 is required each term in which the thesis is in progress. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

**BIO 7113. Principles of Biological Scientific Teaching. (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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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 7211-3. May be repeated for credit. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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 7211-3. May be repeated for credit. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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 7211-3. May be repeated for credit. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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.) Differential Tuition: \$50. Course Fees: GS01 \$30.

**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 5572.) Differential Tuition: \$100. Course Fees: GS01 \$60.

## 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.

- M.S. in Physics (p. 355)
- Ph.D. in Physics (p. 356)

## 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 upper division 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.

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 60 and 65 (paper version) or 79 and 100 (Internet version) or an IELTS score below 7. See Student Policies, Admission Policies, 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:

Code	Title	Credit Hours
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. If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals.		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.		
<b>Total Credit Hours</b>		<b>30</b>

## Non-Thesis 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:

Code	Title	Credit Hours
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. If approved to enroll in undergraduate coursework students must complete the Permission for Enrolling in Undergraduate Courses While a Graduate form and receive all approvals.		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.		
<b>Total Credit Hours</b>		<b>30</b>

## 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 Student Policies, General Academic Regulations, and the Graduate Catalog, Doctoral Degree Regulations).

### Admission Requirements

In addition to satisfying the University-wide graduate admission requirements, applicants must have a Bachelor of Arts or a Bachelor of Science degree from an accredited university and a minimum grade point average of 3.0 (on a 4.0 scale) in upper division undergraduate coursework and all graduate work, preferably in physics. A minimum of two letters of recommendation from persons familiar with the applicant's undergraduate (and graduate, where applicable) scholastic record must be sent to the Graduate School at the same time application is made for admission to UTSA. Background or remedial courses in physics may be required to remove deficiencies.

Applicants whose native language is not English must submit scores from the Test of English as a Foreign Language (TOEFL) 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 60 and 65 (paper version) or 79 and 100 (Internet version) or an IELTS score below 7. See Student Policies, Admission Policies, 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 under Doctoral Degree regulations, in the UTSA Graduate Catalog.
3. No research hours can be transferred to the program.

## Program of Study

Code	Title	Credit Hours
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 6133	Introduction to Scientific Writing	
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 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	
PHY 7983	Current 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 <sup>1</sup>
PHY 7112	Doctoral Dissertation <sup>1</sup>
PHY 7113	Doctoral Dissertation <sup>1</sup>

**Total Credit Hours** **81**

<sup>1</sup> Students must enroll in PHY 7111-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 (in the Graduate Catalog) for the other requirements. Additional details are described in the Department's Graduate Student Handbook.

## 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. Additional details are described in the Department's Graduate Student Handbook.

## 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. Additional details are described in the Department's Graduate Student Handbook.

## 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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.) Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

### 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**PHY 6953. Independent Study. (0-0) 3 Credit Hours.**

Prerequisites: Graduate standing and permission in writing (form available) from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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). Differential Tuition: \$50. Course Fees: GS01 \$30.

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

Prerequisites: Permission from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**PHY 7101. Doctoral Research. (0-0) 1 Credit Hour.**

Prerequisites: Permission from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**PHY 7102. Doctoral Research. (0-0) 2 Credit Hours.**

Prerequisites: Permission from 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. Differential Tuition: \$100. Course Fees: GS01 \$60.

**PHY 7103. Doctoral Research. (0-0) 3 Credit Hours.**

Prerequisites: Permission from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**PHY 7111. Doctoral Dissertation. (0-0) 1 Credit Hour.**

Prerequisites: Permission from 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. Differential Tuition: \$50. Course Fees: GS01 \$30.

**PHY 7112. Doctoral Dissertation. (0-0) 2 Credit Hours.**

Prerequisites: Permission from 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. Differential Tuition: \$100. Course Fees: GS01 \$60.



**PHY 7113. Doctoral Dissertation. (0-0) 3 Credit Hours.**

Prerequisites: Permission from 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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

**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. Differential Tuition: \$150. Course Fees: GS01 \$90.

# UNIVERSITY COLLEGE

University College offers the Doctor of Philosophy degree in Translational Science and the Graduate Certificate in Data Science.

- Master of Science in Artificial Intelligence (p. 362)
- Doctor of Philosophy in Translational Science (p. 362)
- Graduate Certificate in Data Science (p. 366)

## Master of Science in Artificial Intelligence

The Master of Science degree in Artificial Intelligence program is designed to train and equip graduate students in core AI concepts that will fortify their career prospects in AI or related fields. The program comprises three concentrations: 1) Analytics, 2) Computer Science, and 3) Intelligent and Autonomous Systems, that provide a broad spectrum of courses for graduate students to specialize in sub-areas within AI field. Through these concentrations, the program trains graduate students in the design, development, use, and deployment of AI technologies. Curated AI courses provide the students with a repertoire of AI skills and tools for effectively solving problems in a specific domain and extend the knowledge to advance their own respective disciplines. The program also offers a multidisciplinary environment that supports industry-readiness in innovative AI sub-fields. 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 AI related fields. A non-thesis option is available for students who prefer a practical 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 bachelor's degree in engineering, sciences, mathematics, or in related fields for exceptional candidates
- A minimum grade point average of 3.0 in the last 60 semester credit hours of coursework
- A minimum score of 79 on the Test of English as a Foreign Language (TOEFL) iBT or 6.5 on the International English Language Testing System (IELTS), for students whose native language is not English.

Submission of the Graduate Record Examination (GRE) is optional. A student who does not qualify for unconditional admission may be admitted on a conditional basis as determined by the AI Core Committee.

### Degree Requirements

The M.S. in AI program is offered with both Thesis and Non-Thesis options. A minimum of 30 semester credit hours are required to complete the program, including 9 credit hours of core courses, 15 credit hours of concentration required courses, and 6 credit hours of elective courses for the non-thesis option or 6 credit hours of thesis/capstone project. All incoming students are required to enroll in the core courses to achieve a common understanding and knowledge of AI foundations. The enrollment for graduate thesis must be in consultation with the supervising professor and receive approval from the Program Director.

### Thesis Option

The degree requires 30 semester credit hours including 24 technical course credits and 6 thesis credits identified as Master's Thesis in the specific concentration. Students should take 9 semester credit hours of common core courses in the first two semesters. 15 semester credit hours of required courses must be taken within the concentration area to satisfy the depth requirement. No more than 3 semester credit

hours of independent study should be included. Depending on the concentration choice, 3 to 6 semester credit hours may be taken from other concentration courses with approval of the Core Committee. The distribution of required courses is shown below.

<b>A. Required Core Courses</b>		<b>9</b>
CS 5233	Artificial Intelligence	
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Intro to Machine Learning)	
	or CS 6243 Machine Learning	
	or STA 6923 Introduction to Statistical Learning	
<b>B. Prescribed Electives (a set of five courses in the chosen concentration)</b>		<b>15</b>
<b>Analytics Concentration</b>		
DA 6213	Data-Driven Decision Making and Design	
DA 6223	Data Analytics Tools and Techniques	
DA 6233	Data Analytics Visualization and Communication	
DA 6813	Data Analytics Applications	
IS 6713	Data Foundations	
IS 6733	Deep Learning on Cloud Platforms	
IS 6973	Special Problems	
STA 6033	SAS Programming and Data Management	
STA 6233	R Programming for Data Science	
STA 6443	Statistical Modeling	
STA 6543	Predictive Modeling	
STA 6003	Statistical Methods in Research and Practice	
CS/EE Elective		
<b>Computer Science Concentration</b>		
Section 1: Select three to five courses from the following:		
CS 5243	Computer Vision	
CS 5463	Topics in Computer Science (Topic: Autonomous Driving)	
CS 5463	Topics in Computer Science (Topic: Robotics)	
CS 5463	Topics in Computer Science (Topic: Adversarial AI)	
CS 5463	Topics in Computer Science (Parallel and Distributed Machine Learning)	
CS 5483	Topics in Data Science (Topic: Brain Inspired AI)	
CS 5593	Multi-Agent Systems	
CS 6263	Natural Language Processing	
Section 2: Select up to two courses from the following:		
CS 5513	Computer Architecture	
CS 5523	Operating Systems	
CS 5633	Analysis of Algorithms	
<b>Intelligent and Autonomous Systems Concentration</b>		
Additional electives may be chosen from other AI concentrations.		
EE 5103	Engineering Programming	
EE 5143	Linear Systems and Control	
EE 5153	Random Signals and Noise	
EE 5243	Special Topics in Control (Topic: Reinforcement Learning)	
EE 5243	Special Topics in Control (Topic: Optimal Control and Applications)	
EE 5243	Special Topics in Control (Topic: Optimization and Control of Cyber Physical Systems)	

EE 5243	Special Topics in Control (Topic: Computational Intelligence)
EE 5243	Special Topics in Control (Topic: Network Multi-Agent System)
EE 5243	Special Topics in Control (Topic: Advanced Robotics and AI)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Brain Inspired AI)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: AI in Engineering)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Natural Language Processing w/ Deep Learning)
or IS 6973	Special Problems
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Computational Intelligence in Data Analysis)
or STA 6443	Statistical Modeling
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Statistical Inference)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Bioinformatics)
EE 6363	Advanced Topics in Signal Processing (Topic: Deep Learning)
<b>C. Thesis</b>	<b>6</b>
A minimum of 6 semester credit hours are needed. Students must enroll in the Thesis section belonging to their concentration.	
EE 6983	Master's Thesis
STA 6983	Master's Thesis
<b>Total Credit Hours</b>	<b>30</b>

### Non-Thesis Option

The degree requires 30 semester credit hours of technical course credits. Students should take 9 semester credit hours of common core courses in the first two semesters. 15 semester credit hours of required courses must be taken within the concentration area to satisfy the depth requirement. No more than 3 semester credit hours of independent study should be included. Depending on the concentration choice 3 to 6 semester credit hours may be taken from other concentration courses with approval of the Core Committee. An additional 6 semester credit hours of elective courses must be taken from the concentration or outside the concentration. The distribution of required courses is given below.

<b>A. Required Core Courses</b>	<b>9</b>
CS 5233	Artificial Intelligence
EE 5263	Topics in Digital Signal Processing and Digital Filtering
or CS 6243	Machine Learning
or STA 6923	Introduction to Statistical Learning
<b>B. Prescribed Electives (a set of five courses in the chosen concentration)</b>	<b>15</b>
<b>Analytics Concentration</b>	
IS 6713	Data Foundations
IS 6733	Deep Learning on Cloud Platforms
IS 6973	Special Problems
STA 6033	SAS Programming and Data Management

STA 6233	R Programming for Data Science
STA 6443	Statistical Modeling
STA 6543	Predictive Modeling
STA 6003	Statistical Methods in Research and Practice
DA 6213	Data-Driven Decision Making and Design
DA 6223	Data Analytics Tools and Techniques
DA 6233	Data Analytics Visualization and Communication
DA 6233	Data Analytics Visualization and Communication
DA 6813	Data Analytics Applications
CS/EE Elective	
<b>Computer Science Concentration</b>	
Section 1: Select three to five courses from the following:	
CS 5243	Computer Vision
CS 5483	Topics in Data Science
CS 5593	Multi-Agent Systems
CS 6263	Natural Language Processing
CS 5463	Topics in Computer Science (Topic: Autonomous Driving)
CS 5463	Topics in Computer Science (Topic: Robotics)
CS 5463	Topics in Computer Science (Topic: Adversarial AI)
CS 5463	Topics in Computer Science (Topic: Parallel and Distributed Machine Learning)
Section 2: Select up to two courses from the following:	
CS 5513	Computer Architecture
CS 5523	Operating Systems
CS 5633	Analysis of Algorithms
<b>Intelligent and Autonomous Systems Concentration</b>	
Additional electives may be chosen from other AI concentrations.	
EE 5103	Engineering Programming
EE 5143	Linear Systems and Control
EE 5153	Random Signals and Noise
EE 5243	Special Topics in Control (Topic: Reinforcement Learning)
EE 5243	Special Topics in Control (Topic: Optimal Control and Applications)
EE 5243	Special Topics in Control (Topic: Optimization & Control of Cyber Physical Systems)
EE 5243	Special Topics in Control (Topic: Computational Intelligence)
EE 5243	Special Topics in Control (Topic: Network Multi-Agent System)
EE 5243	Special Topics in Control (Topic: Advanced Robotics and AI)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Brain Inspired AI)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: AI in Engineering)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Natural Language Processing w/ Deep Learning)
or IS 6973	Special Problems
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Computational Intelligence in Data Analysis)

or STA 6443 Statistical Modeling	
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Statistical Inference)
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Topic: Bioinformatics)
EE 6363	Advanced Topics in Signal Processing (Topic: Deep Learning)
<b>C. Non-Thesis: 6 hours of electives from inside or outside concentration with advisor approval.</b>	
<b>Total Credit Hours</b>	<b>30</b>

## Doctor of Philosophy Degree 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 Student Policies, General Academic Regulations, and the Graduate Catalog, 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 Student Policies, Admission Policies), 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 Test of English as a Foreign Language (TOEFL) score, with a score of at least an 84 on the internet based test or paper based 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.

3. 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
4. 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
5. A current Curriculum Vitae
6. 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 ([http://gsbs.uthscsa.edu/prospective\\_students/gsbs-application/](http://gsbs.uthscsa.edu/prospective_students/gsbs-application/)). 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. Authorization of Security Background and Sanction check is required before a recommendation for admission consideration.

### 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 and receiving an overall grade of "Pass" on each of 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 receiving an overall grade of "Pass" on each component. Methods for administration of the qualifying exam will be written and oral. The exam will be comprehensive and will include questions covering:

- Knowledge/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 on Course Content:** 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 and core didactic coursework. Students will have up to three weeks to complete the written portion of the qualifying exam:
  - a. The exam will be a take-home exam, and a three week period will be allowed for completion.
  - b. The exam will include one question per domain in the TS PhD curriculum (eight questions total). The instructor for the course taken by the student to fulfill the course requirement for each domain will write the question.
  - c. The response to each question will be limited to 1,000 words. Literature citations are not part of the word count. Students who wish to add exhibits or other addenda must get prior approval from the instructor/question writer.
  - d. Responses will be typed and submitted electronically as a PDF file.
  - e. Students will not be released from lab or class responsibilities while they are completing this portion of the qualifying exam.
  - f. The Written Exam will be scheduled at a time mutually agreed upon by the student, the Supervising Professor, and the participating instructors/question writers and graders.
2. **Dissertation Proposal:** The Dissertation Proposal will consist of the Written Dissertation Proposal and the Oral Exam on the Dissertation Proposal. The Dissertation Committee, chaired by the Supervising

Professor, will be responsible for evaluating and grading these components.

- a. **Written Dissertation Proposal:** The student will prepare a written research proposal that will be the basis for the dissertation research. The Dissertation Proposal will be submitted to the Dissertation Committee at a time mutually agreed upon by the student and the Dissertation Committee, but at least two weeks prior to the scheduling of the Oral Exam.
- b. **Oral Exam on Dissertation Research Proposal:** The oral exam will consist of a presentation of the Dissertation Proposal (a preliminary explanation of the proposed research project which will be defended at the completion of the dissertation) and should include background, methods, and proposed analyses. The relevance of the proposed research to Translational Science must also be addressed. QE Assessment Forms are available online. It is recommended that students review the assessment forms to ensure that all criteria are met. The Dissertation Committee, through questioning, will engage the candidate in a discussion of the proposed research to delineate the strengths and weaknesses of the approach. The oral exam will follow the submission of the written Dissertation Proposal and will be scheduled at a time mutually agreed upon by the student and the Dissertation Committee.

