

# ENVIRONMENTAL SCIENCE, BS

## Program Description

### Introduction

The mission of the Bachelor of Science program in Environmental Science is to educate students to succeed in their chosen careers, to transfer environmental knowledge to the community and to peers, and to provide an environmentally literate workforce and citizenry. The program is intended to provide the environmental science major with a broad foundation in the sciences and mathematics, as well as specialized knowledge in Marine and Coastal Resources, Earth System Science, Environmental Health and Monitoring, Policy and Regulations, and Science Education concentration areas. The environmental science curriculum prepares students for career positions in environmental science or science education, or for further professional development.

## Student Learning Outcomes

Students will:

- Demonstrate a command of environmental science concepts and principles at the undergraduate level.
- Analyze and interpret a variety of environmental science data, and
- Communicate environmental science information effectively at the undergraduate level, in oral and written form, with appropriate use of technology.

## Fast Track from Bachelor's to Master's Degree

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. For more information, see Fast Track Environmental Science, BS and Environmental Science, MS (<http://catalog.tamucc.edu/undergraduate/science/fast-track/fast-track-environmental-science-bs-ms/>).

## General Requirements

Students who wish to obtain a Bachelor of Science degree in Environmental Science may do so by following one of five curriculum plans referred to as concentrations. The concentration options include Earth Systems Science, Marine and Coastal Resources, Environmental Health and Monitoring, Policy and Regulations, and Science Education. A prospective 4-8 level science teacher could obtain a BS in Environmental Science while following the science education concentration. Information on the BS in Environmental Science - Science Education Concentration is found in the College of Science, Science, Mathematics and Technology Education section of the catalog. Details of the requirements for obtaining a teaching certificate are provided in the College of Education and Human Development section of this catalog.

The minimum requirement for a Bachelor of Science Degree in Environmental Science with a concentration in Earth Systems Science, Marine and Coastal Resources, Environmental Health and Monitoring, or Policy and Regulations is a total of 120 hours.

Requirements	Credit Hours
First-Year Seminars (when applicable) <sup>1</sup>	0-2
Core Curriculum Program ( <a href="http://catalog.tamucc.edu/undergraduate/university-college/programs/core-curriculum-program/">http://catalog.tamucc.edu/undergraduate/university-college/programs/core-curriculum-program/</a> )	42
Foundation Courses	16
Environmental Science Major Requirements	24
Concentration Area	27-31
Electives as needed	11-13
<b>Total Credit Hours</b>	<b>120-128</b>

<sup>1</sup>

Full-time, first time in college students are required to take the first-year seminars.

- UNIV 1101 University Seminar I (1 sch)
- UNIV 1102 University Seminar II (1 sch)

## Program Requirements

Code	Title	Hours
<b>Full-time, First-year Students</b>		
First year seminars		0-2
UNIV 1101	University Seminar I *	
UNIV 1102	University Seminar II *	
<b>Core Curriculum Program</b>		
University Core Curriculum		42
Recommended courses are: <sup>1</sup>		
ESCI 1401	Environmental Science I: Intro to Environmental Science	
BIOL 1406	Biology I	
GEOL 1403	Physical Geology	
MATH 1442	Statistics for Life <sup>*,^</sup>	
	or MATH 2413 Calculus I	
<b>Foundation Courses</b>		
No foundation courses may be taken on a pass/no pass (P/NP) basis.		
CHEM 1411	General Chemistry I *	4
CHEM 1412	General Chemistry II	4
GISC 1470	Geospatial Systems I	4
Select one of the following depending on concentration:		4
PHYS 1401	General Physics I	
PHYS 2425	University Physics I	
<b>Environmental Science Major Requirements</b>		
ESCI 3202	Professional Skills	2
ESCI 3351	Oceanography	3
ESCI 3403	Introduction to Meteorology	4
ESCI 4335	Climate and Climate Variability	3
ESCI 4498	Internship in Environmental Science <sup>2</sup>	2
ESCI 4202	Issues in Environmental Science	2
Select two of the following:		8
ESCI 3443	Environmental Biology	

