

Earth and Environmental Sciences - Graduate Programs

Program Objectives

The **MS in Earth and Environmental Sciences** has four options: an Environmental Science Option; a Geoscience Option; a Professional Environmental Science Option; and a Petroleum Geoscience Option.

The Environmental Science Option provides graduate students with an integrated, multidisciplinary education, requiring a breadth of understanding and mastery of a spectrum of scientific and engineering principles. The thesis option, designed for those interested in an in-depth experience in some particular topic, and a non-thesis option are available. All new students are admitted into the non-thesis option. During the first year, students may transfer to the thesis option after obtaining a faculty thesis supervisor. A thesis supervisor is not guaranteed.

The Geoscience Option is a two year program with specializations in stratigraphy, petrology, paleontology, sedimentology, structural geology, Geomechanics, plate tectonics, computer modeling, hydrology, geochemistry and paleoclimatology. Students in this program are prepared for additional graduate work at the PhD level, or for positions in industry and government. Thesis or non thesis options are available. However, all new students are admitted into the non-thesis option. During the first year, students may transfer to the thesis option after obtaining a faculty thesis supervisor. A thesis supervisor is not guaranteed.

The Environmental Science Professional Option is a Professional Master's Degree for those interested in a career in Environmental Science. Instead of a thesis, students participate in a mentoring program, take a course in project economics, work as an intern or in a part time job in the Environmental Science Profession, and course experiences involving business ethics, teamwork, a small research project, and communication. This is a non thesis program.

The Petroleum Geoscience Professional Option is a Professional Masters Degree for those interested in a career in the Petroleum Industry. In addition to core geology courses, students are required to participate in a networking program with industry professionals, work as an intern or in a part time job in petroleum geoscience, take a course in project economics, and participate in course activities that emphasize business ethics, teamwork and communications. A thesis research project is required. All students are initially admitted to the Geoscience non-thesis option. During the first year, students may transfer to the Petroleum Geoscience option after obtaining a faculty thesis supervisor. A thesis supervisor is not guaranteed.

The PhD in Earth and Environmental Sciences. The program leading to the Doctor of Philosophy degree in Earth and Environmental Sciences is designed primarily to prepare doctoral-level students for research careers in industry, government or academic institutions. Students carry out independent research and acquire practical knowledge of the type of research conducted and the constraints (both practical and philosophical) under which such research is conducted. The areas of research are interdisciplinary using the Earth's environment, interpreted broadly, as the theme. Research normally comes from the disciplines of Geoscience, Biology, Chemistry and Engineering, but contributions from other disciplines are welcome. The program is designed to provide graduate students an integrated, multidisciplinary education, requiring a breadth of understanding and mastery of a spectrum of scientific and engineering principles. Among the goals is to provide students who have earned engineering or science undergraduate degrees a common ground for interdisciplinary communication, an understanding of the environment, and competence in a research area that will enable them to evaluate complex environmental problems.

Admission

Students applying for MS or PhD degrees should apply to the Graduate School for regular admission to a particular degree program at <http://www.uta.edu/admissions/graduate/index.php>. (<http://www.uta.edu/admissions/graduate/>)

CATEGORIES OF ADMISSION

Unconditional - all the admission criteria are met and there are no conditions placed on continued enrollment in the program.

Probationary - Applicants who do not meet the standards for unconditional admission may be considered for probationary admission after careful examination of their application materials. Probationary admission normally requires that the applicant receive a B or better in their first 12 hours of graduate coursework at UT Arlington, and/or make up undergraduate deficiencies.

Deferred and Provisional Admission - A deferred admission may be granted when an application is incomplete or when a denied decision is not appropriate. An applicant unable to supply all required documentation prior to the admission deadline but whom otherwise appears to meet admission requirements may be granted provisional admission.