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
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. Refer to the UT Health Handbook (<http://>

iims.uthscsa.edu/sites/iims/files/Education/phd/Student%20Handbook-TS%20PhD-2017-18-FINAL.pdf) for further information on dissertation requirements.

### 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. The relevance of the dissertation to the field of Translational Science will also be evaluated. 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
5. Submitted an approved abstract for publication

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. 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. 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. Translational Science
2. Responsible Conduct
3. Research Design and Analysis
4. Team Science and Leadership
5. Multi-level Cultural Proficiency
6. Scientific Communication
7. Business of Translational Science
8. Evidence-based Implementation and Policy

Refer to the UT Health Catalog (<https://www.uth.edu/academics/applicants/school-catalogs.htm>) and UT Health Handbook (<http://iims.uthscsa.edu/sites/iims/files/Education/phd/Student%20Handbook-TS%20PhD-2017-18-FINAL.pdf>) for further information on program requirements.

Code	Title	Credit Hours
<b>A. Core Curriculum (24 semester credit hours required):</b>		<b>24</b>
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.		
<b>B. Electives (18 semester hours required):</b>		<b>18</b>
12 hours of Prescribed Track Electives		
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.		
<b>C. A minimum of 30 hours combined of Doctoral Research and Dissertation hours are required.</b>		<b>30</b>
<b>Total Credit Hours</b>		<b>72</b>

## Graduate Certificate in Data Science

The graduate certificate in Data Science is a 15-semester-credit-hour program designed for individuals from all academic disciplines to build analytical and computational foundation to investigate data science problems. This certificate program is designed to fill the industry need for more data-science capable professionals and to prepare individuals for a career in data science-related fields. Individuals completing this certificate will gain the practical data science knowledge as well as hands-on skills in data organization, data visualization, data analytics, data mining, and machine learning. The certificate is administered by the University College in conjunction with the School of Data Science.

### Admission Requirements

The certificate is open to all UTSA graduate students, including non-degree seeking students, regardless of their college or major. Applicants who are currently enrolled in a graduate degree program at UTSA have already met University requirements for admission.

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 (see Certificate Program Regulations in this catalog). Students who meet general UTSA admission requirements are eligible for admission to this certificate program.

### Certificate Program Requirements

To earn the Graduate Certificate in Data Science, students must complete 15 semester credit hours as follows:

Code	Title	Credit Hours
<b>A. Required Courses (15 semester credit hours)</b>		<b>15</b>
DS 5003	Introduction to Data Science	

DS 5013	Programming for Data Science	
DS 5023	Data Organization and Visualization	
DS 5033	Data Mining and Machine Learning	
STA 6003	Statistical Methods in Research and Practice	
<b>Total Credit Hours</b>		<b>15</b>

## Data Science (DS) Courses

### **DS 5003. Introduction to Data Science. (3-0) 3 Credit Hours.**

An in-depth investigation into the Data Science life cycle. Focus areas on data visualization, data curation, tools available for data analysis, and software packages will be covered.

### **DS 5013. Programming for Data Science. (3-0) 3 Credit Hours.**

An introduction to data-driven programming emphasizing problem solving, critical thinking, and algorithmic thinking. Topics will focus on foundational computer programming concepts along with fundamentals of object-oriented programming and mathematics/statistics packages.

### **DS 5023. Data Organization and Visualization. (3-0) 3 Credit Hours.**

This course investigates the data organization process from data integration to analysis and visualization through program design and implementation. Topics may also include data collection and sources, file input/output, data preprocessing algorithms, and data visualization using data science software packages and APIs.

### **DS 5033. Data Mining and Machine Learning. (3-0) 3 Credit Hours.**

This course investigates fundamental data science concepts in in-depth analysis, data mining, machine learning, and artificial intelligence. Topics may include clustering, classification, evaluation metrics, supervised and unsupervised learning, search algorithms, intelligent agents, and advanced AI applications in select areas.



# GRADUATE FACULTY

## College for Health, Community and Policy

Name	Title	Education
Baird, Raymond R.	Professor Emeritus	A.B., Eastern New Mexico University; M.A., Ph.D., University of Washington
Cheatwood, A. Derral	Professor Emeritus	B.A., Oklahoma State University; M.A., Ph.D., Ohio State University
Colfer, George R.	Professor Emeritus	B.S., Lock Haven State College; M.S., Ithaca College; Ph.D., Texas A&M University
Dykes, James R.	Associate Professor Emeritus	B.A., Ph.D., The University of Texas at Austin
Gilbert, Michael J.	Associate Professor Emeritus	B.A., M.A., University of New Hampshire; Ph.D., Arizona State University
Halley, Jeffrey A.	Professor Emeritus	B.A., Hobart and William Smith Colleges; M.A., New School for Social Research; Ph.D., City University of New York
Marquez, Raquel	Professor Emerita	B.S., Southwest Texas State University; M.A., Ph.D., University of Texas
Romo, Harriett D.	Professor Emerita	B.A., The University of Texas at Austin; M.A., University of California, Los Angeles; M.A., Ph.D., University of California, San Diego
<b>Criminology and Criminal Justice</b>		
Augustyn, Megan	Associate Professor	B.A., University of Notre Dame; M.A., Ph.D., University of Maryland
Enriquez, Roger	Associate Professor	B.B.A., The University of Texas at San Antonio; J.D., University of Iowa College of Law
Fahmy, Chantal D.	Assistant Professor	B.A., University of California, Irvine; M.S., California State University, Long Beach; Ph.D., Arizona State University
Hartley, Richard D.	Professor	B.S., M.S., Minot State University; Ph.D., University of Nebraska at Omaha
Lynch, Kellie R.	Assistant Professor	B.A., Memorial University; M.S., Ph.D., University of Kentucky
Moon, Byongook	Professor	B.A., Daegu University; M.S., Ph.D., Michigan State University
Smith, Michael R.	Professor	B.S., Virginia Commonwealth University; J.D., University of South Carolina School of Law; Ph.D., Arizona State University
Testa, Alexander M.	Assistant Professor	B.A., University of Albany, SUNY; M.P.P., American University; M.A., Ph.D., University of Maryland
Tillyer, Marie Skubak	Professor	B.A., University of Dayton; M.A., Ph.D., University of Cincinnati

Tillyer, Robert Professor B.A., M.A., Simon Fraser University; Ph.D., University of Cincinnati

### Demography

Huang, Ying	Assistant Professor	LL.B., Southwest University of Political Science and Law; M.P.P., University of Missouri; Ph.D., University of Albany
Potter, Lloyd B.	Professor	B.S., Texas A&M University; M.S., University of Houston; M.P.H., Emory University; Ph.D., The University of Texas at Austin
Saenz, Rogelio	Professor	B.S.W., Pan American University; M.S., Ph.D., Iowa State University
Singelmann, Joachim	Professor	Universität Hamburg; M.A., Ph.D., The University of Texas at Austin
Sparks, Corey	Associate Professor	B.A., M.A., University of Tennessee; Ph.D., Pennsylvania State University
Sparks, P. Johnelle	Professor	B.A., M.A., University of Arkansas; M.A., University of Sydney; Ph.D., Pennsylvania State University
Zenteno, Rene	Professor	B.A., Instituto Tecnológico y de Estudios Superiores; M.A., El Colegio de Mexico; Ph.D., The University of Texas at Austin

### Kinesiology

Cheever, Kelly	Assistant Professor	B.S., Southern Utah University; M.S., Brigham Young University; Ph.D., Temple University
Chung, Eunhee	Assistant Professor	B.E., Kon-Kuk University; B.S.Ed., The University of Georgia; M.S., Ph.D., The University of Wisconsin
Cordova, Alberto	Associate Professor	B.S., M.S., Ph.D., Texas A&M University
Francis, Jimi	Assistant Professor	B.S., M.S., The University of Nevada at Reno; Ph.D., The University of California at Davis
Guan, Jianmin	Associate Professor	B.S., Huizhou Normal College; M.S., Shanghai Institute of Physical Education; M.S., Wayne State University; Ph.D., Texas A&M University
Hart, Curtis L.	Associate Professor in Practice	B.A., Central University of Iowa; M.S., Iowa State University; Ed.D., Oklahoma State University
Land, William	Assistant Professor	B.S., University of Tennessee at Chattanooga; M.S., Ph.D., Florida State University
Oyama, Sakiko	Associate Professor	B.S., Oregon State University; M.S., University of Pittsburg; Ph.D., University of North Carolina
Umeda, Masataka	Assistant Professor	B.S., M.S.H., University of Tsukuba; Ph.D., University of Wisconsin-Madison
Yao, Wan Xiang	Professor	B.S., M.S., Beijing Institute of Physical Education; Ph.D., Auburn University

Zhang, John Quiang Professor B.S., Shandong Teacher's University; M.S., Springfield College; Ph.D., University of Missouri-Columbia

Zhang, Tianou Assistant Professor B.S., Sun Yat-Sen University of Medical Sciences, China; M.S., Peking University, China; Ph.D., University of Minnesota-Twin Cities

#### Nutrition and Dietetics

Leal-Vasquez, Liset Director/Assistant Professor in Practice B.S., The University of Texas-Pan American; M.A., The University of Texas at San Antonio; Ph.D., Texas Women's University

Price, Breanna Clinical Dietetic Instructor/Coordinator M.D.S., The University of Texas Health Science Center at San Antonio; B.S., The University of Texas at San Antonio

Ullevig, Sarah Associate Professor B.S., Texas State University; Ph.D., The University of Texas Health Science Center at San Antonio

#### Psychology

Baumann, Michael R. Professor B.A., Northwestern University; M.A., Ph.D., University of Illinois

Bray, James H. Professor B.S., M.A., Ph.D, University of Houston

Coyle, Thomas R. Professor B.A., M.A., Florida Atlantic University; Ph.D., University of Florida

Eisenberg, Ann R. Professor B.A., M.A., Johns Hopkins University; Ph.D., University of California, Berkeley

Fernandez, Ephrem Professor B.A., University of Western Australia; M.A., Miami University; Ph.D., The Ohio State University

Fuhrman, Robert W. Professor B.A., St. Louis University; M.A., Ph.D., University of Illinois

Garza, Raymond T. Professor B.A., M.A., Texas A&I University; Ph.D., Purdue University

Lopez, Stella D. Associate Professor B.A., Southern Methodist University; Ph.D., The University of Texas at Arlington

Mangold, Deborah Associate Professor B.S., Johns Hopkins University; M.A., Loyola College in Maryland; Ph.D., Howard University

McNaughton-Cassill, Mary E. Professor B.A., M.A., University of California, Santa Barbara; Ph.D., University of California, San Diego/San Diego State University

Morissette, Sandra Baker Professor B.A., University of Vermont; M.A., Ph.D., Boston University

Osman, Augustine Professor B.A., M.A., Ph.D., Western Virginia University

Pillow, David R. Professor B.A., The University of Texas at Arlington; M.A., Ph.D., Arizona State University

Romanowich, Paul Assistant Professor B.A., B.S., University of Florida; M.A., Ph.D., University of California, San Diego

Ryan, Michael P. Associate Professor B.A., Pomona College; Ph.D., Stanford University

Swan, Alicia A. Assistant Professor B.A., Purdue University; M.A., Ph.D., Southern Illinois University, Carbondale

Weston, Rebecca Associate Professor B.A., The University of Texas at Austin; M.A., Ph.D., University of North Texas

Zawacki, Tina Associate Professor B.S., Grand Valley State University; Ph.D., Wayne State University

#### Public Administration

Alexander, Jennifer Associate Professor B.S., Georgetown University; M.S., Ph.D., Virginia Polytechnic Institute and State University

Demir, Tansu Associate Professor B.S., M.A., Hacettepe University; Ph.D., Florida Atlantic University

Elias, Veronica Assistant Professor B.A., The National University of the South, Bahia Blanca, Argentina; M.A., Ph.D., The University of Akron

Fernandez, Kandyce M. Assistant Professor B.A., University of Miami; M.A., Texas A&M University; Ph.D., Arizona State University

Ponomariov, Branco L. Associate Professor B.A., Sofia University; M.A., Central European University; Ph.D., Georgia Institute of Technology

Reddick, Christopher G. Professor B.A., M.A., M.B.A., University of Guelph; Ph.D., University of Sheffield

Romero, Francine Sanders Associate Professor B.A., California State University; M.A., Ph.D., University of California, Riverside

Sanders, Heywood T. Professor A.B., Johns Hopkins University; Ph.D., Harvard University

#### Public Health

Baldwin, Aleta Assistant Professor B.A., The University of Nevada, Las Vegas; M.A., M.P.H., Ph.D., Indiana University

Grigsby, Timothy Assistant Professor B.A., University of California, Irvine; Ph.D., The University of Southern California

He, Meizi Professor B.S., M.S., Sun Yat-sen University of Medical Sciences, China; Ph.D., University of Hong Kong

Howard, Jeffrey Assistant Professor B.A., M.A., The University of Texas at Arlington; Ph.D., The University of Texas at San Antonio

Oswalt, Sara B. Professor B.S., The Pennsylvania State University; M.P.H., Indiana University; Ph.D., The University of Georgia

Sosa, Erica Associate Professor B.A., St. Mary's University; M.S., The University of Texas at San Antonio; Ph.D., Texas A&M University

Graduate Faculty

Sunil, Thankam S.	Professor	B.S., M.S., University of Kerala; M.P.H., Ph.D., International Institute for Population Sciences; M.P.H., University of North Texas Health Science Center; Ph.D., University of North Texas
Wyatt, Tammy	Associate Professor	B.S., Sam Houston State University; M.Ed., Southwest Texas State University; Ph.D., The University of Texas at Austin
Yin, Zenong	Professor	B.S., Beijing Institute of Physical Education; M.A., Ph.D., University of Southern California

**Social Work**

Adams Rueda, Heidi L.	Associate Professor	B.A., University of Nebraska; M.S.W., Ph.D., Arizona State University
Chanmugam, Amy	Associate Professor	B.A., Vassar College; M.S.S.W., Ph.D., The University of Texas at Austin
Christensen, Candace	Associate Professor	M.S.W., Ph.D., University of Utah
Harris, Richard J.	Professor	B.A., Macalester College; M.A., Ph.D., Cornell University
Houston-Vega, Mary K.	Associate Professor	B.A., Colorado State University; M.S.W., University of Denver; Ph.D., University of Southern California
Nevarez, Lucinda	Associate Professor	B.A., The University of Texas at Austin; M.S.W., Ph.D., University of Houston
Piel, Megan	Assistant Professor	B.S., Nebraska Wesleyan University; M.S.W., Arizona State University; Ph.D., Arizona State University
Plantenga, Derek	Senior Lecturer	B.S.W., B.A., Calvin College; M.S.W., Our Lady of the Lake University
Sharma, Bonita B.	Assistant Professor	B.S., M.S.S.W., Ph.D., The University of Texas at Arlington
Todic, Jelena	Assistant Professor	B.A., University of Nevada at Reno; M.S.W., Washington University; Ph.D., The University of Texas at Austin

**Sociology**

Bartkowski, John P.	Professor	B.S., St. Mary's University; M.A., Ph.D., The University of Texas at Austin
Denton, Melinda L.	Associate Professor	B.A., Seattle Pacific University; M.A., Ph.D., University of North Carolina at Chapel Hill
Ellison, Christopher G.	Professor	A.B., Ph.D., Duke University
Garcia-Alexander, Ginny	Assistant Professor	B.S., M.s., Ph.D., Texas A&M University
Hill, Terrence	Associate Professor	B.A., Texas State University; M.A., Bowling Green State University; Ph.D., The University of Texas at Austin
Joyner, Kara	Professor	B.A., Beloit College; M.A., Ph.D., The University of Chicago

