UNIVERSITY COLLEGE

University College offers the Master of Science degree in Artificial Intelligence, Master of Arts degree in Multidisciplinary Studies, Master of Science degree in Multidisciplinary Studies, the Doctor of Philosophy degree in Translational Science, and the Graduate Certificate in Data Science

- M.S. in Artificial Intelligence (p. 1)
- M.A. in Multidisciplinary Studies (p. 3)
- M.S. in Multidisciplinary Studies (p. 4)
- Ph.D. in Translational Science (p. 4)

Master of Science Degree 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.

Code	Title	Credit Hours
A. Required Core Courses		**9**
CS 5233	Artificial Intelligence	
or EE 5663	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	
EE 5993	AI Practicum	
or CS 5893	AI Practicum	
or STA 5893	AI Practicum	
B. Prescribed Electives (a set of five courses in the chosen concentration)		**15**
Analytics Concentration		
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 6003	Statistical Methods in Research and Practice	
STA 6033	SAS Programming and Data Management	
STA 6233	R Programming for Data Science	
STA 6443	Statistical Modeling	
STA 6543	Predictive Modeling	
CS/EE	Elective	
Computer Science Concentration		
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 (Topic: Parallel and Distributed Machine Learning)	
CS 5483	Topics in Data Science (Topic: Brain Inspired AI)	

CS 5593	Multi-Agent Systems	
CS 5813	Cognitive Neuroscience Inspired Machine Learning	
CS 5823	Trust, Confidence and Explainability in Artificial Intelligence	
CS 6263	Natural Language Processing	
CS 6283	Deep Learning	
CS 6313	Deep Reinforcement Learning	
CS 6383	Quantum 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	
Intelligent and Autonomous Systems Concentration		
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)	
C. Thesis		**6**
A minimum of 6 semester credit hours are needed. Students must enroll in the Thesis section belonging to their concentration.		
CS 6983	Master's Thesis	
EE 6983	Master's Thesis	
STA 6983	Master's Thesis	
Total Credit Hours		**30**

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.

Code	Title	Credit Hours
A. Required Core Courses		**9**
CS 5233	Artificial Intelligence	
or EE 5663	Artificial Intelligence	
EE 5263	Topics in Digital Signal Processing and Digital Filtering (Top: Intro to Machine Learning)	
or CS 6243	Machine Learning	
or STA 6923	Introduction to Statistical Learning	
EE 5993	AI Practicum	
or CS 5893	AI Practicum	
or STA 5893	AI Practicum	
B. Prescribed Electives (a set of five courses in the chosen concentration)		**15**
Analytics Concentration		
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 6813	Data Analytics Applications	
CS/EE	Elective	
Computer Science Concentration		
Section 1: Select three to five courses from the following:		
CS 5243	Computer Vision	
CS 5483	Topics in Data Science (Topic: Brain Inspired AI)	
CS 5593	Multi-Agent Systems	
CS 5813	Cognitive Neuroscience Inspired Machine Learning	

CS 5823	Trust, Confidence and Explainability in Artificial Intelligence
CS 6263	Natural Language Processing
CS 6283	Deep Learning
CS 6313	Deep Reinforcement Learning
CS 6383	Quantum Machine Learning
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
Intelligent and Autonomous Systems Concentration	
Additional electives may be chosen from other 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)

C. Non-Thesis: 6 hours of electives from inside or outside concentration with advisor approval.	**6**
Total Credit Hours	**30**

Master of Arts Degree in Multidisciplinary Studies

The Master of Arts (M.A.) in Multidisciplinary Studies (MDS) is a professional degree that can enhance career path development and help students develop specific marketable skills needed to advance their careers. One additional benefit to the multidisciplinary nature of the M.A. in MDS is that it can help eliminate the barriers encountered with traditional M.A. programs that restrict students to one area of expertise. This stackable certificate program prepares students with fundamental and advanced knowledge and skills for the workforce.