GEOL 3443	Environmental Geology	
CHEM 4443	Environmental Chemistry	
<b>Concentration Area</b>		
Select one of the following Concentrations:		27-31
Earth System Science Concentration (p. 2)		
Marine and Coastal Resources Concentration (p. 2)		
Environmental Health and Monitoring Concentration (p. 3)		
Policy and Regulations Concentration (p. 3)		
Science Education Concentration (p. 4)		
<b>Electives</b>		
Select 11-13 hours of electives as needed		11-13
<b>Total Hours</b>		<b>120-128</b>

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See Core Curriculum Program. It is recommended that the Science component area courses be ESCI 1401 Environmental Science I: Intro to Environmental Science (4 sch) and BIOL 1406 Biology I (4 sch) and the component area course be GEOL 1403 Physical Geology (4 sch). It is recommended that the mathematics course be MATH 1442 Statistics for Life (4 sch) or MATH 2413 Calculus I (4 sch), depending on concentration area. Please consult your faculty mentor or academic advisor for specific details.

If these courses are not taken in the University Core, they will still need to be completed.

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The program requires a minimum of 2 hours of ESCI 4498 Internship in Environmental Science (1-4 sch) to satisfy the Major Requirements; however additional hours of credit may be applied towards the Designated Electives in a Concentration Area, with approval of the student's faculty mentor.

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Online offering

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Blended offering

## Concentration Area

Students must take a total of 27-31 semester hours in prescribed courses and electives to complete a concentration in Earth Systems Science, Marine and Coastal Resources, Environmental Health and Monitoring, or Policy and Regulations. Designated electives must be approved in writing by the student's faculty mentor. Students are strongly encouraged to consult their faculty mentor regularly.

### Earth System Science Concentration

This concentration is appropriate for students preparing for careers in earth system science, meteorology, or other fields. Students preparing for graduate school are strongly encouraged to take additional hours in consultation with their faculty mentor. Additional courses in Mathematics are strongly recommended.

In addition to the courses listed below, it is recommended that students choosing this concentration take Calculus I (MATH 2413 ([https://client-snap.dev8.leapfrog.com/tamucc/catalog.tamucc.edu/preview\\_program6d17.html?catoid=22&poiid=2827#tt1739](https://client-snap.dev8.leapfrog.com/tamucc/catalog.tamucc.edu/preview_program6d17.html?catoid=22&poiid=2827#tt1739))) as part of the University Core requirements and University Physics I (PHYS 2425 ([https://client-snap.dev8.leapfrog.com/tamucc/catalog.tamucc.edu/preview\\_program6d17.html?catoid=22&poiid=2827#tt6364](https://client-snap.dev8.leapfrog.com/tamucc/catalog.tamucc.edu/preview_program6d17.html?catoid=22&poiid=2827#tt6364))) as part of the Foundations requirements.

Code	Title	Hours
<b>Earth System Science Concentration Requirements</b>		
MATH 2414	Calculus II	4
MATH 3311	Linear Algebra	3
MATH 3342	Applied Probability and Statistics <sup>*,^</sup>	3
CHEM 3411	Organic Chemistry I	4
	or CHEM 4423 Physical Chemistry I	
<b>Designated Electives</b>		
Select 13 hours with written approval of the faculty mentor (at least 7 13 hours must be upper-level) of the following:		
BIOL 3428	Principles of Ecology	
ESCI 4360	Physical Oceanography	
MATH 2305	Discrete Mathematics I	
MATH 3315	Differential Equations	
MATH 2415	Calculus III	
GEOL 3442	Geomorphology	
GEOL 4316	Marine Geoscience	
GEOL 4411	Sedimentation and Stratigraphy	
GEOL 4444	Hydrogeology	
GISC 3421	Visualization for GIS	
	1-5 hours of approved electives	
<b>Total Hours</b>		<b>27</b>

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Online offering

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Blended offering

### Marine and Coastal Resources Concentration

This concentration is appropriate for students planning careers in marine and coastal resources research or management. Students preparing for graduate school are strongly encouraged to take additional hours in consultation with their faculty mentor.