Lewis, Richard	Professor	B.S., Texas Tech University; M.S., Ph.D., Texas A&M University
Miller, Michael V.	Associate Professor	B.S., M.S., Ph.D., Texas A&M University
Ruiz, Andrea L.	Assistant Professor	B.A., M.S., The University of Texas at San Antonio; Ph.D., The Pennsylvania State University
Swisher, Raymond	Professor	B.A., M.C.R.P., Ohio State University; M.A., Ph.D., University of North Carolina at Chapel Hill
Upenieks, Laura	Assistant Professor	B.S., M.A., Ph.D., University of Toronto
Xu, Xiaohu	Professor	B.A., Sichuan University, PRC; M.A., Michigan State University, Ph.D., University of Michigan

## College of Architecture, Construction and Planning

Name	Title	Education
Baron, Robert	Professor Emeritus	B.Arch., University of Oregon, M.Arch., University of Washington; M.S.Arch., University of Pennsylvania
<b>Architecture</b>		
Alexander, John	Associate Professor	B.Arch., University of Detroit; M.Arch. History, Ph.D., University of Virginia
Blizard, Mark	Associate Professor	B.Arch., M.Arch., Virginia Polytechnic Institute and State University
Burian, Edward R.	Professor	B.Arch., University of Southern California, Los Angeles; M.Arch., Yale University
Caine, Ian	Associate 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
Griffin, Greg P.	Assistant Professor	Ph.D., The University of Texas at Austin
Han, Albert T.	Assistant Professor	M.S., University of Iowa; Ph.D., University of Pennsylvania
James, Ryan D.	Associate Professor	M.A., The Ohio State University; M.A., University of Cincinnati; Ph.D., University of North Carolina at Charlotte

Lombardi, Angela	Associate Professor	B.A., M.Arch., Ph.D., University of Rome
Martinez Molina, Antonio	Assistant Professor	M.S., Ph.D., Universitat Politecnica-Technical University of Valencia
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
Norouzi, Neda	Assistant Professor	M.Arch., M. Urban Regional Planning, University of Colorado; Ph.D., Virginia Polytechnic Institute and State University
Petrov, Antonio	Associate 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 Brookes University 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
Toker-Beeson, Saadet	Associate Professor	B.Arch., M.S., Ph.D., Middle East Technical University, Ankara, Turkey

**Construction Science**

Cai, Jiannan	Assistant Professor	Ph.D., Purdue University
Chakraborty, Debaditya	Assistant Professor	Ph.D., University of Cincinnati
Hatipkarasulu, Yilmaz	Associate Professor	B.S., Cukurova University; M.S., Ph.D., Louisiana State University
Langar, Sandeep	Assistant Professor	Ph.D., Virginia Polytechnic Institute and State University
Sulbaran, Tulio	Professor	Ph.D., Georgia Institute of Technology

**College of Business**

Name	Title	Education
Cardy, Robert L.	Professor Emeritus	B.S., M.A., Central Michigan University; Ph.D., Virginia Polytechnic Institute and State University

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 Emerita	B.A., M.B.A., University of California, Los Angeles; Ph.D., The University of Texas at Austin
Lengnick-Hall, Mark	Professor Emeritus	B.B.A., M.B.A., The University of Texas at Austin; Ph.D., Purdue University
Rao, V. Srinivasan	Professor Emeritus	B.Tech., Indian Institute of Technology, Madras; M.S., Colorado School of Mines; Ph.D., The 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
Walz, Diane B.	Professor Emerita	B.A., St. Louis University; M.B.A., Washington University; Ph.D., The University of Texas at Austin
Warren, John	Associate Professor Emeritus	B.A., Knox College; M.B.A., Governors State University; Ph.D., University of Illinois at Chicago

**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
Linthicum, Cheryl L.	Professor	B.S., Colorado State University; M.B.A., Pittsburgh State University; Ph.D., Oklahoma State University
Liu, Hu (Harrison)	Associate Professor	Ph.D., Texas A&M University; Ph.D., University of Houston
Lopez, Dennis	Associate Professor	B.B.A., University of Puerto Rico; M.B.A., The George Washington University; Ph.D., University of Arkansas
Mao, Juan	Assistant Professor	B.S., M.S., Wuhan University; Ph.D., University of Kansas
Nwaeze, Emeka T.	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; C.M.A., C.P.A.
Raman, K.K.	Professor	BA., University of Calcutta; M.B.A., India Institute of Management, Calcutta; Ph.D., Indiana University
Sanchez, Daniela	Assistant Professor	B.B.A., M.B.A., St. Mary's University; Ph.D., Texas Tech University
Sanchez, J. Manuel	Professor	B.B.A., M.B.A., St. Mary's University; Ph.D., The University of Texas at San Antonio
Sanders, Elaine	Associate Professor	B.B.A., Eastern New Mexico University; M.Acc., Ph.D., The University of Oklahoma

Graduate Faculty

Smith, Pamela C.	Professor	B.S., University of Virginia; M.S., Ph.D., Virginia Polytechnic Institute and State University
Ye, Zhongxia (Shelly)	Associate Professor	B.S., M.Acc., Southwestern University of Finance and Economics; Ph.D., Temple University
Yin, Jennifer	Professor	B.S., M.S. Tax., University of New Orleans; Ph.D., University of Houston

**Economics**

Alva, Samson J.	Associate Professor	B.A. Mercer University; M.A., Ph.D., Boston College
Arslan, Hayri Alper	Assistant Professor	B.A., Boğaziçi University; M.A., Sabancı University; Ph.D., Vanderbilt University
Beheshti, David	Assistant Professor	B.A., Brigham Young University; M.S., Ph.D., The University of Texas at Austin.
Beladi, Hamid	Professor	B.A., Rasht College of Business, Iran; M.S., Ph.D., Utah State University
De la Viña, 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	Professor	B.A., National Tsing Hua University; M.A., Ph.D., Purdue University

**Finance**

Adhikari, Binay	Assistant Professor	B.S., Tribhuvan University; M.B.A., Kathmandu University; M.S. Auburn University; Ph.D., University of Alabama
Bayar, Onur	Professor	B.S., Bogazici University; M.S., University of Pittsburgh; M.S., Carnegie Mellon University; Ph.D., Boston College
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
Kadapakkam, Palani-Rajan	Professor	B.S., Loyola College, India; Postgraduate Diploma in Management, Indian Institute of Management; Ph.D., University of Michigan
Kalcheva, Ivalina	Associate Professor	B.A., University of Economics, Varna Bulgaria; M.B.A., Saginaw Valley State University; Ph.D., University of Utah
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
Wolfe, Brian	Assistant Professor	B.S.C.E., University of Cincinnati; M.B.A., Xavier University; Ph.D., Indiana University

**Information Systems and Cyber Security**

Bachura, Eric	Assistant Professor	B.S., University of Phoenix, Business; M.B.A., Sam Houston State University; Ph.D., The University of Texas at San Antonio
Ball, Larry L.	Associate Professor in Practice	B.S., U.S. Air Force Academy; M.S., University of Southern California; M.S., San Jose State University; Ph.D., Stanford University
Beebe, Nicole	Professor	B.S., Michigan Technological University; M.S., Georgia State University; Ph.D., The University of Texas at San Antonio
Bonto-Kane, Maria Vicente	Assistant Professor in Practice	B.A., Ateneo de Manila University; M.A., M.S., State University of New York in Binghamton; Ph.D., North Carolina State University
Bou-Harb, Elias	Associate Professor	B.S., Notre Dame University; M.S., Ph.D., Concordia University; Postdoctoral, Carnegie Mellon University,
Castaneda, Robert	Associate Professor in Practice	B.S., M.S., Ph.D., The University of Texas at San Antonio
Choo, Kim-Kwang Raymond	Professor	B.A., M.S., University of South Australia; Graduate Diploma in Business Administration, University of Queensland; Ph.D., Queensland University of Technology

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
Guo, Yuanxiong (Richard)	Assistant Professor	B.E., Huazhong University of Science and Technology; M.S., The University of Florida; Ph.D., The University of Florida
Ko, Myung S.	Professor	B.A., University of Washington; M.A., Ph.D., Virginia Commonwealth University
Liu, Zhechao (Charles)	Associate Professor	B.A., Xiamen University, China; M.A., Tulane University; Ph.D., University of Pittsburgh
Menard, Philip	Assistant Professor	B.S., Nicholls State University; Ph.D., Mississippi State University
Najafirad, Peyman (Paul Rad)	Associate Professor	B.S., Sharif University; M.S., Ph.D., The University of Texas at San Antonio
Pugh, William	Assistant Professor in Practice	B.A., Louisiana Tech University; M.S., Texas A&M Central Texas; Ph.D., University of the Incarnate Word
Rao, Hejamadi R.	Professor	B.Tech., India Institute of Technology Kanpur; M.B.A., University of Delhi; Ph.D., Purdue University
Rios, Anthony M.	Assistant Professor	B.S., Georgetown College; Ph.D., University of Kentucky
Spivey, Woodie A.	Associate Professor	B.A.E., Georgia Institute of Technology; M.M.S., Texas Christian University; Ph.D., University of Houston
Teneyuca, David	Assistant Professor in Practice	B.B.A., M.B.A., Our Lady of the Lake University; M.S., St. Mary's University; Ph.D., Our Lady of the Lake University; Ph.D., Colorado Technical University
Valecha, Rohit	Assistant Professor	B.S., M.S., Ph.D., University of Buffalo, SUNY
Villarreal, Marco	Assistant Professor in Practice	M.S., Texas A&M International; Ph.D., The University of Texas Rio Grande Valley
Zhang, Xiaolu	Assistant Professor in Practice	B.E., Northeast Normal University, China; Ph.D., Jilin University, China
Zhu, Hongyi	Assistant Professor	B.B.M., Tsinghua University; Ph.D., The University of Arizona
<b>Management</b>		
Caldwell Marquez, Andrea	Assistant Professor	B.S., Pennsylvania State University; M.B.A., University of Notre Dame; Ph.D., The University of Texas at Austin
Chang, Pepe	Associate Professor	B.S., Ph.D., University of Utah

Clark, Jonathan	Associate Professor	B.A., Boston College; M.S., Ph.D., Harvard University
Cordero, Arkangel	Assistant Professor	B.A., Ave Maria University; M.B.A., Bentley University; M.S., Ph.D., Cornell 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; M.S., Ph.D., Purdue University
Le, Huy	Associate Professor	B.S., Vietnam National University; Ph.D., University of Iowa
Lewis, Alexander C.	Assistant Professor	B.A., Trinity University; M.A., Ph.D., The University of Texas at San Antonio
Marlow, Shannon	Assistant Professor	B.S., M.S., University of Central Florida; Ph.D., Rice University
McDonald, Michael L.	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.	Associate Professor	M.S., University of Michigan; B.B.A., M.S., Ph.D., The University of Texas at Austin
Xu, Kai	Assistant Professor	Bachelor's, Master's, Ph.D., Xi'an Jiaotong University; Ph.D., Texas A&M University

**Management Science and Statistics**

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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
Leung, Mark T.	Associate Professor	B.A., M.B.A., University of California; M.B.A., Ph.D., Indiana University
Park, Yeonjoo	Assistant Professor	B.S., Ewha Womens University-Seoul; M.S., Seoul National University; Ph.D., University of Illinois at Urbana-Champaign
Roy, Anuradha	Associate Professor	B.S., Calcutta University; M.Stat., Indian Statistical Institute, Calcutta; Ph.D., Oakland University
Roy, Arkajyoti	Assistant Professor	B.S., Ph.D., Purdue 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

Graduate Faculty

Tripathi, Ram C.	Professor	B.A., M.A., Banaras Hindu University, India; M.S., Ph.D., University of Wisconsin-Madison
Wang, Min	Associate Professor	B.A., Concordia University; M.S., Ph.D., Clemson University
Wani, Deepa	Assistant Professor	B. Engr., M. Bus., University of Mumbai, India; M.S., Ph.D., University of South Carolina
Wu, Wenbo	Assistant Professor	B.S., The University of Texas at Austin; M.S., University of Central Florida; Ph.D., University of Georgia
Xu, Kefeng	Professor	B.E., Shanghai Jiao-Tong University; M.S.B.A., University of British Columbia; Ph.D., University of Maryland
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**Marketing**

Basuroy, Suman	Professor	B.A., Brandeis University; M.S., Carnegie-Mellon University; Ph.D., University of Pittsburgh
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
Jung, Jihye	Assistant Professor	B.A., Yonsei University, South Korea; M.B.A., KDI School of Public Policy and Management, South Korea; Ph.D., Rice University
Malshe, Ashwin	Assistant Professor	B.E., M.M.S., Mumbai University; Ph.D., Binghamton University, State University of New York
Utecht, Richard L.	Associate Professor	B.B.A., M.B.A., Texas A&I University; Ph.D., University of North Texas
Wang, Dian	Assistant Professor	B.B.A., Texas Tech University; M.B.A., The University of Texas at Arlington; Ph.D., Texas A&M University
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

Briscoe, Felecia	Associate Professor Emerita	B.S., M.A., University of Nevada, Las Vegas; Ed.D., University of Cincinnati
Clark, Ellen R.	Professor Emerita	B.A., Trinity University; M.A., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin
Cook, Gillian E.	Professor Emerita	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
Desjean-Perrotta, Blanche A.	Professor Emerita	B.A., Anna Maria College; M.Ed., Rhode Island College; M.Ed., University of Southern Alabama; Ed.D., University of Arizona
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Henkin, Roxanne	Professor Emerita	B.S., M.S., Ed.D., Northern Illinois University
Kessler, Carolyn L.	Professor Emerita	B.A., St. Mary-of-the-Woods College; M.S., Ph.D., Georgetown University
Laughery, Wayne W.	Professor Emeritus	B.A., M.A., San Diego State College; Ed.D., Columbia University Teachers College
Martin, Nancy K.	Professor Emerita	B.A., M.Ed., Sam Houston State University; Ed.D., Texas Tech University
McGee, Patricia	Associate Professor Emerita	B.A., M.A., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin
Milk, Robert D.	Professor Emeritus	B.A., M.A., Ph.D., Stanford University
Moseley, Christine A.	Professor Emerita	B.S., Texas Tech University; M.A., Angelo State University; Ph.D., Oklahoma State University
Méndez-Negrete, Josie	Professor Emerita	B.A.S.W., M.S.W., San Jose State University; M.A., Ph.D., University of California, Santa Cruz
Nora, Amaury	Professor Emeritus	B.A., The University of Texas at Austin; M.S., Texas A&M University-Kingsville; Ed.D., University of Houston
Orange, Carolyn M.	Professor Emerita	B.A., Harris Teachers College; M.A., Ph.D., Washington University
Padilla, Raymond V.	Professor Emeritus	B.A., University of Michigan; M.A., Ph.D., University of California, Berkeley
Pate, P. Elizabeth	Professor Emerita	B.S., M.Ed., Angelo State University; Ph.D., Texas A&M University
Pérez, Bertha	Professor Emerita	B.S., M.Ed., Our Lady of the Lake University; Ed.D., University of Massachusetts Amherst
Rendón, Laura	Professor Emerita	B.A., University of Houston; M.A., Texas A&M University-Kingsville; Ph.D., University of Michigan

**College of Education and Human Development**

Name	Title	Education
Borman, Christopher A.	Professor Emeritus	B.S., Ed.D., Indiana University; M.A., Northwestern University

