ENVIRONMENTAL SCIENCE (ESCI)

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.

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 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.

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.

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, 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.)