

# ENVIRONMENTAL SCIENCE (ESCI)

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## 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. Calculus II strongly recommended.

## 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.

## 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.

## 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 6230 \*

\* 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)

REVIEW 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. DEVELOPMENT OF A SPILL MANAGEMENT TEAM INCORPORATING THE ELEMENTS OF INCIDENT COMMAND.

## 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, hydrosphere and geosphere. Microbial interactions and physical processes will be emphasized.

**Prerequisite:** CHEM 1311, 1312 and GEOL 1403 or ESCI 1401 or 3351.

**ESCI 6315 Environmental and Geological Applications of GIS****3 Semester Credit Hours (3 Lecture Hours)**

The Geographic Information System (GIS) provides a vehicle for capturing, storing, querying, analyzing, and displaying multidimensional geospatial datasets. This course is designed to introduce students to advanced concepts of GIS and their applications to manage, analyze, and display of multidimensional environmental, geological, and geophysical datasets.

**Prerequisite:** (PHYS 1401 or 2425) and MATH 2413.

**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.

**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.)