Schutz, Paul A.	Professor Emeritus	B.A., B.S., Winona State University; M.Ed., University of Wisconsin-La Crosse; Ph.D., The University of Texas at Austin
Sutherland, Berry	Professor Emeritus	B.S., The University of Texas at Austin; M.S., Ed.D., University of Houston
Tafolla, Carmen	Professor Emerita	B.A., Texas Lutheran College; M.A., Austin College; Ph.D., The University of Texas at Austin
Wagener, James W.	Professor Emeritus	B.A., Southern Methodist University; M.A., Ph.D., The University of Texas at Austin
Winter, Suzanne	Associate Professor Emerita	M.S., Texas A&M University-Corpus Christi; Ph.D., The University of Texas at Austin
Wortham, Sue C.	Professor Emerita	B.S., University of Houston; M.A., Southwest Texas State University; Ph.D., The University of Texas at Austin

**Bicultural-Bilingual Studies**

Christiansen, Martha Sidury	Associate Professor	B.A., Universidad Veracruzana-Xalapa, Mexico; M.A., Indiana University-Purdue University Fort Wayne; Ph.D., The Ohio State University
DelliCarpini, Margo	Professor	B.A., M.A., State University of New York at Stony Brook; Ph.D., Stony Brook University
Ek, Lucila D.	Professor	B.A., Stanford University; Ph.D., University of California, Los Angeles
Flores, Belinda B.	Professor	B.A., M.A., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin
Henderson, Kathryn	Associate Professor	B.A., Washington University in St. Louis; M.A., Framingham State College Campus Guadalajara; Ph.D., The University of Texas at Austin
Huang, Becky	Associate Professor	B.A., National Kaohsiung Normal University-Taiwan; M.Ed., Harvard University; M.A., Ph.D., University of California, Los Angeles
Langman, Juliet	Professor	B.S., Georgetown University; M.A., Ph.D., Stanford University
Lara, Gilberto	Assistant Professor	B.A., M.Ed., Boise State University; Ph.D., The University of Texas at Austin
Lindahl, Kristen M.	Associate Professor	B.A., M.A., Ph.D., University of Utah
Smith, Howard L.	Professor	B.A., Temple University; Ph.D., The University of Arizona
Solís, Jorge L.	Associate Professor	A.B., Stanford University; Ph.D., University of California, Berkeley
Sánchez, Patricia	Professor	B.A., Rice University; M.A., The University of Texas at Austin; Ph.D., University of California, Berkeley

Tian, Zhongfeng	Assistant Professor	B.A., Beijing Normal University-Hong Kong Baptist University United International College; Ed.M., Boston University; Ph.D., Boston College
Trujillo, Armando L.	Associate Professor	B.S., M.Ed., The University of Texas at El Paso; M.A., University of Northern Colorado; Ph.D., The University of Texas at Austin
Yazan, Bedrettin	Associate Professor	B.A., M.A., Middle East Technical University, Ankara; Ph.D., University of Maryland

**College Faculty**

Clark, Langston	Associate Professor	B.S., North Carolina Agricultural and Technical State University; M.A., The Ohio State University; Ph.D., The University of Texas at Austin
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**Counseling**

Duffey, Thelma	Professor	B.A., M.Ed., Trinity University; M.A., Ph.D., St. Mary's University
Interiano-Shiverdecker, Claudia	Assistant Professor	B.A., Ave Maria University, San Marcos, Nicaragua; M.S., Universidad Tecnológica, San Pedro Sula, Honduras; M.S., University of Wisconsin-Stout; Ph.D., University of North Carolina at Charlotte
Jones, Brenda L.	Clinical Assistant Professor	B.S., Alcorn State University; M.A., Ph.D., The University of Texas at San Antonio
Juhnke, Gerald A.	Professor	B.A., Michigan State University; M.A., Central Michigan University; Ed.D., Western Michigan University, Kalamazoo
Lloyd-Hazlett, Jessica	Associate Professor	B.A., University of Virginia; M.Ed., Ph.D., College of William and Mary
Prasath, Priscilla	Assistant Professor	M.S., Bharathiar University; Ph.D., Ohio State University
Robertson, Derek	Assistant Professor	B.S., M.Ed., Texas Tech University; Ph.D., College of William and Mary
Romero, Devon	Assistant Professor	M.A., Ph.D., University of Alabama
Somody, Catherine F.	Clinical Assistant Professor	B.S., Texas State University; M.Ed., Trinity University; Ph.D., The University of Texas at San Antonio
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**Educational Leadership and Policy Studies**

Aguilera, Vangie	Assistant Professor in Practice	B.A., M.Ed., Our Lady of the Lake University; Ed.D., The University of Texas at San Antonio
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Graduate Faculty

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Garza, Jr., Encarnación	Professor	B.A., M.Ed., The University of Texas-Pan American; Ph.D., The University of Texas at Austin
Giles, Mark	Professor	B.A., University of Cincinnati; M.S., Miami University-Ohio; Ph.D., Indiana University
Lac, Van	Assistant Professor	B.A., University of California, Berkeley; M.A., Stanford University; Ph.D., University of Wisconsin-Madison
Merchant, Betty M.	Professor	B.S., M.S., State University of New York College at Plattsburgh; M.S., Ph.D., Stanford University
Niño, Juan M.	Associate Professor	B.S., M.Ed., The University of Texas at Brownsville; Ph.D., Texas State University
Okilwa , Nathern	Assistant Professor	B.A., M.A., University of Wyoming; Ph.D., The University of Texas at Austin
Rodríguez, Mariela A.	Professor	B.A., M.Ed., Our Lady of the Lake University; M.Ed., The University of Texas at Brownsville; Ph.D., New Mexico State University
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Smith, Page A.	Professor	B.S., Wright State University; M.S., University of Dayton; M.A., Ph.D., The Ohio State University
Thompson, David P.	Professor	B.S., M.S., Ph.D., Texas A&M University

**Educational Psychology**

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Karcher, Michael J.	Professor	B.A., Austin College; Ed.M., Ed.D., Harvard University; Ph.D., The University of Texas at Austin
MacNaul, Hannah	Assistant Professor	B.A., Texas State University; M.A., The University of Texas at San Antonio; Ph.D., University of South Florida
Neely, Leslie	Associate Professor	B.S., The University of Texas at Austin; M.Ed., Ph.D., Texas A&M University
Nichols, Sharon L.	Professor	B.A., Bucknell University; M.A., Ph.D., The University of Arizona
Sullivan, Jeremy R.	Professor	B.S., Sam Houston State University; Ph.D., Texas A&M University

Thacker, Ian	Assistant Professor	B.A., University of Colorado, Boulder; M.A.; University of California, Berkeley; M.S., Ph.D., University of Southern California
Villarreal, Victor	Associate Professor	B.A, University of Notre Dame; Ph.D., Texas A&M University

**Interdisciplinary Learning and Teaching**

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Arreguín, María	Associate Professor	B.A., Universidad Autónoma de Nuevo Leon; M.Ed., The University of Texas-Pan American; Ed.D., Texas A&M University-Kingsville
Bonner, Emily P.	Associate Professor	B.A., M.A.T., Trinity University; Ph.D., University of Florida
Boon, Richard T.	Professor	B.S., M.S., Purdue University; Ph.D., George Mason University
Carmona-Dominguez, Guadalupe D.	Associate Professor	B.Sc., Instituto Tecnológico Autónomo de México (ITAM); M.Sc., Centro de Investigaciones y de Estudios Avanzados del Instituto Politécnico Nacional (Cinvestav-IPN); Ph.D., Purdue University
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Emenaha, Uchenna	Assistant Professor	B.S., Houston Baptist University; M.Ed., Texas Southern University; Ph.D. (ABD), University of Houston
Ewoldt, Kathy B.	Assistant Professor	B.S., Park University; M.Ed., Ph.D., University of Nevada Las Vegas
Fies, Carmen H.	Associate Professor	B.S., M.S., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin
García, Claudia Treviño	Assistant Professor in Practice	B.A., M.A., Ph.D., The University of Texas at San Antonio
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Harmon, Janis	Professor	B.A., M.Ed., University of Southwest Louisiana; Ph.D., The Ohio State University
Horowitz, Rosalind	Professor	B.S., M.A., Ph.D., University of Minnesota
Kalinec-Craig, Crystal A.	Assistant Professor	B.S., University of Houston; M.S., Texas A&M University; Ph.D., University of Arizona
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Ramirez, Rica	Assistant Professor	B.S., Texas State University; M.Ed., The University of Texas-Pan American; Ph.D., University of South Florida
Ryan, Ann Marie	Professor	B.A., Loyola University Chicago; M.A., Seattle University; Ph.D., University of Illinois at Chicago
Sanders, Rachel Kaminski	Assistant Professor	B.A., Florida State University; M.A.T., Clemson University; Ph.D., The University of Georgia
Santillan, Lisa L.	Assistant Professor in Practice	B.S., Texas A&M International University; M.A., Ph.D., The University of Texas at San Antonio
Sohn, Lucinda N.	Assistant Professor in Practice	B.S., Texas A&I University; M.S., Ph.D., Texas A&M University-Corpus Christi
Sutterby, John A.	Associate Professor	B.S., M.A., Ph.D., The University of Texas at Austin
Vielma, Karina Ivette	Joint Assistant Professor	B.S., Massachusetts Institute of Technology; M.Ed., Harvard University; Ed.D., The University of Texas at San Antonio
Yuen, Timothy T.	Associate Professor	B.S., University of California, Irvine; M.S., University of Southern California; Ph.D., The University of Texas at Austin
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Cruz, Rachel	Assistant Professor	B.A., The University of Notre Dame; M.A., D.M.A., The University of Texas at Austin
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## College of Engineering

Name	Title	Education
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### Biomedical Engineering and Chemical Engineering

Abu-Lail, Nehal	Associate Professor	B.S., M.S., Jordan University of Science and Technology; Ph.D., Worcester Polytechnic Institute
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Amaechi, Bennett	Professor	B.S., BDS, Dentistry Health Science University of Life, Nigeria; M.S., Guy's Hospital, London, U.K.; Ph.D., University of Liverpool, U.K.
Antebi, Ben	Biomedical Research Physiologist	B.S., Florida Atlantic University; Ph.D., The University of Texas at San Antonio
Appleford, Mark R.	Associate Professor	B.S., M.S., California Polytechnic State University; Ph.D., University of Tennessee Health Science Center/University of Memphis
Asmis, Reto	Professor	M.S., Ph.D., University of Fribourg, Switzerland
Bai, Yidong	Associate Professor	B.S., Fudan University, China; M.S., Ph.D., Columbia University
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Bizios, Rena	Professor	B.S., University of Massachusetts; M.S., California Institute of Technology; Ph.D., Massachusetts Institute of Technology
Bopassa, Jean	Assistant Professor	DEUG I, University of Marien Ngouabi, Republic of Congo; M.S., Ph.D., University of Cocody, Ivory Coast
Brenner, Andrew	Associate Professor	B.S., Texas A&M University; M.D., Texas Tech; Ph.D., The University of Texas at Austin

Graduate Faculty

Brenner, Robert	Associate Professor	B.S., The University of Texas at Arlington; M.S., San Diego State University; Ph.D., The University of Texas at Austin	Glickman, Randolph	Professor	AB, Columbia College of Columbia University; Ph.D., University of Toronto
Brey, Eric	Professor	B.S., M.Eng., University of Louisville; Ph.D., Rice University	Grigoryan, Artyom	Associate Professor	M.S., Ph.D., Yerevan State University, Armenia, USSR; M.S., Moscow Institute of Physics and Technology; M.S., Texas A&M University
Bynum, James	Research Biologist	B.S., The University of Texas at San Antonio; Ph.D., The University of Texas at Austin	Guda, Teja	Associate Professor	B.Tech., Indian Institute of Technology, Bombay; Ph.D., The University of Texas at San Antonio-The University of Texas Health Science Center at San Antonio
Chen, Shuo	Professor (Primary appointment at UTHSCSA)	M.D., M.S., Fujian Medical University, China; Ph.D., The University of Texas Health Science Center at San Antonio	Gutierrez, Gloria E.	Associate Professor (Adjunct Faculty)	M.D., Universidad Nacional Autonoma de Mexico (UNAM)
Chen, Xiao-Dong	Professor (Primary appointment at UTHSCSA)	M.D., Second Medical University, Shanghai, China; Ph.D., University of Nebraska Medical Center at Omaha	Han, Hai-Chao	Professor	B.S., M.S., Ph.D., Jiaotong University, Xi'an, China
Cheng, XingGuo	Principal Scientist, SWrl	B.S., M.S., Wuhan University, China; Ph.D., University of Florida	Harris, Stephen E.	Professor (Primary appointment at UTHSCSA)	B.A., M.A., Ph.D., The University of Texas at Austin
Clarke, Geoffrey D.	Professor (Primary appointment at UTHSCSA)	B.A., North Texas State University; B.A., The University of Texas at Arlington; M.S., Ph.D., The University of Texas Health Science Center at Dallas	Hood, Robert Lyle	Assistant Professor	B.S., University of Houston; M.S., Ph.D., Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences
Dean, David D.	Professor (Primary appointment at UTHSCSA)	B.S., Randolph-Macon College; Ph.D., University of North Carolina at Chapel Hill	Hsieh, Jenny	Professor	B.S., University of California, San Diego; Ph.D., Johns Hopkins University
DeLorenzo, Robert A.	Professor	B.S., The University of Texas at Arlington; M.S., The University of Texas Health Science Center at San Antonio; M.S., University of Maryland University College; M.D., Albany Medical College	Huang, Tim	Professor	B.S., Tunghai University, Taiwan; Ph.D., University of California, Davis
Demeler, Borries	Professor	B.S., University of Montana; Ph.D., Oregon State University	Jacobs, Gary	Assistant Professor	B.S., The University of Texas at Austin; Ph.D., University of Oklahoma
Dion, Gregory	Assistant Professor	M.D., Virginia Commonwealth University School of Medicine	Jiang, Jean	Professor	B.S., Nanjing University, China; Ph.D., State University of New York
Feng, Yusheng	Professor	B.S., Tsinghua University; M.S., University of Oklahoma; Ph.D., The University of Texas at Austin	Jin, Victor	Associate Professor	B.S., Fudan University, China; M.S., University of Ottawa, Canada; Ph.D., Queen's University
Finol, Ender	Professor	B.S., Universidad de Carabobo, Valencia, Venezuela; M.S., University of Massachusetts, Lowell; M.A., Ph.D., Carnegie Mellon University	Kiel, Jeffrey W.	Professor (Primary appointment at UTHSCSA)	B.S., The University of Texas at San Antonio; Ph.D., The University of Texas Health Science Center at San Antonio
Flores, Mario A.	Assistant Professor	B.S., Autonomous Metropolitan University, Mexico City; M.S., Ph.D., The University of Texas at San Antonio	Lancaster, Jack L.	Professor (Primary appointment at UTHSCSA)	B.S., The University of Texas at Arlington; M.S., Ph.D., The University of Texas Health Science Center at Dallas
Fox, Peter T.	Professor (Primary appointment at UTHSCSA)	M.D., Georgetown University School of Medicine	Libich, David	Assistant Professor	B.S., Ph.D., University of Guelph, Canada
Giambini, Hugo	Assistant Professor	B.S., Florida International University; Ph.D., Mayo Clinic	Ling, Jian	Assistant Professor (Program Core faculty outside UTHSCSA and UTSA)	B.S., East China Normal University; M.S., University of Houston; Ph.D., The University of Texas at Austin

