FAST TRACK ENVIRONMENTAL SCIENCE, BS AND ENVIRONMENTAL SCIENCE, MS

Program Description

The university allows the opportunity for high-achieving students to count a select number of graduate credits toward their undergraduate degree and thereby obtain a graduate degree at an accelerated pace. Students interested in the Fast Track in Environmental Science must meet the following application criteria:

- Currently seeking a BS in Environmental Science at A&M-Corpus Christi.
- Minimum of a 3.0 GPA in the last 60 SCH (and a 3.0 GPA in all science and math courses) at the time of Fast Track application.
- Classified as a Senior with successful completion of at least 90 SCH, including

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>BIOL 1406</td>
<td>Biology I</td>
<td>4</td>
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<tr>
<td>CHEM 1411</td>
<td>General Chemistry I</td>
<td>4</td>
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<tr>
<td>CHEM 1412</td>
<td>General Chemistry II</td>
<td>4</td>
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<tr>
<td>ESCI 1401</td>
<td>Environmental Science I: Intro to Environmental Science</td>
<td>4</td>
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<tr>
<td>ESCI 3202</td>
<td>Professional Skills</td>
<td>2</td>
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<tr>
<td>GEOL 1403</td>
<td>Physical Geology</td>
<td>4</td>
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<tr>
<td>MATH 1442</td>
<td>Statistics for Life</td>
<td>4</td>
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<td>or MATH 2413 Calculus I</td>
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<tr>
<td>PHYS 1401</td>
<td>General Physics I</td>
<td>4</td>
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<tr>
<td>or PHYS 2425 University Physics I</td>
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Students accepted into the Fast Track program will be given permission to enroll in up to six hours of prescribed graduate courses during their last semester of undergraduate studies. The hours for these graduate courses will “double-count” toward both the undergraduate and graduate programs. The BS and MS degrees will be awarded sequentially (i.e., upon completion of each degree) and not simultaneously. Students will be allowed to continue enrollment in the graduate program upon successful completion of the undergraduate degree.

Admissions Requirements

Applicants must provide the following at the time of application:

- A completed application form. Application fees are waived for Fast Track applicants.
- Official transcripts of all college and university coursework.
- An essay of at least 300 words describing their educational and career interests, goals, and challenges.
- Three letters of evaluation from persons knowledgeable about their potential for success in graduate studies.

- Identify a faculty member willing to serve as their graduate advisor. Applicants will not be admitted to the program without a graduate advisor.
- Official GRE scores by the time the student is reclassified to MS.

No criterion is weighted more heavily than any other criterion. Applications received or completed after the deadline for admission during one semester may be considered for admission in the following semester at the applicant’s request. Applicants will be notified of the outcome of their application by email.

Academic Preparation

Students accepted to the degree program with insufficient background in science, computer science, mathematics, or communication skills will be required to take undergraduate or graduate prerequisite courses prescribed by their advisory committees. These courses may or may not apply towards the total required for the master’s degree.

Fast Track Curriculum in the Senior Year

BS, Environmental Science students accepted in the Fast Track will have up to six hours of undergraduate elective credit replaced with six hours of graduate credit during the final semester of the senior year. A Fast Track student, in consultation with the faculty adviser, will be able to substitute six hours of undergraduate courses from BIOL, CHEM, COSC, ESCI GEOL, GISC, MATH, PHYS, or other disciplines as approved.

In place of the six hours of undergraduate courses, the student will take the following graduate courses instead:

- ESCI 5302 (sch) or ESCI 5360 (sch) or BLAW 5330 Environmental Law and Policy (3 sch)
  and
- An approved graduate elective.

See the Graduate Catalog for a complete description of the degree requirements for the MS in Environmental Science.