MDS students will design a degree plan that builds on personal interests, academic strengths, and career opportunities. The degree plan pairs graduate certificates in two academic disciplines that enrich the students' marketable skills. At least one of the graduate certificates must be outside the science field to qualify for the M.A. degree. (https://future.utsa.edu/programs/master/multidisciplinary-studies/) Otherwise, please see the information below on the Master of Science in Multidisciplinary Studies program.

The M.A. in Multidisciplinary Studiesis also offered in a 100 percent online format.

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 the fields related to the certificate programs of interest.
- 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.
- A current résumé with employment or other experience.

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 Admissions Committee.

Degree Requirements

To earn the non-thesis M.A. in Multidisciplinary Studies Degree, students must complete 30 semester credit hours. Students should complete two certificate programs as prescribed. No more than 3 semester credit hours of independent study should be included. Depending on the selected certificate pairing, 3 to 6 semester credit hours of graduate-level courses that align with the certificates may be taken as approved by the Graduate Advisor of Record. To satisfy the comprehensive examination requirement, candidates for the M.A. in Multidisciplinary Studies will be required to complete a course designated from one of the concentrations selected (certificate areas) or MDS 5003 (p. 7)

Capstone for Multidisciplinary Studies (p. 7) with a grade of “B” (3.0) or better.

Master of Science Degree in Multidisciplinary Studies

The Master of Science (M.S) in Multidisciplinary Studies (MDS) is a professional degree that prepares students with a diverse academic background, including science, technology, engineering, mathematics, health, and social science to combine their knowledge into one career, including consulting, system engineering, information system management, and data analyst. This professional degree program is designed to prepare graduate students across multiple disciplines with fundamental science, health, and engineering knowledge and skills for the workforce.

MDS students will design a degree plan that builds on personal interests, academic strengths, and career opportunities. The degree plan pairs graduate certificates in two academic disciplines that enrich the students’ marketable skills. At least one of the graduate certificates must be within the science field to qualify for the M.S. degree. (https://future.utsa.edu/programs/master/multidisciplinary-studies/) Otherwise, please see the information above on the Master of Arts in Multidisciplinary Studies program.

The M.S. in Multidisciplinary Studiesis also offered in a 100 percent online format.

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 the fields related to the certificate programs of interest.
- 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.
- A current résumé with employment or other experience.

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 Admissions Committee.

Degree Requirements

To earn the non-thesis M.S. in Multidisciplinary Studies Degree, students must complete 30 semester credit hours. Students should complete two certificate programs as prescribed. No more than 3 semester credit hours of independent study should be included. Depending on the selected certificate pairing, 3 to 6 semester credit hours of graduate-level courses that align with the certificates may be taken as approved by the Graduate Advisor of Record. To satisfy the comprehensive examination requirement, candidates for the M.S. in Multidisciplinary Studies will be required to complete a course designated from one of the concentrations selected (certificate areas) or MDS 5003 (p. 7)Capstone for Multidisciplinary Studies with a grade of “B” (3.0) or better.

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 program is designed to use the existing resources and expertise in specific key areas of each university to offer a strong, diverse, and competitive Translational Science Ph.D. program. The TS Ph.D. will prepare the next generation of scientists to lead the multidisciplinary biomedical research teams of the future in increasingly complex research environments. 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 an 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) iBT score, with a score of at least an 84, 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.
3. Official documentation of the Graduate Record Examination (GRE), or an equivalent, is not required. However, should an applicant submit the GRE score, it will be considered along with the other admission criteria, but will not be used as the sole criterion when making admission decisions. Scores for GRE tests taken more than five years prior to the date of application are not valid and should not be part of the application.

4. A personal statement (1–3 pages) that describes the applicant's past training and experience, future career goals and objectives, scientific research interest, and how the TS Ph.D. program will prepare them to achieve their stated research interest and career goals. The Personal Statement should include but is not limited to:
    - A statement of the applicant's background and purpose for applying to the TS Ph.D. program.
    - Applicant's interest in and commitment to a translational science career.
    - Applicant's potential to develop into a successful scientist, as evidenced by research training/experience, prior publications, etc.
    - Research interest and its applicability to the TS Ph.D. program.
    - Identification of a potential Supervising Professor, if applicable.
    - and Career goals and how the TS Ph.D. program will contribute to their attainment.
5. Recommendation Forms and letters of recommendation from three (3) faculty or other individuals who are familiar with and can provide information about the applicant's academic, research, and/or professional abilities and performance, in addition to the applicant's potential to succeed in a doctoral program and develop into an independent research investigator.
6. A current Curriculum Vitae.
7. A copy of the applicant's U.S. medical or other health professional license or certificate, if applicable.

