

ENVIRONMENTAL SCIENCE (ENV)

ENV 700 ENVIRONMENTAL SYSTEMS (3 Hours)

A groundwork of environmental science, environmental awareness and ecological literacy for the incoming Ph.D. students is presented. The environment and its living and non living components, and the interactions of these component areas studied. The course is set in a thermodynamic perspective and is based on a nested hierarchy of systems. Key concepts and principles that govern how we think the environment works are presented while learning how to apply these concepts to possible solutions of various environmental degradation, pollution and resource problems.

ENV 701 ENVIRONMENTAL CHEMISTRY (3 Hours)

Prerequisite: One year of general Chemistry and one year of organic chemistry.

Studies of the basic concepts of environmental chemistry; the nature of chemical compounds; organic and inorganic; chemical reactions; their effects, and fate of chemical species, in aquatic systems. This include: Studies of equilibrium phenomena of acids, bases, salts, complex compounds, and oxidation/reduction reactions. Studies of water pollution, environmental chemistry of water and its properties.

ENV 702 ENVIRONMENTAL HEALTH (3 Hours)

This course focuses on the impact of environmental problems on human health. Health issues related to water pollution/contamination by physical, chemical and biological agents; wastewater discharges; radiations; air pollution; municipal, and industrial wastes; food contamination; pesticides; occupational hazards; and vector-borne diseases are discussed.

ENV 710 ENVIRONMENTAL MICROBIOLOGY (3 Hours)

ENV 711 APPLIED ENVIRONMENTAL BIOSTATS (3 Hours)

Prerequisite: Biostatistics (Bio 511) or equivalent.

This course is designed as an applied, advanced biostatistics course for students in the Environmental Science Ph.D. Program. Students will learn how to apply important concepts and principles of environmental biostatistics in the conduct of their research, from the initial designing of experiments to proper data collection and analysis, inferences, interpretation of results in applied terms, reporting and presentation of the results. The statistical computer software (SAS) will be used to analyze and interpret results.

ENV 715 PRINCIPLES OF BIOREMEDIATION (3 Hours)

This course uses modern knowledges in life sciences, as well as new developments in biotechnology to address important issues related to environmental clean-up of hazardous wastes. The nature of environmental pollution is reviewed, and basic concepts in molecular biology, biochemistry, microbiology, and plant physiology are applied to demonstrate the significance of bioremediation and phytoremediation in pollution control. Therefore, an emphasis is put on the use of biological methods and processes for the remediation of contaminated soils and water resources.

ENV 717 INTRO TO REMOTE SENSING (3 Hours)

ENV 718 REMOTE SENSING APPLIED (3 Hours)

ENV 720 ENVNMNTL & OCCUPATION HEALTH (3 Hours)

This course explores the relationship and impact of the environment to health and illness in human populations. An exploration of man-made and natural environmental hazards will be discussed. Environmental health and risk assessment will be discussed as well as interventions. Environmental policy and practices will be viewed from the public health perspective and include the study of energy, waste, environmental justice, and regulation.

ENV 721 SOLID WASTE MANAGEMENT & TREAT (3 Hours)

This course emphasizes on waste control methodologies for both municipal and industrial wastes including hazardous and nonhazardous waste under the Resource Conservation and Recovery Act (RCRA). The students are familiarized with environmental legislation regulating these wastes at state and federal levels. A thorough review is done on waste handling, transport, treatment technologies including chemical, physical, biological and thermal treatments, and disposal options such as land disposal of wastes. Waste minimization techniques such as source reduction and recycling are also discussed.

ENV 751 WATERQUALITY MANAGEMENT (3 Hours)

This course provides students with basic concepts and principles in Water Quality Management. The effects of organic, inorganic, biological and thermal pollutants/contaminants in various systems of the hydrologic cycle including streams, reservoirs, and estuaries; eutrophication; water quality criteria and standards; monitoring concepts; methods in water quality management; regulatory considerations; and non point source pollution control, are discussed.