Courses

ESCI 1401 Environmental Science I: Intro to Environmental Science 4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
Principles of the scientific method and critical thinking provide a foundation for subsequent consideration of environmental issues through a multidisciplinary approach. Laboratory exercises and local field experiences reinforce concepts introduced in the lectures. Fall, Spring.
Co-requisite: SMTE 0096.
TCCNS: ENV 1401

ESCI 1490 Selected Topics 1-4 Semester Credit Hours (1-4 Lecture Hours) Subject materials variable. May be repeated for credit when topics are significantly different. Faculty approval required. Offered on sufficient demand.

ESCI 3202 Professional Skills 2 Semester Credit Hours (2 Lecture Hours) Presentation and discussion of selected topics relating to the professional skills of practicing environmental scientists including literature searches, reviews, paper presentation, professional and career opportunities, professional ethics. Fall, Spring.
ESCI 3351 Oceanography
3 Semester Credit Hours (3 Lecture Hours)
Methods and principles of oceanography. A survey of oceanography with emphasis placed on the physical processes affecting water and water masses of the world oceans. Fall (on sufficient demand), Spring.
Prerequisite: CHEM 1412, ESCI 1401 or GEOL 1403.

ESCI 3403 Introduction to Meteorology
4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
This course is an introduction to meteorology and the dynamics of planetary atmospheres. Emphasis on atmospheric accretion, composition, evolution, structure, and dynamics. Lab exercises cover basic measurement techniques, weather maps, and forecasting. Fall, Spring (on sufficient demand).
Co-requisite: SMTE 0096.

ESCI 3443 Environmental Biology
4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
Historical, contemporary, and projected concerns of human activities on biological aspects of ecosystem functioning.
Prerequisite: BIOL 1407.
Co-requisite: SMTE 0096.

ESCI 4130 Oil Spill Prevention and Response Lab
1 Semester Credit Hour (2 Lab Hours)
Practical techniques for control, containment, countermeasures, removal, and disposal of oil spills in an environmentally safe manner. Field exercises will include use of boats, booms and skimmers. Fall, Spring, Summer (on sufficient demand).
Prerequisite: ESCI 4230*.
* May be taken concurrently.
Co-requisite: SMTE 0096.

ESCI 4170 Hazardous Waste Operations and Emergency Response Lab
1 Semester Credit Hour (2 Lab Hours)
Practical techniques for handling, reducing, and disposing of hazardous wastes in an environmentally safe manner. Lab exercises in use of personal protective gear and safe handling of hazardous substances. Fall, Spring, Summer (on sufficient demand).
Prerequisite: ESCI 4270*.
* May be taken concurrently.
Co-requisite: SMTE 0096.

ESCI 4201 Scientific Diving Techniques
2 Semester Credit Hours (2 Lecture Hours)
Theory, science, and art of underwater diving technology and its application to scientific objectives. Course helps fulfill some training requirements of the Texas A&M University-Corpus Christi Guidelines for scientific diving.

ESCI 4202 Issues in Environmental Science
2 Semester Credit Hours (2 Lecture Hours)
Exploration of major issues in environmental science posing past, present and future challenges. Selected readings, student presentations and papers.
Prerequisite: ESCI 1401.

ESCI 4230 Oil Spill Prevention and Response Theory
2 Semester Credit Hours (2 Lecture Hours)
Historical perspective of laws and regulations governing oil spill prevention and response. Current methods for control, containment, countermeasures, removal, and disposal of oil spills in an environmentally safe manner. Fall, Spring, Summer (on sufficient demand).

ESCI 4270 Hazardous Waste Operations and Emergency Response Theory
2 Semester Credit Hours (2 Lecture Hours)
Study of the laws and regulations of hazardous waste management from an historical perspective followed by current techniques for handling, reducing, and disposing of hazardous wastes in an environmentally safe manner. Fall, Spring, Summer (on sufficient demand).

ESCI 4301 Environmental Regulations
3 Semester Credit Hours (3 Lecture Hours)
A survey of state and federal environmental laws and regulations, and their impact on the environment. Case studies of environmental issues and legislated regulations.
Prerequisite: POLS 2305 and 2306.