Full-time students accepted for the program are eligible to apply for financial support in the form of competitive teaching assistantships, research assistantships, or research fellowships.

Applications must be submitted online (http://gsbs.uthscsa.edu/prospective_students/gsbs-application/). A complete application includes the application form, official transcripts, 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. 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. The Translational Science Ph.D. Program also offers a Data Science track defined as 12 semester credit hours, which are counted towards the 72 hours of graduate coursework required to complete the program. Students will work with a graduate advisor or the supervising professor to complete an individualized degree plan that will meet the student's research interests 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 the 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 (https://www.uthscsa.edu/academics/biomedical-sciences/programs/translational-science-phd/)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 (http://catalog.uthscsa.edu/biomedicalsciences/translationalscience/phd/#admissionsrequirementstext) and UT Health Handbook (https://www.uthscsa.edu/academics/biomedical-sciences/programs/translational-science-phd/)for further information on program requirements.

Code	Title	Credit Hours
A. Core Curriculum (24 semester credit hours required):		**24**
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. Electives (18 semester hours required):		**18**
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.		
C. A minimum of 30 hours combined of Doctoral Research and Dissertation hours are required.		**30**
Total Credit Hours		**72**

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 an 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 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
A. Required Courses (15 semester credit hours)		15
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	
Total Credit Hours		**15**

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.
Prerequisite: STA 6003, DS 5003, and DS 5013, or the equivalents. 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. Course fee: LRDS $37.50.

DS 5033. Data Mining and Machine Learning. (3-0) 3 Credit Hours.
Prerequisite: STA 6003 and completion of or concurrent enrollment in DS 5023. 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.

Multidisciplinary Studies (MDS) Courses

MDS 5003. Capstone for Multidisciplinary Studies. (3-0) 3 Credit Hours.
Prerequisite: Graduate standing and permission in writing (form available) of the instructor and the Graduate Advisor of Record. This is a project-based course in which students collaborate on projects spanning various specialization areas. It serves as a pivotal opportunity for students to integrate their academic knowledge into practical, real-world applications and cultivate the essential skills needed to collaborate effectively across disciplines. Through engaging in hands-on projects, students deepen their understanding of course content and develop invaluable teamwork, problem-solving, and communication skills essential for success in diverse professional settings. Course Fee: LRMS $12.50.

MDS 6941. Internship. (0-0) 1 Credit Hour.
Prerequisite: Consent of Graduate Advisor of Record. Supervised experience, relevant to the student's program of study, within selected organizations and agencies. May be repeated for credit but not more than 6 hours will apply to the Master's degree. Course Fee: LRMS $12.50.

MDS 6943. Internship. (0-0) 3 Credit Hours.
Prerequisite: Consent of Graduate Advisor of Record. Supervised experience, relevant to the student's program of study, within selected organizations and agencies. May be repeated for credit but not more than 6 hours will apply to the Master's degree. Course Fee: LRMS $12.50.

MDS 6951. Independent Study. (0-0) 1 Credit Hour.
Prerequisite: 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. Course Fee: LRMS $12.50.

MDS 6953. Independent Study. (0-0) 3 Credit Hours.
Prerequisite: 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. Course Fee: LRMS $12.50.

MDS 6971. Special Topics. (1-0) 1 Credit Hour.
Prerequisite: Consent of instructor. An organized course offering the opportunity for specialized study not normally or not often available as part of the regular course offerings. Special Topics courses may be repeated for credit when topics vary, but no more than 6 hours, regardless of discipline, will apply to the degree. Course Fee: LRMS $12.50.

MDS 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 topics vary, but no more than 6 hours, regardless of discipline, will apply to the degree. Course Fee: LRMS $12.50.