INTERNATIONAL STUDENTS

An applicant whose native language is not English must demonstrate a sufficient level of skill with the English language to assure success in graduate studies. Applicants must submit a score of at least 550 on the paper-based TOEFL, a score of at least 213 on the computer-based TOEFL, a minimum

score of 40 on the TSE, a minimum score of 6.5 on the IELTS, or a minimum TOEFL iBT total score of 79 with sectional scores that meet or exceed 22 for the writing section, 21 for the speaking section, 20 for the reading section, and 16 for the listening section to.

An applicant holding either a bachelor's or a master's degree from a regionally accredited U.S. college or university is not required to submit a TOEFL, TOEFL iBT, TSE or IELTS score for admission purposes. Any other waivers of the score requirements must be recommended by the applicant's Graduate Advisor and approved by the Dean of Graduate Studies.

FINANCIAL AID

Students that are unconditionally admitted into the MS or PhD programs can also apply for available scholarships and/or Graduate Teaching Assistantships. Award of scholarships or Assistantships will be based on consideration of the same criteria utilized in admission decisions. To be eligible, candidates must have a GPA of 3.0 in their last 60 undergraduate credit hours plus any graduate credit hours as calculated by the Graduate School, and must be enrolled in a minimum of 9 hours of coursework in both long semesters to retain their Financial Aid. To be eligible for a Graduate Teaching Assistantship, a non-native English speaker must receive a TOEFL iBT score of at least 23, or an IELTS score of at least 7 on the speaking section of those exams. Applications for Scholarships or Teaching Assistantships must be submitted over the internet at <https://uta.academicworks.com/>. (<https://uta.academicworks.com/>) Deadline is March 1st for the following academic year starting in August.

DENIAL OF ADMISSION

A candidate may be denied admission if they have less than satisfactory performance on a majority of the admission criteria described above.

Earth and Environmental Sciences Master's Program Admissions

For unconditional admission a student must meet the following requirements:

For the Environmental Science Options: A B.S. degree in biology, chemistry, geoscience, mathematics, or engineering with the following courses or their equivalent: 1 semester of introductory physics for science majors; 2 semesters of introductory chemistry for science majors; and Calculus I and II. Students with a Bachelor's Degree in other sciences will also be considered, subject to satisfactory completion of deficiency courses.

For the Geoscience Options: A B.S. degree in an Earth Science discipline with the following courses or their equivalent: Mineralogy, Petrology, Structure, Stratigraphy/sedimentology, Field Geology and Geophysics or Paleontology. In addition, one semester of Biology, Calculus I and II, and a year of Chemistry and Physics is required.

For all Options:

- A minimum undergraduate GPA of 3.0 on a 4.0 scale, as calculated by the Graduate School.
- Graduate Record Examination (GRE) scores are used in conjunction with GPA's. For example a person with a GPA below 3.0 will need a GRE score better than average. Masters students who have succeeded in the Earth and Environmental Sciences Program typically score higher than the 60th Percentile on the verbal and quantitative portion of the GRE.
- An applicant whose native language is not English must submit a score of at least 550 on the paper-based TOEFL, a score of at least 213 on the computer-based TOEFL, a minimum score of 40 on the TSE, a minimum score of 6.5 on the IELTS, or a minimum TOEFL iBT total score of 79 with sectional scores that meet or exceed 22 for the writing section, 21 for the speaking section, 20 for the reading section, and 16 for the listening section. However, an applicant whose native language is not English with a bachelor's or a master's degree from a regionally accredited U.S. college or university is not required to submit a TOEFL, TOEFL iBT, TSE or IELTS score for admission purposes.
- Favorable letters of recommendation from people familiar with the applicant's academic work.

Master's Degree Requirements

EARTH AND ENVIRONMENTAL SCIENCES MASTER'S DEGREE

There are additional requirements for all Master's programs listed in this CATALOG under University Requirements and Policies.