ESCI 4320 Environmental Health
3 Semester Credit Hours (3 Lecture Hours)
Overview of the toxicology and epidemiology of pollutants in the air, water and soil. Associations of environmental exposure with adverse health effects such as cancer, cardiovascular disease, and reproductive outcomes; also chemical markers and symptoms of disease. Pollutants studied include lead, asbestos, radiation, radon, noise, metals, halogenated hydrocarbons, aromatic hydrocarbons, silica, indoor air quality, formaldehyde, and outdoor air pollutants. Offered on sufficient demand.

ESCI 4321 Introduction to Soil and Groundwater Restoration
3 Semester Credit Hours (3 Lecture Hours)
Introduction to methods for restoring contaminated soil and groundwater by examining the factors and processes influencing the efficacy of remediation systems. An emphasis will be placed on the scientific principles upon which soil and groundwater remediation is based. Cross listed with GEOL 4321.

ESCI 4322 Introduction to Industrial Hygiene
3 Semester Credit Hours (3 Lecture Hours)
Introduction to health protection practices in the industrial environment. Health basis for OSHA laws, regulations. Sampling and testing procedures.

ESCI 4324 Introduction to Industrial Toxicology
3 Semester Credit Hours (3 Lecture Hours)
Review of human physiology, general concepts of toxicology: dose-response relationship, interactions between the host and the agents, risk assessment, to provide an introductory understanding of toxicology related to the chemicals in the workplace.

ESCI 4332 Wetlands and Water Quality
3 Semester Credit Hours (3 Lecture Hours)
Introduction to wetland ecosystems (natural, constructed and restored) with an emphasis on the role of wetlands in water quality. Topics include wetland systems, their history and role in society, relationships between biology, geology, ecology, hydrology and chemistry in wetland environments. Offered on sufficient demand.
Prerequisite: CHEM 1412 and BIOL 1406.
ESCI 4335 Climate and Climate Variability
3 Semester Credit Hours (3 Lecture Hours)
Course intended to guide environmental science majors in developing a conceptual understanding of Earth's global climate and its variability. Review of past climates, present mean state of the climate system, climate variability from seasonal to multidecadal time scales, and climate change. Special attention given to climates of the Gulf of Mexico, Caribbean Sea and surrounding land regions. Plausible climate-change scenarios, as well as mitigation and adaptation strategies are also discussed. Cross listed with ATSC 4335. Spring.
Prerequisite: (ESCI 3351 or 3403) and (PHYS 1401 or 2425).

ESCI 4340 Severe Weather
3 Semester Credit Hours (3 Lecture Hours)
Introduction to mesoscale weather systems including thunderstorms, squall lines and hurricanes, as well as the mechanisms of tornado and lighting. Methods of observing, analyzing, and predicting these severe weather systems with the interpretation of satellite and radar images will also be introduced in this class.
Prerequisite: ESCI 3403.

ESCI 4344 Air Pollution and the Clean Air Act
3 Semester Credit Hours (3 Lecture Hours)
Introduction to the chemistry and physics of air pollution and regulations. Topics include photochemistry, acid rain, air pollution meteorology and dispersion, global change, and the Clean Air Act.

ESCI 4360 Physical Oceanography
3 Semester Credit Hours (3 Lecture Hours)
Physical description of the sea, physical properties of seawater and sea ice, methods and measurements, wind-driven ocean circulation, thermohaline ocean circulation, boundary processes, waves, tides and mixing. Seasonal and interannual variability such as El Niño/Southern Oscillation phenomena. Implications for marine biology, marine geology, human impacts, other topics. Fall.
Prerequisite: PHYS 1401 or 2425.

ESCI 4365 Occupational Safety and Accident Prevention
3 Semester Credit Hours (3 Lecture Hours)
This course provides students with fundamental knowledge of regulatory requirements on occupational safety and practical techniques on accident prevention in the work environment. Offered on sufficient demand.