Liu, Jason Zhjie	Assistant Professor	B.S., Lanzhou University, China; M.S., Chinese Academy of Sciences, China; Ph.D., University of Georgia at Athens	appointment at UTHSCSA)
Meyer, Andrew	Assistant Professor	B.S., University of California, Berkeley; M.S., M.D., Virginia Commonwealth University; M.M.S., The University of Texas Health Science Center at San Antonio	Tang, Liang
Nicolella, Daniel P.	Assistant Professor (Adjunct Faculty)	B.S., M.S., Drexel University; Ph.D., Case Western Reserve University	Associate Professor
Ong, Joo L.	Professor	B.S., University of Iowa; M.S., Ph.D., University of Alabama at Birmingham	B.S., Jiangsu Polytechnic University, China; Ph.D., University of Louisville
Patel, Sandeep	Associate Professor	B.S., Boston University; D.O., University of Health Science, College of Osteopathic Medicine; M.M.S., Texas Tech University	Vail, Neil K.
Paukert, Martin	Assistant Professor	M.D., Eberhard Karls University of Tubingen	Assistant Professor (Adjunct Faculty)
Qutub, Amina	Associate Professor	B.S., Rice University; Ph.D., University of California, Berkeley/ San Francisco	Vielma, Karina Ivette
Ramirez-Hernandez, Abelardo	Assistant Professor	B.S., Ph.D., Universidad Autónoma del Estado de Morelos	Assistant Professor
Rathbone, Christopher R.	Assistant Professor	B.A., University of Northern Iowa; M.S., Texas A&M University; Ph.D., University of Missouri	B.S., Massachusetts Institute of Technology; M.Ed., Harvard University; Ph.D., The University of Texas at San Antonio
Rawls, H. Ralph	Professor (Primary appointment at UTHSCSA)	B.S., Louisiana State University; Ph.D., Florida State University	Wang, Howard
Romero Uribe, Gabriela	Assistant Professor	B.S., Autonomous University of San Luis Potosi; M.S., Ph.D., University of the Basque Country	Associate Professor
Salamone, Ann B.	Assistant Professor (Adjunct Faculty)	B.S., Western Kentucky University; M.S., Rice University	B.A., Cornell University; M.D., Johns Hopkins University School of Medicine
Salamone, Joseph C.	Professor (Adjunct Faculty)	B.S., Hofstra University; Ph.D., Polytechnic Institute of Brooklyn (New York University)	Wang, Xiaodu
Shah, Amita	Assistant Professor	B.S., Trinity University; M.D., UT-Health San Antonio; Ph.D., The University of Texas at San Antonio	Professor
Sousa, Rui	Professor	B.A., Harvard University; Ph.D., University of Pittsburgh	B.S., M.S., Beijing Institute of Aeronautics and Astronautics, China; Ph.D., Yokohama National University, Japan
Sprague, Eugene A.	Professor (Primary appointment at UTHSCSA)	Ph.D., The University of Texas Health Science Center at San Antonio	Weintraub, Susan
Stockand, James	Professor (Primary appointment at UTHSCSA)	B.S., Texas A&M University; Ph.D., The University of Texas Health Science Center at Houston	Professor
Sylvia, Victor L.	Professor (Primary	B.S., M.S., Ph.D., Texas A&M University	Xu, Kexin
			Assistant Professor
			Professor
			B.S., M.S., Lehigh University; M.D., Georgetown University School of Medicine; Ph.D., Massachusetts Institute of Technology
			Ye, Jing Yong
			Professor
			B.S., Huazhong University of Science and Technology, China; Ph.D., University of Tsukuba, Japan
			<b>Civil and Environmental Engineering</b>
			Arroyo, G. Alberto
			Professor
			B.S., Universidad Nacional de Ingeniería, Lima, Peru; M.S., Ph.D., New Mexico State University, P.E.
			Bin-Shafique, Sazzad
			Professor
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			Professor
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			Dessouky, Samer
			Professor
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			Diaz, Manuel A.
			Professor
			B.S., M.S., National University of Engineering, Peru; Ph.D., The University of Texas at Austin, P.E.
			Ghannoum, Wassim
			Associate Professor
			B.Eng., M.Eng., McGill University; Ph.D., University of California, Berkeley, P.E.
			Giacomoni, Marcio
			Associate Professor
			B.S., University of Brasilia, Brazil; M.S., Federal University of Rio Grande do Sul, Brazil; Ph.D., Texas A&M University, P.E.
			Huang, Jie
			Associate Professor
			B.S., M.S., Wuhan University, China; Ph.D., The University of Kansas, P.E.

Graduate Faculty

Johnson, Drew	Professor	B.S., The University of Texas at Austin; Ph.D., University of Minnesota, P.E.	Chen, Qian	Assistant Professor	B.E., Nanjing University of Technology; Ph.D., Mississippi State University
Kapoor, Vikram	Assistant Professor	B.Tech., Jaypee Institute of Information Technology, Noida, India; Ph.D., University of Cincinnati	Choo, Kim-Kwang Raymond	Professor	B.A., M.S., University of South Australia; Graduate Diploma in Business Administration, University of Queensland; Ph.D., Queensland University of Technology
Kumar, Amit	Associate Professor	B.S., Babasaheb Bhimrao Ambedkar Bihar University; M.S., Indian Institute of Technology Bombay; Ph.D., Purdue University	Gatsis, Nikolas	Associate Professor	B.S., University of Patras; M.S.E.E., Ph.D., University of Minnesota
Matamoros, Adolfo	Professor	Lic., University of Costa Rica; M.S., Ph.D., University of Illinois at Urbana-Champaign	Grigoryan, Artyom	Associate Professor	M.S., Ph.D., Yerevan State University, Armenia, USSR; M.S., Moscow Institute of Physics and Technology; M.S., Texas A&M University
Montoya, Arturo	Associate Professor	B.S., M.S., Ph.D., Columbia University	Gui, Changfeng	Professor	B.S., M.S., Peking University; Ph.D., University of Minnesota, Twin Cities
Papagiannakis, A.T.	Professor	B.S., National Technical University of Athens; M.S., University of Saskatchewan; Ph.D., University of Waterloo, P.E.	Guo, Ruyan	Professor	B.S., M.S., Xian Jiaotong University, China; Ph.D., The Pennsylvania State University
Sharif, Hatim O.	Professor	B.S., University of Khartoum; M.S., Colorado State University; Ph.D., University of Connecticut, P.E.	Hansen, Lars	Professor in Practice	B.S., Rice University; M.S., Stanford University; Ph.D., The University of Texas at Austin
ShIPLEY, Heather	Professor	B.S., Baylor University; M.S., Ph.D., Rice University	Hood, Robert Lyle	Assistant Professor	B.S., University of Houston; M.S., Ph.D., Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences
Testik, Firat	Professor	B.S., Orta Dogu Teknik Universitesi, Turkey; M.S., University of Minnesota; Ph.D., Arizona State University	Huang, Yufei	Professor	B.S., Northwestern Polytechnic University, China; M.S., Ph.D., State University of New York at Stony Brook
Weissmann, José	Professor	B.S., M.S., University of Sao Paulo; Ph.D., The University of Texas at Austin, P.E.	Jamshidi, Mohammad	Professor	B.S., Oregon State University; M.S., Ph.D., University of Illinois at Urbana-Champaign
<b>Electrical and Computer Engineering</b>					
Ahmed, Sara	Assistant Professor	B.S., M.S., Ph.D., Virginia Polytechnic Institute and State University	Jin, Yufang	Professor	B.S., Zhengzhou University, China; M.S., Chinese Academy of Aviation, China; M.S., Ph.D., University of Central Florida
Ahn, Ethan C.	Assistant Professor	B.S., M.S., KAIST; Ph.D., Stanford University	John, Eugene	Professor	B.S., University of Kerala, India; M.S., The University of Texas at El Paso; Ph.D., The Pennsylvania State University
Akopian, David	Professor	B.S., M.S., Moscow Institute of Physics and Technology, Russia; Ph.D., Tampere University of Technology, Finland	Kelley, Brian T.	Associate Professor	B.S., Cornell University; M.S., Ph.D., George Institute of Technology
Alamaniotis, Miltos	Assistant Professor	B.S., University of Thessaly; M.S., Ph.D., Purdue University	Krishnan, Ram	Associate Professor	B.Tech., Pondicherry University, India; M.S., New Jersey Institute of Technology; Ph.D., George Mason University
Banerjee, Taposh	Assistant Professor	B.E., Nagpur University; M.E., Indian Institute of Science Bangalore; Ph.D., University of Illinois Urbana-Champaign	Lee, Wonjun	Assistant Professor	B.S., Korea University; M.S., Ph.D., Purdue University
Bhalla, Amar S.	Research Professor	B.S., M.S., Rajasthan University, India; Ph.D., The Pennsylvania State University	Lin, Wei-Ming	Professor	B.S., National Taiwan University; M.S., Ph.D., University of Southern California
Bhounsule, Pranav	Assistant Professor	B.E., Goa Engineering College; M.Tech., Indian Institute of Technology Madras; Ph.D., Cornell University	Morton, Paul E.	Professor in Practice	B.S., Purdue University; M.S., Ph.D., M.D., University of Missouri-Columbia
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Najafirad, Peyman (Paul Rad)	Associate Professor	B.S., Sharif University; M.S., Ph.D., The University of Texas at San Antonio
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Qian, Chunjiang	Professor	B.S., M.S., Fudan University, China; Ph.D., Case Western Reserve University
Shadaram, Mehdi	Professor	B.S., University of Science and Technology, Iran; M.S., Ph.D., The University of Oklahoma
Smith, Bruce	Associate Professor	B.S., M.S., University of Michigan- Ann Arbor; Ph.D., University of Rhode Island
Taha, Ahmad	Assistant Professor	B.S., American University of Beirut; Ph.D., Purdue University
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Zhang, Jianqiu (Michelle)	Associate Professor	B.S., Zhejiang University, China; M.S., Zhongshan University, China; Ph.D., State University of New York at Stony Brook

**Mechanical Engineering**

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Bhounsule, Pranav	Assistant Professor	B.E., Goa College of Engineering; M.S., Indian Institute of Technology Madras; Ph.D., Cornell University
Castillo Villar, Krystal	Associate Professor	B.S., M.S., Tecnologico do Monterrey; Ph.D., Texas Tech University and Tecnologico de Monterrey
Chen, F. Frank	Professor	B.S., Tunghai University; M.S., Ph.D., University of Missouri-Columbia
Chocron, Sidney	Adjoint Professor	M.S., Ph.D., Polytechnic University of Madrid, Spain
Combs, Christopher	Assistant Professor	B.S., University of Evansville; Ph.D., The University of Texas at Austin
Dong, Bing	Associate Professor	B.E., Nanjing University of Technology; M.S., National University of Singapore; Ph.D., Carnegie Mellon University
Feng, Yusheng	Professor	B.S., Tsinghua University; M.S., The University of Oklahoma; Ph.D., The University of Texas at Austin
Feng, Zhi-Gang	Associate Professor	B.S., Shanghai Jiaotong University; M.S., Ph.D., Tulane University

Finol, Ender	Professor	B.S., Universidad de Carabobo, Valencia, Venezuela; M.S., University of Massachusetts, Lowell; M.A., Ph.D., Carnegie Mellon University
Gao, Wei	Assistant Professor	B.S., Sichuan University; M.S., Tsinghua University; M.S., University of California, Irvine; Ph.D., The University of Texas at Austin
Han, Hai-Chao	Professor	B.S., M.S., Ph.D., Jiaotong University, Xi'an, China
Hood, Robert Lyle	Assistant Professor	B.S., University of Houston; M.S., Ph.D., Virginia Tech-Wake Forest University School of Biomedical Engineering and Sciences
Jacobs, Gary	Adjoint Assistant Professor	B.S., The University of Texas at Austin; Ph.D., University of Oklahoma
Jafari, Amir	Assistant Professor	B.S., Isfahan University of Technology; M.S., Urmia University; Ph.D., Italian Institute of Technology, University of Genova
Karimi, Amir	Professor	B.S., Oregon State University; M.S., University of Portland; Ph.D., University of Kentucky
Liu, Ruijie	Associate Professor	B.S., M.S., Tianjin University; M.S., West Virginia University; Ph.D., The University of Texas at Austin
Manteufel, Randall D.	Associate Professor	B.S., M.S., The University of Texas at Austin; Ph.D., Massachusetts Institute of Technology
Millwater, Harry R.	Professor	B.S., Rice University; M.S., Ph.D., The University of Texas at Austin
Montoya, Arturo	Associate Professor	B.S., M.S., Ph.D., Columbia University
Popelar, Carl	Adjoint Professor	B.S., M.S., The Ohio State University; Ph.D., The University of Texas at Austin
Restrepo, David	Assistant Professor	B.S., M.S., Universidad EAFIT; Ph.D., Purdue University
Rincon Troconis, Brendy C.	Assistant Professor	B.S., Universidad del Zulia, Maracaibo, Venezuela; M.S., Ph.D., The Ohio State University
Saygin, Can	Professor	B.S., M.S., Ph.D., Middle East Technical University, Ankara, Turkey
Walker, James	Adjoint Professor	B.S., M.A., Ph.D., The University of Utah
Wan, Hung-Da	Associate Professor	B.S., M.S., National Taiwan University; Ph.D., Virginia Polytechnic Institute and State University
Wang, Xiaodu	Professor	B.S., M.S., Beijing Institute of Aeronautics and Astronautics, China; Ph.D., Yokohama National University, Japan

Zeng, Xiaowei	Associate Professor	B.E., M.S., Huazhong University of Science and Technology, China; M.S., Ph.D., The George Washington University
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Henderson, Dwight F.	Professor Emeritus	B.A., M.A., Ph.D., The University of Texas at Austin
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Johnson, David R.	Professor Emeritus	B.A., University of Illinois; M.A., Ph.D., University of Chicago
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Linard, Rita	Associate Professor Emerita	B.A., M.M., University of Northern Illinois; D.M.A., The University of Texas at Austin
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## College of Liberal and Fine Arts

Name	Title	Education
Allan, Diana	Professor Emerita	B.M., B.M.E., Pittsburgh State University; M.A., Stephen F. Austin State University; D.M.A., The University of Texas at Austin
Allen, Mark E.	Professor Emeritus	B.A., St. Norbert College; M.A., Arizona State University; Ph.D., University of Illinois
Almaráz, Jr., Félix D.	Professor Emeritus	B.A., M.A., St. Mary's University; Ph.D., University of New Mexico
Balentine, James S.	Professor Emeritus	B.A., M.M., University of South Carolina; D.M.A., The University of Texas at Austin
Binks, Ronald C.	Professor Emeritus	B.F.A., Rhode Island School of Design; M.F.A., Yale University
Boyd, Steven R.	Professor Emeritus	B.A., Claremont McKenna College; M.A., Ph.D., University of Wisconsin-Madison
Broderick, James A.	Professor Emeritus	B.A., St. Ambrose College; M.A., University of Iowa
Cantú, Norma E.	Professor Emerita	B.S., M.S., Texas A&I University; Ph.D., University of Nebraska
Craven, Alan E.	Professor Emeritus	B.A., M.A., Ph.D., University of Kansas
Daniels, Bruce C.	Professor Emeritus	A.B., Syracuse University; M.A., Ph.D., University of Connecticut
Dowdy, Eugene	Professor Emeritus	B.M., The University of Texas at Austin; M.M., The University of Texas at San Antonio; D.M.A., University of Iowa
Dunne, Matthew	Professor Emeritus	B.M., State University College of New York; M.M., Florida State University; D.M.A., The University of Texas at Austin
Durand, Francisco	Professor Emeritus	B.A., M.A., Pontificia Universidad Católica de Peru; Ph.D., University at California, Berkeley
Ehardt, Carolyn L.	Professor Emerita	B.S., Virginia Commonwealth University; M.A., Ph.D., The University of Texas at Austin
Field, Charles T.	Professor Emeritus	B.A., Stanford University; M.F.A., University of Washington
Garcia, MaryEllen	Associate Professor Emerita	B.A., Occidental College; M.A., Indiana University; Ph.D., Georgetown University
Gelo, Daniel J.	Professor Emeritus	B.A., M.A., M.Phil., Ph.D., Rutgers University
Gibbs, Beverly J.	Professor Emerita	B.A., M.A., University of Michigan; Ph.D., University of Wisconsin-Madison

