

EHS 211
ENVIRONMENTAL HEALTH AND TOXICOLOGY

COURSE DESCRIPTION:

Prerequisites: None

Corequisites: None

This course covers the many effects of environmental agents (chemical, physical, and biological) on human health. Particular emphasis is placed on principles of toxicology and federal regulations relevant to environmental health. Upon completion, students should be able to recommend rational strategies for the control of chemical hazards in the occupational and general environment. Course Hours Per Week: Class, 5. Semester Hours Credit, 5.

COURSE OBJECTIVES:

Upon completion of this course, the student will be able to:

- a. Identify and give examples of the major classes of toxins.
- b. Identify factors which determine disposition of toxins in the human body.
- c. Interpret simple dose-response relationships in order to determine quantitative measures of toxicity.
- d. Differentiate among differing time-courses of chemical exposure.
- e. Compare and contrast OSHA and ACGIH standards for airborne chemical hazards.
- f. Explain the roles of environmental and biological monitoring in protecting worker health.

OUTLINE OF INSTRUCTION:

- I. Environmental Health and Public Health
 - A. Mortality and morbidity
 - B. Epidemiology
 - C. Chemical, biological, and physical agents
 - D. Role of environmental health in community health

- II. Toxicology: Introduction
 - A. History
 - B. Definitions
 - C. Elements of toxicology
 - D. Environmental and occupational toxicology

- III. Exposure and Entry

- A. Exposure routes
 - B. Local effects
 - C. Gastrointestinal absorption
 - D. Respiratory absorption
 - E. Skin absorption
 - F. Other
- IV. Dose-Response Relationships
- A. Classic dose-response curve
 - B. Measures of toxicity
 - C. Extrapolations
 - D. Time-course of exposures
- V. Mechanisms of Toxicity (Pharmacodynamics)
- A. Direct irritation
 - B. Enzyme inhibition
 - C. Lipid peroxidation
 - D. Interactions with DNA
- VI. Systemic Toxicity/Target Organs
- A. Neurotoxins
 - B. Hemotoxins
 - C. Hepatotoxins and nephrotoxins
 - D. Immunotoxins
 - E. Mutagens, carcinogens, teratogens
- VII. Hazardous Agents
- A. Metals
 - B. Gases
 - C. Corrosives
 - D. Solvents
 - E. Biocides
 - F. Pulmonary fibrogenic agents
 - G. Other
- VIII. Risk Assessment and Management
- A. Risk: perceived and real
 - B. Quantitative risk assessment
 - C. Risk communication
 - D. Risk management
- IX. Monitoring for Toxic Exposures
- A. Air monitoring

- B. Biomonitoring: rationale
- C. Biomonitoring: examples

REQUIRED TEXTBOOKS AND MATERIALS:

Kent, Chris. *Basics of Toxicology*. New York: John Wiley & Sons, 1998.

STATEMENT FOR STUDENTS WITH DISABILITIES:

Students who require academic accommodations due to any physical, psychological, or learning disability are encouraged to request assistance from a disability services counselor within the first two weeks of class. Likewise, students who potentially require emergency medical attention due to any chronic health condition are encouraged to disclose this information to a disability services counselor within the first two weeks of class. Counselors can be contacted by calling 919-536-7207, ext. 1413 or by visiting the Student Development Office in the Phail Wynn Jr. Student Services Center, room 1209.