ESCI 4408 Environmental Microbiology
4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
Relationships between microorganisms and their biotic and abiotic environment. Current topics such as air quality (i.e., molds), water quality and bioremediation will be discussed. Laboratory will include techniques for sampling from soil, air and water. Offered on sufficient demand.
Prerequisite: BIOL 2421.
Co-requisite: SMTE 0096.

ESCI 4480 Environmental Site Assessment
4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
Interdisciplinary application of environmental regulations, risk assessment to specific examples. Knowledge of United States environmental regulations assumed; ESCI 4301 Environmental Regulations recommended.

ESCI 4490 Selected Topics
4 Semester Credit Hours (4 Lecture Hours, 4 Lab Hours)
Subject materials variable. May be repeated for credit when topics are significantly different. Faculty approval required. Offered on sufficient demand.

ESCI 4496 Directed Independent Study
1-4 Semester Credit Hours
Requires a formal proposal of study to be completed in advance of registration and to be approved by the supervising faculty, the Chairperson, and the Dean of the College. Fall, Spring, Summer.

ESCI 4498 Internship in Environmental Science
1-4 Semester Credit Hours (4 Lecture Hours)
Two to four semester hours of credit may be earned by working in an internship position in a governmental agency or industry.

ESCI 5350 Fundamentals of Physical Oceanography
3 Semester Credit Hours (3 Lecture Hours)
Principles that rule water motions and associated transport and dispersion of natural and man-made substances in the sea including a review of the mean ocean circulation and its spatial and temporal variability, observational methods, ocean circulation theories and air-sea interactions.

ESCI 5392 Thesis I: Thesis Proposal
3 Semester Credit Hours (3 Lecture Hours)
Review of the literature on a thesis topic. Completion of a written research proposal including proposed experimental design. If the thesis proposal is not completed by the end of the semester, a mark of "IP" will be awarded. An "IP" is a permanent, non-punitive grade notation. In order to receive a qualitative grade in the course, the student must enroll in and complete this course in a subsequent semester.
Prerequisite: ESCI 5392.

ESCI 5393 Thesis II: Thesis Research
3 Semester Credit Hours (3 Lecture Hours)
Collection and organization of research data and presentation of a rough draft of the thesis manuscript to the thesis advisor. May be repeated; no more than three hours may be taken per semester. If the thesis draft is not completed by the end of the semester, a mark of "IP" will be awarded. An "IP" is a permanent, non-punitive grade notation. In order to receive a qualitative grade in the course, the student must enroll in and complete this course in a subsequent semester.
Prerequisite: ESCI 5392.

ESCI 5394 Thesis III: Thesis Submission
3 Semester Credit Hours (3 Lecture Hours)
Thesis defense and completion of the thesis manuscript including acceptance of the final copy by the advisory committee. May be repeated; no more than three hours may be taken per semester. If the thesis is not completed by the end of the semester, a mark of "IP" will be awarded. An "IP" is a permanent, non-punitive grade notation. In order to receive a qualitative grade in the course, the student must enroll in and complete this course in a subsequent semester.
Prerequisite: ESCI 5392.

ESCI 5397 Directed Research
3 Semester Credit Hours (3 Lecture Hours)
Emphasis on experimental design as related to environmental science. For students selecting the professional (non-thesis) option. Only three semester hours will count towards the non-thesis degree. Requires presentation of results in a written paper and seminar. If the professional paper is not completed by the end of the semester, a mark of "IP" will be awarded. An "IP" is a permanent, non-punitive grade notation. In order to receive a qualitative grade in the course, the student must enroll in and complete this course in a subsequent semester.
Prerequisite: ESCI 5392.

ESCI 5596 Directed Independent Study
1-5 Semester Credit Hours (1-5 Lecture Hours)
DIRECTED INDEPENDENT STUDY. Study in areas of current interest. (A total of six hours of Directed Independent Study may be counted toward the MS degree.)
ESCI 5940  Project Research  
* 1-9 Semester Credit Hours  
Research related to the MS project. Requires consent of graduate advisor. Does not count as credit toward the MS degree in Environmental Science. Course is taken as credit/no credit.