Environmental Science Thesis Option

Core Courses

General core courses		7
EVSE 5303	SUSTAINABILITY ISSUES SEMINAR III	
EVSE 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	
Select one of the following engineering courses		3
CE 5321	ENGINEERING FOR ENVIRONMENTAL SCIENTISTS	
CE 5319	PHYSICAL-CHEMICAL PROCESSES II	
or CE 5328	FUNDAMENTALS OF AIR POLLUTION	
Select one of the following science courses		3
EVSE 5309	ENVIRONMENTAL SYSTEMS-BIOLOGICAL ASPECTS ¹	

EVSE 5310	ENVIRONMENTAL SYSTEMS-CHEMICAL ASPECTS ¹	
EVSE 5311	ENVIRONMENTAL SYSTEMS-GEOLOGICAL ASPECTS ¹	
Select one of the following in City, or Regional Planning:		3
PLAN 5342	ENVIRONMENTAL POLICY	
PLAN 5343	FOUNDATIONS OF ENVIRONMENTAL POLICY	
PLAN 5351	TECHNIQUES OF ENVIRONMENTAL ASSESSMENT	
Electives within one of the following departments: Biology, Chemistry, Earth and Environmental Sciences, Civil and Environmental Engineering, or Urban and Public Affairs		6
Two semesters of GEOL 5199 or EVSE 5199 - Seminar		2
EVSE 5698	THESIS	6
Total Hours		30

¹ Students with less than 20 undergraduate hours in biology, chemistry, or geology will need to take a third environmental systems course as a deficiency. Students entering with a BS degree in one of these areas must take their two courses in the other areas.

Environmental Science Non-Thesis Option

Core Courses

General core courses		7
EVSE 5303	SUSTAINABILITY ISSUES SEMINAR III	
EVSE 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	
Select one of the following engineering courses		3
CE 5321	ENGINEERING FOR ENVIRONMENTAL SCIENTISTS	
CE 5319	PHYSICAL-CHEMICAL PROCESSES II	
or CE 5328	FUNDAMENTALS OF AIR POLLUTION	
Select one of the following in science:		3
EVSE 5309	ENVIRONMENTAL SYSTEMS-BIOLOGICAL ASPECTS ¹	
EVSE 5313	ENVIRONMENTAL REGULATION OF CHEMICAL HAZARDS ¹	
EVSE 5311	ENVIRONMENTAL SYSTEMS-GEOLOGICAL ASPECTS ¹	
Select one of the following in City and Regional Planning		3
PLAN 5305	LAND USE, MANAGEMENT AND DEVELOPMENT	
PLAN 5316	LAND USE PLANNING AND THE LAW	
PLAN 5352	ENVIRONMENT ASSESSMENT POLICY & PRACTICE	
Electives within one of the following departments: Biology, Chemistry, Earth and Environmental Sciences, Civil and Environmental Engineering, or Urban and Public Affairs		9
EVSE Seminar		2
Two semesters of GEOL 5199 or EVSE 5199		
EVSE 5395	MASTER'S PROJECT	3
Successful completion of the Master's Comprehensive Examination in the final semester		
Total Hours		30

¹ Students with less than 20 undergraduate hours in biology, chemistry, or geology will need to take a third environmental systems course as a deficiency. Students entering with a BS degree in one of these areas must take their two courses in the other areas.

² Must include at least 6 hours in department(s) outside that in which the first 9 hours of electives are taken.

The Geoscience Thesis Option

Core Courses

GEOL 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	4
Select one of the following in engineering (or advisor approved):		3
CE 5321	ENGINEERING FOR ENVIRONMENTAL SCIENTISTS	
IE 5304	ADVANCED ENGINEERING ECONOMY	
take two hours in the following seminar:		2
GEOL 5199	TECHNICAL SESSIONS	

Advisor Approved Electives		15
GEOL 5698	THESIS	6
Total Hours		30

The Geoscience Non-Thesis Option

Core Courses

GEOL 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	4
Select one of the following in engineering (or advisor approved):		3
CE 5321	ENGINEERING FOR ENVIRONMENTAL SCIENTISTS	
IE 5304	ADVANCED ENGINEERING ECONOMY	
take two hours in the following seminar:		2
GEOL 5199	TECHNICAL SESSIONS	
Advisor Approved Electives		18
GEOL 5395	MASTER'S PROJECT	3
Total Hours		30