Little, Ken D.	Professor Emeritus	B.F.A., Texas Tech University; M.F.A., The University of Utah
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Lundy, Eileen	Associate Professor Emerita	B.A., College of St. Teresa; M.A., Ph.D., The University of Texas at Austin
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Lyons, Bonnie K.	Professor Emerita	B.A., M.A., Ph.D., Tulane University
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Mabry, Gary L.	Professor Emeritus	B.M.Ed., Abilene Christian University; M.M., Hardin Simmons University; D.M.A., University of Colorado
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Morris, Jr., John M.	Professor Emeritus (posthumous)	B.A., M.A., M.S., Ph.D., The University of Texas at Austin
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Pino, Jr., Frank	Professor Emeritus	B.A., M.A., Arizona State University; Ph.D., Northwestern University
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Poetschke, Linda A.	Professor Emerita	B.M., University of North Texas; M.M., The University of Texas at Austin
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Reynolds, John F.	Professor Emeritus	B.A., M.A., Michigan State University; Ph.D., Rutgers University
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Rush, Kent T.	Professor Emeritus	B.F.A., California College of Arts and Crafts; M.A., The University of New Mexico; M.F.A., The University of Texas at Austin
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Rustowicz, Robert	Associate Professor Emeritus	B.M.E., Central Michigan University; M.M., D.M.A., University Cincinnati
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Sebald, David	Professor Emeritus	B.M., M.M., Ph.D., Michigan State University
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Silantien, John J.	Professor Emeritus	B.M.E., Hartt College of Music; M.M., Catholic University of America; D.M.A., University of Illinois
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Sobré, Judith B.	Professor Emerita	B.A., New York University; M.A., Ph.D., Harvard University
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Urdaneta, Maria-Luisa	Professor Emerita	B.A., M.A., The University of Texas at Austin; Ph.D., Southern Methodist University
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Wickham, Christopher	Professor Emeritus	B.A., M.Phil., University of Reading, England; Ph.D., University of Wisconsin-Madison
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Woodson, Linda T.	Professor Emerita	B.S., Ph.D., Texas Christian University
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<b>Anthropology</b>		
Bartlett, Thad Q.	Professor	B.A., Grinnell College; M.A., Ph.D., Washington University

Brown, M. Kathryn	Professor	B.A., Southwest Texas State University; M.A., The University of Texas at San Antonio; M.A., Ph.D., Southern Methodist University
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Campos, Fernando A.	Assistant Professor	B.S., California Institute of Technology; M.A., Ph.D., University of Calgary
Cepek, Michael	Professor	B.A., University of Illinois at Urbana-Champaign; M.A., Ph.D., University of Chicago
Flaherty, Devin	Assistant Professor	B.A., University of California, San Diego; M.A., Ph.D., University of California, Los Angeles
Fleuriet, K. Jill	Professor	B.A., Harvard University; M.A., San Diego State University; M.A., Ph.D., Stanford University
Gallagher, Patrick M.	Assistant Professor	B.A., Columbia University; M.A., Ph.D., Stanford University
Halvaksz II, Jamon A.	Associate Professor	B.A., University of Kentucky; M.A., Ph.D., University of Minnesota
Hamilton, Marcus J.	Associate Professor	B.S., University College London, England; M.S., Ph.D., University of New Mexico
Hard, Robert J.	Professor	B.A., University of Arizona; M.A., Ph.D., University of New Mexico
Levi, Laura J.	Associate Professor	B.A., Bryn Mawr College; Ph.D., University of Arizona
Pozzi, Luca	Assistant Professor	B.S., M.S., University of Torino, Italy; Ph.D., New York University
Wikberg, Eva C.	Assistant Professor	M.S., Umeå University, Sweden; Ph.D., University of Calgary
Yaeger, Jason	Professor	B.A., University of Michigan; Ph.D., University of Pennsylvania

**Art and Art History**

Armendariz, Richard	Professor	B.F.A., The University of Texas at San Antonio; M.F.A., University of Colorado at Boulder
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Eckmann, Teresa	Associate Professor	B.A., University of Massachusetts; Ph.D., University of New Mexico
Elliott, Gregory M.	Professor	B.F.A., M.A., Stephen F. Austin State University; M.F.A., Southern Methodist University
Giberga, Ovidio C.	Associate Professor	B.S., Florida State University; M.F.A., University of Florida
Johnson, Julie	Associate Professor	B.A., Northern Illinois University; M.A., University of Iowa; Ph.D., University of Chicago
McCoin, Mark H.	Associate Professor	B.S., University of Colorado at Denver; M.F.A., University of Colorado at Boulder
Rowe, Elizabeth	Associate Professor	B.F.A., University of Northern Iowa; M.F.A., Syracuse University
Sherer, Scott	Professor	B.A., Yale University; M.A., University of Kentucky, Lexington; Ph.D., University of Minnesota, Minneapolis
Wiersema, Juliet B.	Associate Professor	B.A., University of the Pacific; M.A., Institute of Fine Arts, New York University; Ph.D., University of Maryland

**Communication**

Daas, Karen	Associate Professor	B.A., Gustavus Adolphus College; M.A., Minnesota State University; Ph.D., University of Nebraska, Lincoln
DeTurk, Sara	Professor	B.A., University of Virginia; M.Ed., University of Massachusetts Amherst; Ph.D., Arizona State University
Hajek, Christopher	Professor	B.A., Loyola University; M.A., University of Hawaii; Ph.D., University of California, Santa Barbara
Kang, Seok	Professor	B.A., Sungkyunkwan University, Seoul, Korea; M.A., Sogang University, Seoul, Korea; M.A., Illinois State University; Ph.D., University of Georgia
Kanso El-Ghori, Ali	Professor	B.A., Lebanese University; M.S., Ph.D., Ohio University
Khan, Shamshad	Associate Professor	B.A., Aligarh University, Aligarh, India; M.A., M.Phil., Jawaharlal Nehru University, New Delhi, India; Ph.D., Simon Fraser University
Kline, Kimberly	Professor	B.A., Kennesaw State University; M.O.C., Georgia State University; Ph.D., University of Georgia
LeBlanc III, H. Paul	Professor	B.A., St. Mary's University; M.A., Louisiana State University; Ph.D., Southern Illinois University
Levitt, Steven R.	Professor	B.A., Montana State University; M.A., West Virginia University; Ph.D., The Ohio State University
Lewis, Laurie	Professor	B.A., University of Washington; M.A., University of Illinois; Ph.D., University of California at Santa Barbara
Mahood, Charles (Chad)	Associate Professor	B.A., M.A., The Pennsylvania State University; Ph.D., University of California, Santa Barbara
McDonald, Jamie	Associate Professor	B.S., M.S., Universite de Montreal; Ph.D., University of Colorado, Boulder
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Tokunaga, Robert	Assistant Professor	B.A. and M.A., University of Hawai'i at Mānoa; Ph.D., University of Arizona
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**English**

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Graduate Faculty

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Colombini, Crystal	Assistant Professor	B.A., University of Oregon; M.A., Ph.D., University of Nevada, Reno
Drinka, Bridget A.	Professor	B.A., University of Illinois at Urbana-Champaign; M.S., Georgetown University; Ph.D., The University of Texas at Austin
Fonzo, Kimberly	Assistant Professor	B.A., Hanover College; M.A., Ph.D., University of Illinois at Urbana-Champaign
Garza, Kimberly	Assistant Professor	B.A., M.A., The University of Texas at Austin; Ph.D., University of North Texas
Hum, Sue	Associate Professor	B.A., Park College; Ph.D., Texas Christian University
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Lanehart, Sonja	Professor	B.A., The University of Texas at Austin; M.A., Ph.D., University of Michigan
Moody, Joycelyn K.	Professor	B.A., Spring Hill College; M.A., University of Wisconsin-Madison; Ph.D., University of Kansas
Portillo, Annette	Associate Professor	B.A., University of California, San Diego; M.A., Ph.D., Cornell University
Reesman, Jeanne C.	Professor	B.A., Centenary College of Louisiana; M.A., Baylor University; Ph.D., University of Pennsylvania
Saldívar-Hull, Sonia	Professor	B.A., University of Houston; M.A., Ph.D., The University of Texas at Austin
Sinanan, Kerry	Assistant Professor	B.A. (Hons), Ph.D., Trinity College, Dublin
Vance, David Ray	Associate Professor	B.A., The University of Texas at Austin; M.A., University of Illinois at Chicago; Ph.D., University of Houston
Walker, Kenneth	Assistant Professor	B.A., University of California, Davis; M.A., University of Nevada, Reno; Ph.D., University of Arizona
<b>History</b>		
Clinton, Catherine	Professor	A.B., Harvard University; M.A., University of Sussex; Ph.D., Princeton University
Davies, Brian L.	Professor	B.A., M.A., Ph.D., University of Chicago
Gardner, Kirsten	Associate Professor	B.A., Georgetown University; M.A., Ph.D., University of Cincinnati
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Kelly, Patrick J.	Associate Professor	B.A., The University of Texas at Austin; Ph.D., New York University
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Konove, Andrew	Assistant Professor	B.A., Haverford College; M.A., M.Phil., Ph.D., Yale University
Michel, Gregg	Associate Professor	B.A., University of Chicago; M.A., Ph.D., University of Virginia
Ng, Wing Chung	Professor	B.A., M.Phil., University of Hong Kong; Ph.D., University of British Columbia
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**Modern Languages and Literatures**

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Himelblau, Jack	Professor	A.B., M.A., University of Chicago; Ph.D., University of Michigan
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Nummikoski, R. Marita	Associate Professor	B.A., M.A., Helsinki University; Ph.D., The University of Texas at Austin
Oleszkiewicz, Malgorzata	Professor	B.A., M.A., Queens College; Ph.D., New York University
Requena, Pablo	Assistant Professor	B.A., Universidad Nacional de Córdoba; M.A., Pennsylvania State University; Ph.D., Pennsylvania State University
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<b>Music</b>		
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El-Kikhia, Mansour O.	Professor	B.A., American University of Beirut; M.A., Ph.D., University of California, Santa Barbara	Martinez, Andrew O.	Professor Emeritus	B.S., Santa Fe College; Ph.D., University of Arizona
Gervais, Bryan T.	Associate Professor	B.A., University of Massachusetts; M.A., Ph.D., University of Maryland	Robbins, Kay A.	Professor Emerita	S.B., Ph.D., Massachusetts Institute of Technology
Hofferberth, Matthias	Associate Professor	B.A., Westfälische Wilhelms-Universität, Münster; M.A., Goethe-University, Frankfurt and University of Wales, Swansea; Ph.D., Goethe-University, Frankfurt	Robbins, Steve	Professor Emeritus	S.B., S.M., Ph.D., Massachusetts Institute of Technology
Jones, Richard C.	Professor	B.S., Austin Peay State University; M.A., Indiana University; Ph.D., The Ohio State University	Rodriguez, Paul H.	Professor Emeritus	B.S., Creighton University; M.S., University of New Mexico; Ph.D., University of Rhode Island
Laracey, Melvin C.	Associate Professor	B.A., University of Notre Dame; J.D., University of Michigan Law School; M.P.A., Harvard University; Ph.D., University of Michigan	Smith, Robert K.	Professor Emeritus	B.S., Washington State University; M.S., Ph.D., University of Iowa
Mathur, Ritu	Associate Professor	B.A., University of Kolkata; M.A., M.Phil., Jawaharlal Nehru University; Ph.D., York University	Swanson, Eric R.	Professor Emeritus	B.S., Western Michigan University; M.A., Ph.D., The University of Texas at Austin
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Stefanova, Boyka	Professor	Dipl. Economist, Karl Marx Higher Economic Institute, Sofia Bulgaria; Doctorate, University of National and World Economy, Bulgaria; M.A., Ph.D., University of Delaware	Travis, Betty S. P.	Professor Emerita	B.A., M.S., St. Mary's University; Ph.D., The University of Texas at Austin
Taylor, Jon R.	Professor	B.A., M.A., Ph.D., University of Oklahoma	Van Auken, Oscar	Professor Emeritus	B.S., High Point College; M.S., Ph.D., University of Utah
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Wilson, Walter C.	Associate Professor	B.A., Augustana College; Ph.D., The University of Oklahoma	Wayner, Jr., Matthew J.	Professor Emeritus	A.B., Dartmouth College; M.S., Tufts University; Ph.D., University of Illinois
			Wene, Gregory P.	Professor Emeritus	B.A., M.A., The University of Texas at Austin; Ph.D., University of Iowa
			Williams, Lawrence R.	Professor Emeritus	B.S., Texas Southern University; M.A., Ph.D., University of Michigan

## College of Sciences

Name	Title	Education	Biology		
Berriozábal, Manuel	Professor Emeritus	B.S., Rockhurst College; M.S., University of Notre Dame; Ph.D., University of California, Los Angeles	Apicella, Alfonso	Assistant Professor	B.S., Ph.D., University of Naples, Italy
Birnbaum, Stuart J.	Associate Professor Emeritus	B.S., State University of New York at Stony Brook; Ph.D., Cambridge University	Arulanandam, Bernard P.	Professor	B.S., M.A., Minnesota State University; M.B.A., The University of Texas at San Antonio; Ph.D., Medical College of Ohio
Chou, Youn-Min	Professor Emeritus	B.S., National Taiwan University; M.S., The University of Texas at El Paso; Ph.D., Southern Methodist University	Barea-Rodriguez, Edwin J.	Professor	B.A., Inter-American University of Puerto Rico; M.A., Ph.D., Southern Illinois University, Carbondale
Chronopoulos, Anthony	Professor Emeritus	B.S., University of Athens; M.S., University of Minnesota; Ph.D., University of Illinois at Urbana-Champaign	Burgos-Robles, Anthony	Assistant Professor	B.S., Pontifical Catholic University of Puerto Rico; Ph.D. Ponce School of Medicine, Puerto Rico
			Cardona, Astrid	Associate Professor	B.S., Universidad de Antioquia, Colombia; Ph.D., The University of Texas Health Science Center at San Antonio

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Cassill, J. Aaron	Professor	B.A., Harvard University; Ph.D., University of California, San Diego	McCarrey, John	Professor	B.S., M.S., Ph.D., University of California, Davis
Chambers, James P.	Professor	B.A., St. Mary's University; M.A., Incarnate Word College; Ph.D., The University of Texas Health Science Center at San Antonio	Muzzio, Isabel	Associate Professor	B.S., University of Massachusetts; M.S., Ph.D., Rutgers University
Engelberth, Jurgen	Associate Professor	B.Sc., M.Sc., University of Bonn, Germany; Ph.D., University of Bochum, Germany	Paladini, Carlos	Professor	B.A., Ph.D., Rutgers University
Eppinger, Mark	Assistant Professor	M.S., Tuebingen University; Ph.D., University of Tuebingen	Perry, George	Professor	A.A., Allan Hancock College, B.A., University of California, Santa Barbara, Ph.D., University of California, San Diego
Forsthuber, Thomas	Professor	M.D., Ph.D., University of Tubingen	Phelix, Clyde F.	Professor	B.A., State University of New York; Ph.D., University of Missouri
Gaufo, Gary	Associate Professor	B.A., M.A., Ph.D., University of California, Berkeley	Renthal, Robert D.	Professor	B.A., Princeton University; Ph.D., Columbia University
Guentzel, M. Neal	Professor	B.A., M.A., Ph.D., The University of Texas at Austin	Santamaria, Fidel	Associate Professor	B.S., National Autonomous University of Mexico (UNAM); Ph.D., California Institute of Technology
Hanson, Kirsten K.	Assistant Professor	B.A., M.S., University of Chicago; Ph.D., University of Cambridge	Savelli, Francesco	Assistant Professor	M.S., Ph.D., Universita` degli Studi di Roma "La Sapienza", Italy
Haro, Luis S.	Professor	B.A., University of California, San Diego; Ph.D., University of California, Santa Cruz	Saville, Stephen	Associate Professor	B.Sc., Wolverhampton University, England; Ph.D., University of Leicester, England
Heidner, Hans W.	Professor	B.S., California Polytechnic State University-San Luis Obispo; M.S., North Carolina State University; Ph.D., University of California, Davis	Senseman, David M.	Associate Professor	B.S., Kent State University; M.S., Ph.D., Princeton University
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**Environmental Science and Ecology**