ESCI 6101  Environmental Research Seminar  
* 1 Semester Credit Hour (1 Lecture Hour)  
Studies and analysis of pertinent literature. May be repeated for credit, but credit may count only once towards the degree plan.

ESCI 6130  Oil Spill Management Lab  
* 1 Semester Credit Hour (1 Lab Hour)  
Field exercises in Oil Spill Response, utilizing a Spill Management Team incorporating the elements of incident command.  
Prerequisite: ESCI 6270.  
* May be taken concurrently.  
Co-requisite: SMTE 0096.

ESCI 6170  Hazardous Waste Treatment Technologies Lab  
* 1 Semester Credit Hour (1 Lab Hour)  
Review of practical techniques for handling, reducing and disposing of hazardous wastes in an environmentally safe manner.  
Prerequisite: ESCI 6270.  
* May be taken concurrently.  
Co-requisite: SMTE 0096.

ESCI 6201  Advanced Scientific Diving Techniques  
* 2 Semester Credit Hours  
Advanced study of the theory, science, and art of underwater diving technology and its application to scientific objectives. Course helps fulfill some training requirements of the Texas A&M University-Corpus Christi guidelines for scientific diving.

ESCI 6203  Professional Skills for Scientists  
* 2 Semester Credit Hours  
Presentation and discussion of professional skills of practicing scientists including literature searches, evaluation of information sources, oral and written communication skills, lifelong learning, careers and professional opportunities.

ESCI 6230  Oil Spill Management Theory  
* 2 Semester Credit Hours (2 Lab Hours)  

ESCI 6270  Hazardous Waste Treatment Technologies Theory  
* 2 Semester Credit Hours (2 Lecture Hours)  
Review of the laws and regulations of hazardous waste management from an historical perspective followed by reports on current techniques for handling, reducing, and disposing of hazardous wastes in an environmentally safe manner.

ESCI 6302  Federal Environmental Laws and Regulations  
* 3 Semester Credit Hours (3 Lecture Hours)  
Advanced study of case histories involving the application of state and federal environmental laws and regulations. Review of permits, waste registrations, manifests, self-reporting and inspection reports.

ESCI 6310  Fundamentals of Remote Sensing  
* 3 Semester Credit Hours (3 Lecture Hours)  
Fundamental theory of satellite/airborne remote sensing techniques, sensor performance and calibration, and the scientific applications for land, ocean and atmosphere observations. Topics include physical principles of remote sensing, radiometry, sensors and sensor technology from infrared to microwave sensing, and scientific applications for land, ocean and atmosphere observations.

ESCI 6314  Biogeochemical Processes  
* 3 Semester Credit Hours  
Water and element cycling in the atmosphere, hydroosphere and geosphere. Microbial interactions and physical processes will be emphasized.  
Prerequisite: CHEM 1311, 1312 and GEOL 1403 or ESCI 1401 or 3351.

ESCI 6320  Advanced Environmental Health  
* 3 Semester Credit Hours  
Advanced study of the toxicology and epidemiology of pollutants in the air, water and soil. Associations of environmental exposure with adverse health effects such as cancer, cardiovascular disease and reproductive outcomes, also chemical markers and symptoms of disease. Pollutants studied include lead, asbestos, radiation, radon, noise, metals, halogenated hydrocarbons, aromatic hydrocarbons, silica, indoor air quality, formaldehyde, and outdoor air pollutants.

ESCI 6321  Advanced Soil and Groundwater Restoration  
* 3 Semester Credit Hours (3 Lecture Hours)  
Advanced study of methods for restoring contaminated soil and groundwater by examining the factors and processes influencing the efficacy of remediation systems. An emphasis will be placed on the scientific principles upon which soil and groundwater remediation is based.