Environmental Science Professional Option

EVSE 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	4
Select one of the following Engineering Courses		3
CE 5321	ENGINEERING FOR ENVIRONMENTAL SCIENTISTS	
IE 5304	ADVANCED ENGINEERING ECONOMY	
Select one of the following in science:		3
EVSE 5309	ENVIRONMENTAL SYSTEMS-BIOLOGICAL ASPECTS ¹	
EVSE 5311	ENVIRONMENTAL SYSTEMS-GEOLOGICAL ASPECTS ¹	
EVSE 5313	ENVIRONMENTAL REGULATION OF CHEMICAL HAZARDS ¹	
Select one of the following in City and Regional Planning:		3
PLAN 5305	LAND USE, MANAGEMENT AND DEVELOPMENT	
PLAN 5316	LAND USE PLANNING AND THE LAW	
PLAN 5352	ENVIRONMENT ASSESSMENT POLICY & PRACTICE	
Professional Courses		
Take each of the following courses:		
EVSE 5120	ENVIRONMENTAL PROFESSIONAL MENTORING & BUSINESS ETHICS	1
EVSE 5199	SEMINAR IN ENVIRONMENTAL & EARTH SCIENCES	1
EVSE 5115	PROFESSIONAL EXPERIENCE	1
or EVSE 6197	RESEARCH IN ENVIRONMENTAL & EARTH SCIENCES	
EVSE 5395	MASTER'S PROJECT	3
Other Electives		
Electives within one of the following departments: Biology, Chemistry, Earth and Environmental Sciences, Civil and Environmental Engineering, or Urban and Public Affairs		11
Successful completion of the Master's Comprehensive Examination in final semester.		
Total Hours		30

¹ Students with less than 20 undergraduate hours in biology, chemistry, or geology will need to take a third environmental systems course as a deficiency. Students entering with a BS degree in one of these areas must take their two courses in the other areas.

Energy Geoscience Professional Option

Professional Courses		8
GEOL 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	
GEOL 5351	ENERGY RESOURCES FOR GEOSCIENTISTS	
GEOL 5190	GEOSCIENCE INTERNSHIP	
or GEOL 5199	TECHNICAL SESSIONS	
Electives within one of the following departments: Biology, Chemistry, Earth and Environmental Sciences, Civil and Environmental Engineering		19

GEOL 5395	MASTER'S PROJECT	3
Total Hours		30

Dual Degree Program

Dual master's degrees can be arranged with any suitable program. By participating in a dual degree program, students may apply 6-18 total semester credit hours jointly to meet the requirements of both degrees, thus reducing the total number of hours which would be required to earn both degrees separately. The number of hours which may be jointly applied ranges from six to 18, subject to the approval of Graduate Advisors from both programs. Degree plans, thesis or professional report proposals and programs of work must be approved by Graduate Advisors from both programs. The successful candidate will be awarded both degrees rather than one joint degree.

To participate in the dual degree program, students must make separate application to each program and must submit a separate program of work for each degree. Those interested in the dual degree program should consult the appropriate Graduate Advisors for further information on course requirements. See also the statement on Dual Degree Programs in the general information section of this catalog.

Arrangements to offer a dual degree have already been made between Earth and Environmental Sciences and the Program in City and Regional Planning (M.C.R.P. degree), School of Urban and Public Affairs.

Admission Requirements

For unconditional admission a student must meet the following requirements:

- A Masters Degree or at least 30 hours of graduate coursework in environmental science, biology, chemistry, geology, mathematics or engineering. Students with a Bachelor's degree in environmental science, geosciences, biology, chemistry, mathematics, or engineering will be considered for the B.S. to Ph.D. track if they meet the other requirements for admission to doctoral studies. Students with a Bachelor's Degree in other sciences will also be considered, subject to satisfactory completion of courses to make up deficiencies.
- A strong quantitative background including courses in differential and integral calculus (i.e., Calculus I and II). Students that have not taken these courses will be expected to complete them during their first year of residence.
- A minimum graduate coursework GPA of 3.0 on a 4.0 scale, as calculated by the Graduate School.
- Graduate Record Examination (GRE) scores are considered in admission decisions. Doctoral students who have succeeded in the Earth and Environmental Sciences Program typically score higher than the 60th percentile the verbal and the quantitative portion of the GRE.
- For applicants whose native language is not English, a minimum score of 550 on the Test of English as a Foreign Language (or an equivalent score on a computer-based test) or a score of 40 on the Test of Spoken English.
- Favorable letters of recommendation from people familiar with the applicant's academic work and/or professional work.
- A statement must be submitted to the program detailing the applicant's specific research interests and identifying the faculty member who is requested as supervisor of the dissertation research.
- Students may be considered for unconditional admission if further review of their transcripts, recommendation letters, correspondence or direct interactions with Earth and Environmental Sciences faculty, and statement of research interests indicates that they are qualified to enter the Doctoral Program.

Doctoral Degree Requirements

EARTH AND ENVIRONMENTAL SCIENCES DOCTORAL DEGREE

The Doctoral Program provides students with the interdisciplinary knowledge and skills to conduct independent research in Earth and Environmental Sciences. Students conduct dissertation research under the supervision of a faculty member in one of the participating departments (Biology, Chemistry, Earth and Environmental Sciences, Civil and Environmental Engineering, or Urban and Public Affairs). The supervising professor and a faculty committee assign courses in this primary area of emphasis to support the student's research and professional goals. To provide interdisciplinary training, additional courses are assigned in a secondary area of emphasis.

If they have not already done so in their previous work, all Doctoral students must take following courses:

EVSE 5303	SUSTAINABILITY ISSUES SEMINAR III	3
EVSE 5454	STATISTICS FOR EARTH AND ENVIRONMENTAL SCIENTISTS	4
Select one of the following engineering courses		3
CE 5321	ENGINEERING FOR ENVIRONMENTAL SCIENTISTS	
CE 5319	PHYSICAL-CHEMICAL PROCESSES II	
or CE 5328	FUNDAMENTALS OF AIR POLLUTION	
Select one of the following science courses		3
EVSE 5309	ENVIRONMENTAL SYSTEMS-BIOLOGICAL ASPECTS	
EVSE 5310	ENVIRONMENTAL SYSTEMS-CHEMICAL ASPECTS	

EVSE 5311	ENVIRONMENTAL SYSTEMS-GEOLOGICAL ASPECTS	
Select one of the following in City, or Regional Planning:		3
PLAN 5342	ENVIRONMENTAL POLICY	
PLAN 5343	FOUNDATIONS OF ENVIRONMENTAL POLICY	
PLAN 5351	TECHNIQUES OF ENVIRONMENTAL ASSESSMENT	
Two semesters of		2
EVSE 5199	SEMINAR IN ENVIRONMENTAL & EARTH SCIENCES	
or GEOL 5199	TECHNICAL SESSIONS	

Students who enter the Doctoral Program with a Master's degree in a science or engineering field, or with 30 semester hours of graduate coursework, take a Diagnostic Examination In the first year of residence to evaluate this previous work. The student's supervising committee must approve all courses taken to meet degree requirements.

Students who enter the Doctoral Program with a Bachelor's degree take 30 semester hours of graduate coursework that includes Engineering, Science and Public Policy courses. These students are encouraged to take the diagnostic exam in their first year of enrollment. The student's supervising committee must approve all courses taken to meet degree requirements.

Students may choose among any of the five participating units for their primary and secondary areas of emphasis. Course selection within these areas of emphasis is guided by the student's supervising committee and must result in a cohesive program that supports the dissertation research.

Other requirements include:

- a. Successful completion of the Diagnostic Examination at the end of the first year of residence.
- b. Successful completion of the Comprehensive Examination, an oral defense of a research proposal to be pursued for the dissertation, and a specialization examination over areas of the student's proposed research.
- c. Demonstration of proficiency in one foreign language or a research tool such as advanced computer skills, statistics, or operations research.
- d. Successful defense of the dissertation and acceptance of the dissertation by the supervising committee.