In addition to the courses listed below, it is recommended that students choosing this concentration take either MATH 1442 Statistics for Life (4 sch) or MATH 2413 Calculus I (4 sch) as part of the University Core requirements and take either PHYS 1401 General Physics I (4 sch) or PHYS 2425 University Physics I (4 sch) as part of the Foundations requirements. MATH 2413 Calculus I (4 sch) is strongly recommended for students anticipating graduate school or research careers; also, it is a prerequisite to some of the optional courses listed below under the concentration. If MATH 1442 Statistics for Life (4 sch) is not taken, then MATH 3342 Applied Probability and Statistics (3 sch) is required from the designated elective hours.

Code	Title	Hours
<b>Marine and Coastal Resources Concentration Requirements</b>		
BIOL 1407	Biology II	4
ESCI 4301	Environmental Regulations	3
<b>Designated Electives</b>		
Select 24 hours with written approval of the faculty mentor (at least 18 hours must be upper-level) from the following:		
BIOL 2421	Microbiology	
BIOL 3428	Principles of Ecology	
BIOL 4336	Marine Ecology	

BIOL 4444	Estuarine Organisms
CHEM 3411	Organic Chemistry I
CHEM 3412	Organic Chemistry II
ESCI 4230	Oil Spill Prevention and Response Theory
ESCI 4130	Oil Spill Prevention and Response Lab
CHEM 4344	Chemical Oceanography
CHEM 4443	Environmental Chemistry
ESCI 4360	Physical Oceanography
ESCI 4498	Internship in Environmental Science
GEOL 3442	Geomorphology
GEOL 4411	Sedimentation and Stratigraphy
GEOL 4436	Introduction to Petroleum Geology
GEOL 4444	Hydrogeology
GISC 2301	Geospatial Systems II
GISC 3421	Visualization for GIS
MATH 3342	Applied Probability and Statistics <sup>*,^</sup>
PHYS 1402	General Physics II
1-5 hours of approved electives	

**Total Hours** 31

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Online offering

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Blended offering

### Environmental Health and Monitoring Concentration

This concentration is appropriate for students planning careers in environmental health, environmental assessment and remediation, and environmental management. Students preparing for graduate school are strongly encouraged to take additional hours in consultation with their faculty mentor.

In addition to the courses listed below, it is recommended that students choosing this concentration take either MATH 1442 Statistics for Life (4 sch) or MATH 2413 Calculus I (4 sch) as part of the University Core requirements and take either PHYS 1401 General Physics I (4 sch) or PHYS 2425 University Physics I (4 sch) as part of the Foundations requirements. MATH 2413 Calculus I (4 sch) is strongly recommended for students anticipating graduate school or research careers; also, it is a prerequisite to some of the optional courses listed below under the concentration. If MATH 1442 Statistics for Life (4 sch) is not taken, then MATH 3342 Applied Probability and Statistics (3 sch) is required from the designated-elective hours.

Code	Title	Hours
<b>Environmental Health and Monitoring Concentration Requirements</b>		
BIOL 1407	Biology II	4
BIOL 2421	Microbiology	4
ESCI 4301	Environmental Regulations	3
ESCI 4320	Environmental Health	3
CHEM 3411	Organic Chemistry I	4
<b>Designated Electives</b>		
Select 13 hours with written approval of the faculty mentor (at least 11 hours must be upper-level) from the following:		
BIOL 3430	Physiology	
BIOL 4408	Microbial Diversity and Ecology	

or ESCI 4408 Environmental Microbiology	
BIOL 4406	Immunology
or BIMS 4406 Immunology	
BIOL 4433	Parasitology
BIOL 4336	Marine Ecology
BIMS 4327	Introduction to Toxicology
CHEM 3412	Organic Chemistry II
CHEM 3417	Quantitative Analysis
CHEM 3418	Instrumental Analysis
ESCI 4270	Hazardous Waste Operations and Emergency Response Theory
ESCI 4170	Hazardous Waste Operations and Emergency Response Lab
ESCI 4230	Oil Spill Prevention and Response Theory
ESCI 4130	Oil Spill Prevention and Response Lab
MATH 3342	Applied Probability and Statistics <sup>*,^</sup>
1-5 hours of approved electives	

**Total Hours** 31

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Online offering

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Blended offering

### Policy and Regulations Concentration

This concentration is appropriate for students anticipating careers in environmental or natural resource regulation or environmental law. Students preparing for graduate school are strongly encouraged to take additional hours in consultation with their faculty mentor.

