

# ENVIRONMENTAL SCIENCE (ESCI)

## ESCI 1401 Environmental Science I: Intro to Environmental Science 4 Semester Credit Hours (4 Lecture 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.

**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.

## 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.

## 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.

**Prerequisite:** CHEM 1412, ESCI 1401 or GEOL 1403.

## ESCI 3403 Introduction to Meteorology

### 4 Semester Credit Hours (4 Lecture 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.

**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 (1 Lab Hour)

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 4320.

**Co-requisite:** ESCI 4230, SMTE 0096.

## ESCI 4170 Hazardous Waste Operations and Emergency Response Lab

### 1 Semester Credit Hour (1 Lab Hour)

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.

**Co-requisite:** ESCI 4270, 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. PREREQUISITES: JUNIORS/SENIORS ONLY AND ESCI 1401 - ENVIRONMENTAL SCIENCE I: INTRO TO ENVIRONMENTAL SCIENCE OR PERMISSION OF INSTRUCTOR.

**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.

## 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.

**Co-requisite:** ESCI 4230.

## 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. PREREQUISITES: POLS 2305 - U.S. GOVERNMENT AND POLITICS\*\* AND POLS 2306 - STATE AND LOCAL GOVERNMENT\*\*.

**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.

**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.

**Prerequisite:** BIOL 3428 and CHEM 4443 or ESCI 3443.

**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.

**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.

**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.

**ESCI 4370 HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE****3 Semester Credit Hours (3 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. Lab exercises in use of personal protective gear and safe handling of hazardous substances. SMTE 0096 is a co-requisite for this course. Documented completion of this safety training is required early in the semester for continued participation in this course. Safety training given during a laboratory meeting early in the semester is required for continued participation in this course.

**Co-requisite:** SMTE 0096.

**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.

**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.

**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.

**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. PREREQUISITE: SENIOR ENVIRONMENTAL SCIENCE MAJORS ONLY; REQUIRES APPROVAL OF THE FACULTY. MAY BE REPEATED FOR CREDIT. FALL, SPRING, SUMMER.