ESCI 6322  Industrial Hygiene  
* 3 Semester Credit Hours  
Health protection practices in the industrial environment. Health basis for OSHA laws, regulations. Sampling and testing procedures.

ESCI 6324  Advanced Industrial Toxicology  
* 3 Semester Credit Hours (3 Lecture Hours)  
Advanced review of human physiology, general concepts of toxicology: dose-response relationship, interactions between the host and the agents, risk assessment, to provide a fundamental understanding of toxicology related to the chemicals in the workplace.

ESCI 6332  Advanced Wetlands and Water Quality  
* 3 Semester Credit Hours (3 Lecture Hours)  
Introduction to wetland ecosystems (natural, constructed and restored) with an emphasis on the role of wetlands in water quality. Topics include wetland systems, their history and role in society, relationships between biology, geology, ecology, hydrology and chemistry in wetland environments.  
Prerequisite: CHEM 1412 and BIOL 1406.

ESCI 6340  Ocean Resources  
* 3 Semester Credit Hours (3 Lecture Hours)  
Investigation of topics related to the discovery, distribution, and exploitation of marine resources of the ocean with a focus on the Gulf of Mexico, including the impact of resource exploitation on biological systems, and the development of marine policy.
ESCI 6345 Living with Coastal Hazards
3 Semester Credit Hours (3 Lecture Hours)
Study of how coastal processes, such as hurricanes, sea-level rise, and erosion, intersect with human activities to create hazardous conditions and how society responds to these conditions, presented through discussion, case studies, and field trips.

ESCI 6359 Ecosystem Dynamics
3 Semester Credit Hours (3 Lecture Hours)
Investigation of the interactions between organisms and physical processes that regulate marine ecosystem functions.

ESCI 6360 Coastal Management and Ocean Law
3 Semester Credit Hours (3 Lecture Hours)
The legal and policy framework associated with the coastal zone and ocean environment. Public access to coastal lands and waters, public trust, wetlands regulation; international law of the sea, fisheries law, and marine pollution.

ESCI 6365 Managing Occupational Safety and Accident Prevention
3 Semester Credit Hours (3 Lecture Hours)
This course provides students with advanced knowledge of regulatory requirements on occupational safety and practical techniques on accident prevention in the work environment.

ESCI 6380 Environmental Management Systems
3 Semester Credit Hours (3 Lecture Hours)
This course explores the systems management approach used by businesses and governments to promote environmental quality and sustainability. EMS and ISO 14001 standards go beyond minimally acceptable environmental compliance.

ESCI 6408 Environmental Microbiology
4 Semester Credit Hours (3 Lecture Hours, 3 Lab Hours)
Relationships between microorganisms and their biotic and abiotic environments. Role of microorganisms in biogeochemical cycling. Methodology in microbial ecology. Biotechnological aspects.
Prerequisite: BIOL 2421.

ESCI 6416 Advanced Geochemistry
4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
Advanced study of the Earth processes using principles of chemical equilibrium, thermodynamics, isotope geochemistry and organic geochemistry. Applications of low-temperature geochemistry to geologic problems.

ESCI 6480 Environmental Site Assessment
4 Semester Credit Hours (3 Lecture Hours, 2 Lab Hours)
Interdisciplinary application of environmental regulations, risk assessment to specific examples. Knowledge of United States environmental regulations assumed; ESCI 4301 or ESCI 6203 - Professional Skills for Scientists recommended.

ESCI 6590 Advanced Topics
1-5 Semester Credit Hours (1-3 Lecture Hours, 4 Lab Hours)
Advanced study in a specific area of environmental science. May be repeated for credit when topics vary. Offered on sufficient demand.

ESCI 6596 Directed Independent Study
1-5 Semester Credit Hours (1-5 Lecture Hours)
Study in areas of current interest. (A total of six hours of Directed Independent Study may be counted toward the MS degree.)