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Graduate Faculty

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Gui, Changfeng	Professor	B.S., M.S., Peking University, China; Ph.D., University of Minnesota, Twin Cities	Chabanov, Andrey	Professor	M.S., Kharkov State University, Ukraine; D.Sc., Ukrainian Academy of Sciences, Ukraine; Ph.D., City University of New York
Gutierrez, Juan	Professor	M.S., Ph.D., Florida State University	Chen, Chonglin	Professor	B.S., Huachiao University, P.R. China; M.S., Chinese Academy of Sciences, P.R. China; M.S., Ph.D., The Pennsylvania State University
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Iovino, José N.	Professor	B.A., M.S., Universidad de los Andes, Columbia; Ph.D., University of Illinois at Urbana-Champaign	Desai, Mihir	Adjoint Associate Professor	B.Sc., University of London, U.K.; Ph.D., University of Birmingham, U.K.
Le, Dung	Professor	B.S., University of Saigon, Vietnam; Diploma in Mathematics, International Center for Theoretical Physics, Italy; Ph.D., Arizona State University	Ebert, Robert	Adjoint Assistant Professor	B.S., University of Calgary; M.A.Sc., University of Toronto; Ph.D., The University of Texas at San Antonio
Liang, Su	Associate Professor	Ph.D., University of Connecticut	Elliot, Heather	Adjoint Professor	B.S., Clemson University; M.S., University of Michigan; Ph.D., University of Alabama in Huntsville
Norman, F. Alexander	Associate Professor	B.A., University of Virginia; M.A., Ed.D., The University of Georgia	Fuselier, Stephen	Adjoint Professor	B.S., University of Southern California; M.S., Ph.D., University of Iowa
Pasnicu, Cornel	Professor	B.A., M.S., Ph.D., University of Bucharest, Romania	Gladstone, George	Adjoint Professor	B.Sc., The University of British Columbia; M.S., Ph.D., California Institute of Technology
Popa, Mihai	Associate Professor	B.S., M.S., University of Bucharest; Ph.D., University of California, Los Angeles	Goldstein, Jerry	Adjoint Professor	B.S., Brooklyn College; Ph.D., Dartmouth College
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<b>Physics and Astronomy</b>					
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Bayless, Amanda	Adjoint Assistant Professor	B.S., Michigan State University; M.S., San Diego State University; Ph.D., The University of Texas at Austin	Marucho, Marcelo	Associate Professor	M.S., University of Buenos Aires; Ph.D., National University of La Plata
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Silva, David	Professor	B.S., University of Arizona, Ph.D., University of Michigan
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## ADDITIONAL COURSE FEES

In addition to tuition, additional fees and charges may be assessed for the incidental cost of services of the major pursued or the courses selected by a student. Course descriptions in this catalog will list any Additional Course Fee(s) to be charged for the course. Students should be aware of additional fees and charges incurred by their major or course selection that will be added to the total cost of tuition.

Additional Course Fees are subject to change by the Texas Legislature or The University of Texas System Board of Regents and become effective on the date enacted. The Texas Legislature does not set the specific amount for any particular student fee. The student fees described in this catalog are authorized by state statute; however, the specific fee amounts and the determination to increase fees are made by The University of Texas at San Antonio and The University of Texas System Board of Regents.

Differential Tuition is assessed to all students taking College of Architecture, Construction and Planning, College of Business, College of Engineering and College of Sciences graduate courses. For more information on differential tuition, please refer to Tuition (<http://catalog.utsa.edu/policies/tuitionfees/tuition/>) in *UTSA Student Policies*.

Charge/Fee Name	Code	Amount	Charged Per	Charge/Fee Description
Certification Charge (COEHD) - College of Liberal & Fine Arts Majors	SELS	\$20	Semester	This charge is assessed all undergraduate College of Liberal and Fine Arts and College of Sciences majors seeking teacher certification to defray costs associated with group advising, individual advising, processing applications for admission to the Program, processing applications for certification to the State Board, outreach via classroom visits and mobile advising at student events.
Certification Charge (COEHD) - Graduate Students	SEGR	\$20	Semester	This charge is assessed graduate students seeking various professional certifications. Services for graduate students are provided only during their final semester. The fee will be attached to EDL 6941-3 for Educational Leadership students and may be assessed for other professional certification courses for principals, school counselors and Master Reading teachers.
Certification Charge (COEHD) - Post-Baccalaureate Students	SECC	\$105	Semester	This charge is assessed all post-baccalaureate students seeking initial teacher certification to defray costs of providing transcript evaluation, group and individual advising, and processing of certification applications to the State Board.
College of Engineering and Integrated Design (CEID) Programs Fee	SAP1	\$25	Course	This fee is assessed students enrolled in certain lower-division undergraduate courses in the architecture curriculum who use any of the studios under the direction of the College of Engineering and Integrated Design (CEID). This fee is to defray costs of supplies, materials, equipment, and services for students enrolled in Architecture, Interior Design, and Construction Science and Management curriculum
Counseling Support Fee	COUN	\$35	Course	All students registered in certain counseling department courses are charged this fee to defray costs of services and training designed to prepare counselors.
Dietetics and Nutrition Program Service Charge	DNPS	\$75	Semester	This charge is assessed all undergraduate and graduate students enrolled in the Coordinated Program in Dietetics (CDP) to defray costs associated with annual student orientation, training for students and off-site preceptors, administrative services to support student internship placement, tracking of practicum/internship hours, and other reports and systems required for ACEND accreditation.
Dietetics Teaching Kitchen Fee	DNMF	\$225	Credit Hour	This fee is assessed all students enrolled in certain Dietetics and Nutrition Program courses to defray costs associated with the purchase of foods, consumable supplies and materials to be used in a kitchen laboratory.

Dietetics and Nutrition Practicum Fee	DNPF	\$20	Credit Hour	This fee is assessed all students enrolled in certain Dietetics and Nutrition Program courses to defray costs associated with supervision of students at affiliation sites at various locations; including student liability coverage costs associated with the practicum courses, related faculty travel, recruitment and meetings with preceptors, field trips, instructional support materials, recognition events and training for the preceptors.
Dietetics and Nutrition Testing Fee	DNTM	\$112	Credit Hour	This fee is assessed all students enrolled in certain Dietetics and Nutrition Program capstone courses to defray costs associated with the purchase of educational materials for assessing student learning using computer-based testing in preparation for the national credentialing exam and including, but not limited to, the purchase of revised materials and annual subscriptions to online manuals.
Digital Learning Fee	DL01	\$25	Credit Hour	This fee is assessed each student enrolled in certain hybrid or online courses with a maximum charge of \$150 per semester to defray costs associated with managing, maintaining, upgrading and general operations of the University's Learning Management System (LMS) and online course development activities.
Education Assessment Course Fee (COEHD)	LEA1/ LEA2	\$15/ \$25	Course	A fee of \$15 per undergraduate course and \$25 per graduate course will be assessed all students registered in certain College of Education and Human Development courses to defray costs of development and maintenance of a collection of professional assessment materials.
Education TExES Charge	CETC	\$65	Semester	This charge is assessed all students pursuing teaching or professional certification through the College of Education and Human Development to defray costs associated with providing materials and services mandated by the Texas Education Agency, to support student success on the Texas Examinations of Educator Standards (TExES). Services offered include individual and group tutorials, workshops and large review sessions, implementation of Practice TExES exams, instructional materials, supplies, and salaries.
Educational Field Clinical Instruction Fee - College of Education and Human Development	STF1	\$75	Course	This fee will be assessed all students during their semester of student teaching and students in special education practicum settings, counseling practica, and student internships to defray costs associated with providing materials and services associated with field-based courses and practica, to include supervision of student teachers, interns, and students in field placement at both the graduate and undergraduate levels, appreciation items for student teaching supervisors, mileage costs and salaries, training in the use of educational technology, and travel to mandatory state-wide Texas Education Agency training.
Educational Field Instruction Fee - KIN	STFK	\$57	Semester	This fee will be assessed all students during their semester of student teaching and students in special education practicum settings, counseling practica, and student internships to defray costs associated with providing materials and services associated with field-based courses and practica, to include supervision of student teachers, interns, and students in field placement at both the graduate and undergraduate levels, appreciation items for student teaching supervisors, mileage costs and salaries, training in the use of educational technology, and travel to mandatory state-wide Texas Education Agency training.

Additional Course Fees

Equipment and Materials Fee - Department of Physics and Astronomy	MEPA	\$18	Course	This fee is assessed all students registered for certain courses in the Department of Physics and Astronomy to defray costs associated with purchase and maintenance of demonstration equipment, printing supplies, and acquisition of WEBASSIGN to enhance learning and wages.
Equipment and Materials Fee - Political Science and Geography, Media Equipment and Materials	MST1	\$30/ \$35	Course	A fee of \$30 per undergraduate student and \$35 per graduate student is assessed all students registered for certain courses in the Department of Political Science and Geography to defray costs of the media studio and salaries for tutorial instruction.
Equipment and Materials Fee - Political Science and Geography, Geographic Information Systems Materials	GIS1	\$32/ \$40	Course	A fee of \$32 per undergraduate student and \$40 per graduate student is assessed all students registered for certain courses in the Department of Political Science and Geography to defray costs of printing equipment and supplies and salaries for tutorial instruction.
Field Trip Fee - Biology	STFB	\$40	Course	A supplementary fee is assessed students in certain Biology and Environmental Science and Ecology courses to pay for the expenses of field trips.
Field Trip Fee - Environmental Science and Ecology	STFE	\$40	Course	A supplementary fee is assessed students in certain Biology and Environmental Science and Ecology courses to pay for the expenses of field trips.
Foreign Language Multimedia Learning Center Fee	MM01	\$7	Course	This fee is assessed each student who registers at UTSA in a foreign language course to defray costs of supplies, printing, equipment and part-time lab helpers in the Multimedia Learning Center.
Global Business Skills Charge - College of Business International Programs	BISP	\$10	Course	This fee will be assessed all students enrolled in certain lower-division undergraduate College of Business classes to defray costs of programs that develop students' global business skills including: programs that give participating students on-campus or U.S.-based access to study, research, or practicums related to global business; programs that immerse participating students in global business environments for study, research or practicums in U.S. or international locations; and, costs to administer programs related to developing global business skills.
Graduate Services Charge - College of Education and Human Development	GH01	\$30	Credit Hour	This charge is assessed all students enrolled in graduate or doctoral courses in the College of Education and Human Development to defray costs associated with advising, orientation, certification, placement, research support, recruitment, professional education, meetings, and other administrative and support services.
Graduate Services Charge - College of Engineering and Integrated Design (CEID)	CEGS	\$60/ \$30	Semester	A charge of \$60 per semester (\$30 per summer session) is assessed all students enrolled in graduate courses of the College of Engineering and Integrated Design (CEID) curriculum to defray the cost of providing advising, orientation, and administrative services.
Graduate Services Charge – College for Health, Community and Policy	GHC1	\$25	Credit Hour	This charge is assessed all students enrolled in graduate courses in the College for Health, Community and Policy (HCAP) to defray cost of hiring graduate assistants; support graduate student travel to present their research at national conferences; orientation, recruiting and reception for new graduate students; support for hiring teaching assistants for grad student summer teaching; and staff support.
Graduate Services Charge - College of Liberal and Fine Arts	GL01	\$30	Credit Hour	This charge is assessed all students enrolled in graduate courses of the College of Liberal and Fine Arts to defray costs associated with services to master's and doctoral students including advising, orientation, graduation, certification, placement, research support, professional education meetings, seminars, administrative services, graduate student travel, assistantships, and other support services.

Graduate Services Charge - College of Sciences	GS01	\$30	Credit Hour	This charge is assessed all students enrolled in graduate or doctoral courses of the College of Sciences curriculum to provide advising, research support, recruitment, professional meetings, assistantships, administrative services, and seminars.
Honors Experiential Enrichment Fee	EEHC	\$240	Fall/Spring Semester	A fee of \$240 per Fall and Spring semester is assessed all students enrolled in the Honors College to defray costs associated with specialized counseling within Honors, specialized advising within student majors, design of new opportunities for study-abroad, purchase of consumables for undergraduate research, faculty training and access to experiential tutorial sequences to improve readiness for graduate school and professional/board exams.
Individual Instruction Fee – Music	M001	\$150	Credit Hour	This fee is assessed all students in certain Music courses to defray the costs associated with instrument purchases, sponsoring artist teachers, master class and workshops for music majors, better tutoring opportunities for performing ensembles and to establish an opera budget.
Installment Tuition Charges	IPP3	\$16	Semester	This charge is assessed when a student elects to pay tuition, fees, and charges under the installment payment plan. This charge is normally included in the first installment payment. A \$10 charge is assessed for each delinquent installment payment.
Instrument Users Fee (COS) - Department of Environmental Science and Ecology	IUS1	\$15	Course	This fee is assessed all students registered in certain Environmental Science and Ecology courses to defray costs of repairing and replacing teaching equipment.
Instrument Users Fee (COS) - Department of Biology	IUB1	\$10	Course	This fee assessed all students registered in certain Biology courses to defray costs of repairing and replacing teaching equipment.
Instrument Users Fee (COS) - Department of Chemistry	IUC1	\$15	Course	This fee is assessed all students registered in certain Department of Chemistry courses to defray costs of repairing and replacing teaching equipment and salaries for technicians.
Instrument Users Fee (COS) - Department of Computer Science	IUCS	\$15	Credit Hour	This fee is assessed all students registered in certain Department of Computer Science courses to defray costs of hardware and software instruments, peripheral devices, software licenses and maintenance of the computer science lab equipment, and administrative support.
Instrument Users Fee (COS) - Department of Geological Sciences	IUE1	\$15	Course	This fee is assessed all students registered in certain Department of Geological Sciences courses to defray costs of repairing and replacing teaching equipment.
Instrument Users Fee (COS) - Department of Physics and Astronomy	IUP1	\$20	Course	This fee is assessed all students registered in certain Physics and Astronomy courses to defray costs of purchase, repair and maintenance of teaching equipment and salaries for technicians.
Instrument Users Fee (COLFA) - Department of Music	IUM1	\$30	Credit Hour	This fee is assessed all students registered in certain Music courses to defray costs of musical instrument technical training and the replacement and maintenance of musical instruments.
International Student Insurance Fee	HIF1/ HIF2/ HIF3			All international students are required to purchase the UT System Student Health Insurance Plan, which covers basic medical expenses for injury and sickness. The plan is in compliance with the United States Information Agency's regulations. The fee is assessed as part of the regular tuition and fee charges. A waiver of this fee is available, provided 1) the student presents proof of coverage by a comparable U.S. health plan, and 2) UTSA approves the comparable health coverage.