ENV 755 AIR QUALITY MANAGEMENT (3 Hours)

This course provides students with basic concepts and principles of air quality management. Contaminant classification, pollutant sources, criteria pollutants, health effects, exposure and risk assessment are discussed. Pollutant measurements and air quality assessment techniques are considered with regard to atmospheric effects on dispersion and transport. Identification of, and control strategies for, stationary and mobile sources, and environmental regulations are studied, and indoor air quality considered.

ENV 780 ENVIRONMENTAL EPIDEMIOLOGY (3 Hours)

This course is designed to provide students with the basic knowledge and skills required to develop and apply epidemiologic principles and concepts to the study of adverse effects of various environmental factors on both human and ecological health. Emphasis is put on the study of the health effects of physical, chemical and biologic factors in the external environment, broadly conceived from the epidemiologic point of view. As such, it enables students to interpret epidemiological data and understand the approaches used in the epidemiologic investigations of acute and chronic diseases. The course also covers the basic methods and issues involved in epidemiologic investigation of disease conditions in human populations.

ENV 800 ENVIRONMENTAL TOXICOLOGY (3 Hours)

Prerequisite: ENV 701, ENV 702.

This course is designed to provide an overview of the basic principles and concepts of toxicology including : exposure characterization, dose-response relationship, kinetics and distribution of toxicants in a biological system; to understand the fate, behavior and toxicities of xenobiotic chemicals, and the mechanisms by which they affect cells and organs; and to identify the sources and discuss the effects of various groups of environmental toxicants including heavy metals, pesticides and other industrial byproducts.

ENV 801 RISK ASSESSMENT&MANAGMNT (3 Hours)

Prerequisite: ENV 800, MATH 700.

This course is designed to provide students with qualitative and quantitative skills necessary to evaluate the probability of injury, disease and death in humans and other life forms, from exposure to various environmental contaminants. Hazard identification, exposure assessment, dose-response evaluation and risk characterization are emphasized. Regulatory and technical aspects of risk assessment in the promulgation of public and environmental safety standards are discussed.

ENV 802 ENVIRONMENTAL PHYSIOLOGY (3 Hours)

This course provides students the basic concepts of homeostasis and adaptation to the environment. Discussions are designed to provide an understanding of the physiological responses to various types of pollutants in the different environmental systems including aerospace, hyperbaric, marine and terrestrial environments. Emphasis is placed on homeostatic responses at cellular, organ and organ system levels to various environmental stresses.

ENV 803 WETLAND ECOLOGY (3 Hours)

This course is designed to provide scientific knowledge for a better understanding of interactions between biological, physical and chemical components of wetlands. The structure and function of various types of wetlands; their biodiversity, biogeochemistry, and the impact of pollution on their ecological characteristics are discussed. Discussions are also done on how constructed wetlands can be used as water quality enhancers.

ENV 805 MEDICAL GEOLOGY (3 Hours)

This course is designed to provide students with qualitative and quantitative skills necessary to examine and understand the impacts of the natural geologic materials and processes on the prevalence, incidence and distribution of human (and other animal) diseases. The course focuses on the understanding of the nature and behavior of geological factors, and the examination of their impacts on health. Hence, the course will encompass major local, national and global health issues impacted by geological materials and/or processes. It will also encompass the interactions between human activities, geological factors, environment and health, as well as the innovative technologies that are used for the characterization and impact assessment of geologic materials on health.

ENV 900 SEMINAR (0.5 Hours)

This course focuses on contemporary issues in environmental health science. The student is expected to review, discuss, and present orally a report on a topic related to contemporary environmental issues. Topic areas for selection include (but not limited to): environmental biology, environmental chemistry, environmental microbiology, environmental toxicology, atmospheric science, water quality management, solid and hazardous waste management, computer modeling and remote sensing. Students are required to attend all scheduled seminars.

ENV 989 RESEARCH PROBLEMS (6 Hours)

ENV 999 DISSERTATION RESEARCH (1-6 Hours)

Original research in one of several subdisciplines in Environmental Science. Credit per academic session allowable is 1-6 hours. Student must produce, present and defend a document of publication quality.