In addition to the courses listed below, it is recommended that students choosing this concentration take either MATH 1442 Statistics for Life (4 sch) or MATH 2413 Calculus I (4 sch) as part of the University Core requirements and take either PHYS 1401 General Physics I (4 sch) or PHYS 2425 University Physics I (4 sch) as part of the Foundations requirements. MATH 2413 Calculus I (4 sch) is strongly recommended for students anticipating graduate school or research careers; also, it is a prerequisite to some of the optional courses listed below under the concentration. If MATH 1442 Statistics for Life (4 sch) is not taken, then MATH 3342 Applied Probability and Statistics (3 sch) is required from the designated-elective hours.

Code	Title	Hours
<b>Policy and Regulations Concentration Requirements</b>		
ESCI 4301	Environmental Regulations	3
ESCI 4320	Environmental Health	3
<b>Designated Electives</b>		
Select 21 hours with written approval of the faculty mentor (at least 15 hours must be upper-level) from the following:		
BIOL 1407	Biology II	
BIOL 3428	Principles of Ecology	
ESCI 4270	Hazardous Waste Operations and Emergency Response Theory	
ESCI 4170	Hazardous Waste Operations and Emergency Response Lab	
ESCI 4230	Oil Spill Prevention and Response Theory	
ESCI 4130	Oil Spill Prevention and Response Lab	

POLS 3313	The Legislative Process	
POLS 3342	Introduction to Public Policy	
MATH 3342	Applied Probability and Statistics <sup>*,^</sup>	
6-9 hours of approved electives		
<b>Total Hours</b>		<b>27</b>

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Online offering

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Blended offering

### Science Education Concentration

Information on the Bachelor of Science Degree in Environmental Science with a science education concentration is found in the College of Science, Science, Mathematics and Technology Education (<http://catalog.tamucc.edu/undergraduate/science/teaching-certificates/science-mathematics-technology-education-teacher-certificate/>) section of the catalog.

## Course Sequencing

### Earth System Science Concentration

First Year		Hours
<b>Fall</b>		
ESCI 1401	Environmental Science I: Intro to Environmental Science	4
GEOL 1403	Physical Geology	4
ENGL 1301	Writing and Rhetoric I	3
UNIV 1101	University Seminar I	1
HIST 1301	U.S. History to 1865	3
<b>Hours</b>		<b>15</b>

<b>Spring</b>		
BIOL 1406	Biology I	4
MATH 2413	Calculus I	4
ENGL 1302	Writing and Rhetoric II	3
or COMM 1311	or Foundation of Communication	
UNIV 1102	University Seminar II	1
HIST 1302	U.S. History Since 1865	3
<b>Hours</b>		<b>15</b>

Second Year		Hours
<b>Fall</b>		
MATH 2414	Calculus II	4
CHEM 1411	General Chemistry I	4
POLS 2305	U.S. Government and Politics	3
Creative Arts Core Requirement		3
<b>Hours</b>		<b>14</b>

<b>Spring</b>		
GISC 1470	Geospatial Systems I	4
CHEM 1412	General Chemistry II	4
POLS 2306	State and Local Government	3
Language, Philosophy & Culture Core Requirement		3
<b>Hours</b>		<b>14</b>

Third Year		Hours
<b>Fall</b>		
PHYS 2425	University Physics I	4

ESCI 3202	Professional Skills	2
CHEM 3411	Organic Chemistry I	4
MATH 3342	Applied Probability and Statistics	3
Social and Behavioral Sciences Core Requirement		3
<b>Hours</b>		<b>16</b>

<b>Spring</b>		
PHYS 2426	University Physics II	4
ESCI 3351	Oceanography	3
GEOL 3443	Environmental Geology	4
Designated Elective		2
Upper Level Designated Elective		3
<b>Hours</b>		<b>16</b>

Fourth Year		Hours
<b>Fall</b>		
MATH 3311	Linear Algebra	3
ESCI 3443	Environmental Biology	4
Upper Level Designated Elective		3
ESCI 3403	Introduction to Meteorology	4
<b>Hours</b>		<b>14</b>