*Additional Course Fees*

International Student Program Charge	OIP1	\$125	Semester	This charge is assessed all international students to defray costs of programs and services for international students in the Office of International Programs.
Internship Fee - College of Education and Human Development	INT1	\$50	Credit Hour	This fee is assessed each student enrolled in designated internship courses in the departments of BBL, ILT, ELPS, EDP, COU, KHN, and REGSS. To defray costs associated with the creation, development, coordination, placement, and supervision of students engaged in these internship courses and support administrative cost for an internship coordinator.
Internship Fee - Department of Criminal Justice	CJIF	\$65	Semester	This fee is assessed each student enrolled in Department of Criminal Justice courses to defray costs associated with creating, developing, and implementing internships including salaries and material costs.
ISCS Course Resource Fee (COB) - Department of Information Systems & Cyber Security	ISCS	\$25	Credit Hour	This fee is assessed all undergraduate and graduate students enrolled in certain Information System courses in the College of Business to defray the cost of providing materials including but not limited to technology maintenance, administrative and equipment support, and direct and indirect costs to upgrade the student's classroom and virtual learning experience such as Virtual Desktop Infrastructure (VDI), cyber range time and specialized software.
ISCU Education Abroad Course Fee	ISCU	\$40	Credit Hour	This fee is assessed all students attending Study-Abroad courses in Urbino, Italy, to defray cost associated with the oversight, administration, program accounting, creation/adjustment, and on-site management of courses taught in Urbino.
Laboratory Fee	L001	\$2 - \$30	Course	In certain courses, a laboratory fee, not to exceed the actual cost of materials and supplies and no less than \$2 nor more than \$30, may be charged. When a laboratory fee is charged, the online schedule of classes indicates the associated fee.
Learning Resource Fee - Core Curriculum	LRC1	\$4	Credit Hour	A fee is assessed each student enrolled in Core Curriculum courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Learning Resource Fee - Writing Program	LRF1	\$4	Credit Hour	A fee is assessed each student enrolled in Writing Program courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Learning Resource Fee - College of Business	LRB1	\$15	Course	A fee is assessed each student enrolled in certain lower-division undergraduate College of Business courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Learning Resource Fee - College of Education and Human Development	LRH1	\$20	Course	A fee is assessed each student enrolled in College of Education and Human Development undergraduate and graduate courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Learning Resource Fee - College of Engineering and Integrated Design (CEID)	LRE1	\$20	Course	A fee is assessed each student enrolled in certain lower-division undergraduate College of Engineering and Integrated Design (CEID) courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.

Learning Resources Fee - College for Health, Community and Policy	LRHC	\$10	Course	This fee is assessed all students registered in certain Departments of Kinesiology, Health & Nutrition, Sociology, & Psychology in the College for Health, Community and Policy (HCAP) to defray costs to provide materials & course supplies, individual and/or group advising, hiring supplemental instruction reader/graders, coaching, tutorials, discussions and study skills sessions, reviews and instructional support lab materials.
Learning Resource Fee - College of Liberal and Fine Arts	LRLF	\$10	Course	A fee is assessed each student enrolled in College of Liberal and Fine Arts courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Learning Resource Fee - College of Sciences	LRS1	\$15	Credit Hour	A fee is assessed each student enrolled in certain lower-division undergraduate College of Sciences courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Learning Resource Fee - Academic Inquiry (AIS)	LRU1	\$12	Credit Hour	A fee is assessed each student enrolled in certain University College courses to provide materials, services and administrative support to enhance student success and to defray costs for funding Graduate Assistants, Teaching Assistants and materials to upgrade the student's classroom experience.
Manipulatives Fee - Department of Mathematics	MFSM	\$30/ \$35	Course	A fee of \$30 per undergraduate course and \$35 per graduate course is assessed all students in certain mathematics courses to defray costs of manipulatives used in courses for pre-service and in-service mathematics teachers and payment of salaries for assistance with manipulatives.
Music Course Fee	MC01	\$25	Credit Hour	This fee is assessed Music majors and non-Music majors that perform in and/or attend university ensemble concerts, dance minors, and students registered in music courses that are in the core curriculum and thus required to attend university performances. To defray costs of concert quality instruments, custom music chairs, music stands, sheet music, lighting, sound, and storage equipment, residency activities and guest artists/performers.
National Student Exchange Program Application Fee	NSEC	\$95	App.	This fee is assessed students participating in the National Student Exchange program to defray costs associated with the application fee charged by NSE for student participation.
Physical Education - Golf Activity Fee	PAH1	\$80	Semester	A fee of \$80 for a semester or summer term is required for physical education golf activity courses to defray costs of equipment for use of driving range.
Physical Education - Kinesiology Activity Fee	PAG1	\$20	Course	This fee is assessed students in certain Kinesiology courses to defray costs associated with equipment used in the instruction of kinesiology activity classes including golf, tennis, soccer, football, basketball, badminton, volleyball, resistance training and elementary PE activities. Additional expenses include the rental of exercise and sport facilities for course instruction.
Physical Education - Kinesiology Supply and Maintenance Fee	KSM1	\$10	Course	This fee is assessed all students registered in certain Kinesiology courses to defray costs associated with purchase of disposable or consumable materials and maintenance of equipment in instructional classes.
Physical Education - Outdoor Activity Fee	PARC	\$40	Semester	This fee is assessed all students enrolled in certain Kinesiology courses to defray costs associated with repair and purchase of equipment and transportation.

Additional Course Fees

PreClinical & Outbound Clinical Fee	OCTF	\$500	Semester	This fee is assessed certain COEHD teacher candidates during their clinical teaching semester to defray costs associated with hiring a clinical faculty member to supervise the students and to pay for faculty travel to school sites outside of Bexar county.
Professional Affiliation, Accreditation, and Development Fee – College of Education and Human Development	EHPA	\$20	Semester	To defray costs associated with maintaining affiliations and accreditations with national professional organizations, administrative staff support, professional development of faculty, staff and students associated with various organizations.
Professional Affiliation and Development Fee - Department of Social Work	SWPA	\$25	Semester	This fee is assessed each student enrolled in certain social work courses to defray costs associated with affiliation expenses for professional organizations (accreditation fees, membership, travel, etc.) and professional development for social work graduate students (registration, travel, honorarium, etc.).
Professional Development and Enrichment Fee - College of Liberal and Fine Arts	LFPE	\$60	Semester	This fee is assessed to College of Liberal and Fine Arts students each semester to defray the costs associated with providing student enrichment experiences including experiential learning, immersion/alternative break experiences, and programming to develop marketable skills, professional development & growth, internship & externship support services, and associated personnel & operational costs.
Professional Development Charge - College of Business - Undergraduate	BPD1	\$60	Semester	This fee is assessed all Sophomore, Junior and Senior College of Business students each semester to defray costs associated with providing personnel, training, and other support for professional development programs, placement, and internship support services.
Professional Development Charge - College of Business - Graduate	BPD2	\$150	Semester	This fee is assessed all Graduate College of Business Students each semester to defray costs associated with providing personnel, training and other support for professional development programs, placement, and internship support services.
Program Charge - Education Abroad Application Fee	SAAF	\$75	Semester	This fee is assessed all students applying to participate in study abroad and exchange programs.
Program Charge - Education Abroad Program Fee	SARF	\$150/ \$75	Semester	A charge of \$150 per semester is assessed all students registered in for-credit study abroad and exchange programs, and \$75 per semester for research and non-credit programs.
Program Charge - Education Abroad Services Health Insurance Fee	SAHF	\$20	Week	This fee is assessed all students each week they are abroad, while enrolled in a study-abroad program, to defray the costs of insurance, International SOS, and administrative expenses.
Program Charge - Honors College	PCHC	\$100	Fall/Spring Semester	A charge of \$100 per Fall and Spring semester is assessed all students enrolled in the Honors College to defray costs associated with providing services for initiatives of the honors student leadership team, such as enhanced community building opportunities and attendance of conferences and programs to provide extensive experiential learning opportunities for both curricular and non-curricular initiatives.
Program Charge - Roadrunner Camp Charge	CAMP	\$125	Student	This fee is assessed each student attending Roadrunner Camp.
School Psychology Support Fee	SPS1	\$14	Credit Hour	This fee is assessed all students enrolled in the School Psychology Master's Program to defray costs associated with services and training necessary to prepare School Psychologists for practicum, school-based internships, job placement, and for clinic operations and support.

Studio Art Fee	SAF1	\$45	Course	This fee is assessed students enrolled in art (ART) courses in the visual arts curriculum that will use any of the studios under the direction of the Department of Art and Art History to defray costs associated with set up and maintenance of the art studios, instructional exhibitions, wages for graduate assistants and costs of supplies and materials.
Supplementary and Special Fees		Varies	Course	Some art, music, and other courses may require supplementary or special fees. When such fees are assessed, the online schedule of classes indicates the associated fee.
Technology Services and Instructional Support Charge - College of Business	BTSI	\$15	Course	This fee is assessed all students registered in certain lower-division undergraduate College of Business courses to defray costs associated with personnel and equipment support for instruction.
Technology Services and Instructional Support Charge - College of Education and Human Development	STSH	\$10	Credit Hour	This fee is assessed all students registered in College of Education and Human Development courses to defray costs associated with providing personnel and technology support for Web design, procurement, maintenance and support, computer hardware and software, and other support necessary to maintain laboratory operations as well as technology for student needs and distance learning. Will improve services through the conversion of computer labs to Technology Teaching and Learning labs where students will receive integrated and graduated training, develop hands-on expertise in ISTE standards appropriate to their future roles as educators, school counselors, school psychologists and educational leaders.
Technology Services and Instructional Support Charge - College of Engineering and Integrated Design (CEID)	STSE	\$10	Credit Hour	This fee is assessed all students enrolled in certain lower-division undergraduate College of Engineering and Integrated Design (CEID) courses to defray costs associated with providing additional personnel, calibration of equipment, computer software/hardware, service contracts, and other laboratory equipment maintenance.
Technology Services and Instructional Support Charge - College for Health, Community and Policy	STHC	\$6	Credit Hour	This fee is assessed all students registered in the College for Health, Community and Policy courses to defray costs to upgrade technology in student labs, purchase software and technology agreements, and to provide new learning resources for distance and collaborative learning. The funds will also support A/V tech fees for student academic programs, meetings and events.
Technology Services and Instructional Support Fee - College of Liberal and Fine Arts	STLF	\$6	Credit Hour	This fee is assessed all students registered in COLFA courses to defray costs associated with providing personnel and technology support for Web design, procurement, maintenance and support, computer hardware and software, personnel, and other support necessary to maintain laboratory/computer technology-based teaching, research, and learning operations.
Technology Services and Instructional Support Charge - College of Sciences	STSI	\$7	Credit Hour	This fee is assessed all students registered in certain lower-division undergraduate College of Sciences courses to defray costs associated with providing additional personnel and equipment support for instruction, technology support for Web design and maintenance, Web accessible course information, support for academic reporting and distance learning, service contracts, and other support necessary to maintain laboratory equipment.
Technology Services and Instructional Support Charge - Writing Program	STSF	\$2	Credit Hour	This fee is assessed all students enrolled in certain Writing Program courses to defray costs associated with providing personnel and equipment support of instructional design incorporating new technologies.



*Additional Course Fees*

Three-Attempt Enrollment Charge	TTEC	\$512.85	Credit Hour	This charge is assessed all undergraduate students enrolled in the same course for the third and subsequent times to defray revenue lost as a result of nonfunding by the state.
Undergraduate Credit Limitation Charge - 45-Hour Limitation	CL45	\$512.85	Credit Hour	Resident undergraduate students who initially enrolled from the Fall 1999 Semester through the Summer 2006 Semester and who enroll in courses in excess of 45 semester credit hours above those required for completion of their degree program will be assessed an additional charge of \$512.85 per semester credit hour to defray UTSA's loss of formula funding revenue from the state. Students with questions or who wish to appeal this policy due to extenuating circumstances should contact their advising center. Please refer to "Undergraduate Credit Limitation" in General Academic Regulations.
Undergraduate Credit Limitation Charge - 30-Hour Limitation	CL30	\$512.85	Credit Hour	Effective Fall 2006, all new undergraduate resident students will be assessed the higher tuition rate of \$512.85 per semester credit hour for hours attempted in excess of 30 semester credit hours above those required for completion of a degree to defray UTSA's loss of formula funding revenue from the state. Students with questions or who wish to appeal this policy due to extenuating circumstances should contact their advising center. Please refer to "Undergraduate Credit Limitation" in General Academic Regulations.
Doctoral Credit Limitation Charges	CL99	\$997.10	Credit Hour	Doctoral students who enroll in courses in excess of 99 semester credit hours of doctoral work will be assessed an additional charge of \$997.10 per semester credit hour to defray UTSA's loss of formula funding revenue from the state
UTSA Card Replacement Charge	YIR1	\$10		This charge is assessed for replacement of a lost and/or stolen student identification card.
Writing Materials Fee	LB01/ WRC1	\$5	Course	This fee is assessed for composition courses.

# INDEX

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## A

Additional Course Fees .....	392
Admission to Candidacy .....	13

## C

Carlos Alvarez College of Business .....	16
Certificate Programs .....	4
College for Health, Community and Policy .....	209
College of Education and Human Development .....	70
College of Liberal and Fine Arts .....	251
College of Sciences .....	305
Completing the Degree (doctoral) .....	14

## D

Degree Requirements (master's) .....	6
Degree Requirements (doctoral) .....	11
Department of Philosophy and Classics .....	287
Department of Accounting .....	24
Department of Anthropology .....	252
Department of Art and Art History .....	260
Department of Bicultural-Bilingual Studies .....	71
Department of Biomedical Engineering and Chemical Engineering .....	136
Department of Chemistry .....	305
Department of Communication .....	264
Department of Computer Science .....	311
Department of Counseling .....	82
Department of Criminology and Criminal Justice .....	214
Department of Demography .....	217
Department of Earth and Planetary Sciences .....	318
Department of Economics .....	30
Department of Educational Leadership and Policy Studies .....	91
Department of Educational Psychology .....	101
Department of Electrical and Computer Engineering .....	150
Department of English .....	267
Department of Finance .....	34
Department of History .....	273
Department of Information Systems and Cyber Security .....	40
Department of Integrative Biology .....	326
Department of Interdisciplinary Learning and Teaching .....	116
Department of Kinesiology .....	226
Department of Management .....	52
Department of Management Science and Statistics .....	56

Department of Marketing .....	65
Department of Mathematics .....	339
Department of Mechanical Engineering .....	168
Department of Modern Languages and Literatures .....	277
Department of Molecular Microbiology and Immunology .....	344
Department of Music .....	281
Department of Neuroscience, Developmental and Regenerative Biology .....	349
Department of Physics and Astronomy .....	355
Department of Political Science and Geography .....	290
Department of Psychology .....	226
Department of Public Administration .....	232
Department of Public Health .....	237
Department of Race, Ethnicity, Gender, and Sexuality Studies .....	134
Department of Social Work .....	241
Department of Sociology .....	246
Doctoral Degree Regulations .....	11

## G

Graduate Catalog .....	2
Graduate Faculty .....	368
Graduate Program Committee Requirements .....	13

## I

Introduction .....	3
--------------------	---

## K

Klesse College of Engineering and Integrated Design .....	136
---	-----

## M

Master's Degree Regulations .....	6
-----------------------------------	---

## S

School of Architecture and Planning .....	178
School of Civil and Environmental Engineering, and Construction Management .....	191

## T

Transfer of Credit (master's) .....	8
Transfer of Credit (doctoral) .....	12

## U

University College .....	362
--------------------------	-----