<b>Spring</b>		
ESCI 4498	Internship in Environmental Science	2
ESCI 4335	Climate and Climate Variability	3
ESCI 4202	Issues in Environmental Science	2
Upper Level Designated Elective		3
Upper Level Designated Elective		2
Elective (to meet 120 hrs)		4
<b>Hours</b>		<b>16</b>
<b>Total Hours</b>		<b>120</b>

### Marine and Coastal Resources Concentration

First Year		Hours
<b>Fall</b>		
ESCI 1401	Environmental Science I: Intro to Environmental Science	4
CHEM 1411	General Chemistry I	4
MATH 1442	Statistics for Life	4
UNIV 1101	University Seminar I	1
ENGL 1301	Writing and Rhetoric I	3
<b>Hours</b>		<b>16</b>

<b>Spring</b>		
ENGL 1302	Writing and Rhetoric II	3
or COMM 1311	or Foundation of Communication	
CHEM 1412	General Chemistry II	4
GEOL 1403	Physical Geology	4
UNIV 1102	University Seminar II	1
Social and Behavioral Sciences Core Requirement		3
<b>Hours</b>		<b>15</b>

Second Year		Hours
<b>Fall</b>		
PHYS 1401	General Physics I (PHYS 2425 may be substituted.)	4
BIOL 1406	Biology I	4

Language, Philosophy & Culture Core Requirement	3
HIST 1301 U.S. History to 1865	3
<b>Hours</b>	<b>14</b>
<b>Spring</b>	
BIOL 1407 Biology II	4
GISC 1470 Geospatial Systems I	4
HIST 1302 U.S. History Since 1865	3
Elective (to meet 120 hrs)	4
<b>Hours</b>	<b>15</b>
<b>Third Year</b>	
<b>Fall</b>	
ESCI 3202 Professional Skills	2
ESCI 3443 Environmental Biology	4
ESCI 3403 Introduction to Meteorology	4
Designated Elective	3
POLS 2305 U.S. Government and Politics	3
<b>Hours</b>	<b>16</b>
<b>Spring</b>	
GEOL 3443 Environmental Geology	4
POLS 2306 State and Local Government	3
Designated Elective	3
Upper Level Designated Elective	4
<b>Hours</b>	<b>14</b>
<b>Fourth Year</b>	
<b>Fall</b>	
Upper Level Designated Elective	4
ESCI 3351 Oceanography	3
Upper Level Designated Elective	4
Creative Arts Core Requirement	3
<b>Hours</b>	<b>14</b>
<b>Spring</b>	
ESCI 4335 Climate and Climate Variability	3
ESCI 4202 Issues in Environmental Science	2
ESCI 4301 Environmental Regulations	3
Upper Level Designated Elective	4
Upper Level Designated Elective	2
ESCI 4498 Internship in Environmental Science	2
<b>Hours</b>	<b>16</b>
<b>Total Hours</b>	<b>120</b>

## Environmental Health and Monitoring Concentration

<b>First Year</b>	
<b>Fall</b>	
ESCI 1401 Environmental Science I: Intro to Environmental Science	4
GEOL 1403 Physical Geology	4
ENGL 1301 Writing and Rhetoric I	3
UNIV 1101 University Seminar I	1
MATH 1442 Statistics for Life	4
<b>Hours</b>	<b>16</b>
<b>Spring</b>	
BIOL 1406 Biology I	4

CHEM 1411 General Chemistry I	4
ENGL 1302 Writing and Rhetoric II or COMM 1311 or Foundation of Communication	3
UNIV 1102 University Seminar II	1
Social and Behavioral Sciences Core Requirement	3
<b>Hours</b>	<b>15</b>
<b>Second Year</b>	
<b>Fall</b>	
BIOL 1407 Biology II	4
CHEM 1412 General Chemistry II	4
POLS 2305 U.S. Government and Politics	3
Creative Arts Core Requirement	3
<b>Hours</b>	<b>14</b>
<b>Spring</b>	
GISC 1470 Geospatial Systems I	4
BIOL 2421 Microbiology	4
POLS 2306 State and Local Government	3
Language, Philosophy & Culture Core Requirement	3
<b>Hours</b>	<b>14</b>
<b>Third Year</b>	
<b>Fall</b>	
ESCI 3202 Professional Skills	2
ESCI 3443 Environmental Biology	4
CHEM 3411 Organic Chemistry I	4
Upper Level Designated Elective	3
HIST 1301 U.S. History to 1865	3
<b>Hours</b>	<b>16</b>
<b>Spring</b>	
GEOL 3443 Environmental Geology	4
ESCI 3351 Oceanography	3
PHYS 1401 General Physics I (PHYS 2425 may be substituted.)	4
HIST 1302 U.S. History Since 1865	3
Designated Elective	2
<b>Hours</b>	<b>16</b>
<b>Fourth Year</b>	
<b>Fall</b>	
ESCI 4301 Environmental Regulations	3
ESCI 4320 Environmental Health	3
ESCI 3403 Introduction to Meteorology	4
Upper Level Designated Elective	3
Upper Level Designated Elective	2
<b>Hours</b>	<b>15</b>
<b>Spring</b>	
ESCI 4202 Issues in Environmental Science	2
ESCI 4335 Climate and Climate Variability	3
Upper Level Designated Elective	3
Elective (to meet 120 hrs)	4
ESCI 4498 Internship in Environmental Science	2
<b>Hours</b>	<b>14</b>
<b>Total Hours</b>	<b>120</b>

## Policy and Regulations Concentration

### First Year

Fall		Hours
ESCI 1401	Environmental Science I: Intro to Environmental Science	4
GEOL 1403	Physical Geology	4
ENGL 1301	Writing and Rhetoric I	3
UNIV 1101	University Seminar I	1
HIST 1301	U.S. History to 1865	3
<b>Hours</b>		<b>15</b>

### Spring

BIOL 1406	Biology I	4
MATH 1442	Statistics for Life	4
ENGL 1302	Writing and Rhetoric II	3
or COMM 1311	or Foundation of Communication	
UNIV 1102	University Seminar II	1
HIST 1302	U.S. History Since 1865	3
<b>Hours</b>		<b>15</b>

### Second Year

#### Fall

BIOL 1407	Biology II	4
CHEM 1411	General Chemistry I	4
POLS 2305	U.S. Government and Politics	3
Creative Arts Core Requirement		3
<b>Hours</b>		<b>14</b>

#### Spring

GISC 1470	Geospatial Systems I	4
CHEM 1412	General Chemistry II	4
POLS 2306	State and Local Government	3
Language, Philosophy & Culture Core Requirement		3
Designated Elective		2
<b>Hours</b>		<b>16</b>

### Third Year

#### Fall

ESCI 3202	Professional Skills	2
ESCI 3443	Environmental Biology	4
ESCI 3403	Introduction to Meteorology	4
Upper Level Elective		3
Social and Behavioral Sciences Core Requirement		3
<b>Hours</b>		<b>16</b>

#### Spring

GEOL 3443	Environmental Geology	4
ESCI 3351	Oceanography	3
PHYS 1401	General Physics I	4
Designated Elective		3
Designated Elective		1
<b>Hours</b>		<b>15</b>

### Fourth Year

#### Fall

ESCI 4301	Environmental Regulations	3
ESCI 4320	Environmental Health	3
Elective (to meet 120 hrs)		3

Upper Level Designated Elective	3	
Upper Level Designated Elective	3	
<b>Hours</b>		<b>15</b>
<b>Spring</b>		
ESCI 4498	Internship in Environmental Science	2
ESCI 4335	Climate and Climate Variability	3
ESCI 4202	Issues in Environmental Science	2
Upper Level Designated Elective	3	
Upper Level Designated Elective	3	
Elective (to meet 120 hrs)	1	
<b>Hours</b>		<b>14</b>
<b>Total Hours</b>		<b>120</b>

## 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:** ENVR 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:** BIOL 1407, CHEM 1411 or ESCI 1401.

**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 lightning. 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 2426.

**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**

Two to four semester hours of credit may be earned by working in an internship position in a governmental agency or industry.