

# **TECHNOLOGY 437 – Fundamentals of Industrial Hygiene**

**2006-07 Catalog Data:** TECH 437 Fundamentals of Industrial Hygiene

**Catalog Description:** Application of principles of industrial hygiene for the safety specialist, whose role has been greatly expanded by recent federal legislation. Emphasis on stress-producing conditions including noise, ventilation, temperature, radiation, lighting, and their effect on human performance and productivity.

**Prerequisites:** CHEM 110, CHEM 111, MATH 155, TECH 230, TECH 231, and TECH 434

**Co-requisites:** None

**Textbook:**

- The Occupational Environment, Its Evaluation, Control, and Management by Salvatore R DeNardi, Chapters 1, 2, 3, 6, 7, 10, 11, 12, 13, 15, 20, 23, 24, 40, and 41. Other information will be provided by the instructor. The specific references will include:
  - American Conference of Industrial Hygienists,
    - Threshold Limit Values
    - Principles of Ventilation
    - Documentation of TLV's
  - Congressional Federal Register, 29CFR1910
  - NIOSH Pocket Guide to Hazardous Materials

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Office Hours: 1:00 – 3:00 Mon/ Weds,

**or by appointment**

**Course Meetings:** Monday 600-900 PM

Learning Objectives	Relational ABET Learning Outcomes
<p>Recognize the common health hazards in industrial operations.</p> <p>Knowledgeable in exposure monitoring techniques.</p> <p>Research the potential health effects of industrial chemicals</p> <p>Evaluate health risks based on exposure data.</p> <p>Apply OSHA and other standards to industrial settings.</p> <p>Develop control strategies to reduce and/or eliminate potential health hazards in the industrial setting.</p>	<p>A. An appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines.</p> <p>B. An ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering, and technology.</p> <p>F. An ability to identify, analyze and solve technical problems.</p> <p>G. An ability to communicate effectively in writing.</p> <p>J. An ability to understand professional, ethical and social responsibilities.</p>

## **COURSE OBJECTIVES:**

The students will be able to:

1. Recognize the common health hazards in industrial operations.
2. Knowledgeable in exposure monitoring techniques.
3. Research the potential health effects of industrial chemicals
4. Evaluate health risks based on exposure data.
5. Apply OSHA and other standards to industrial settings.
6. Develop control strategies to reduce and/or eliminate potential health hazards in the industrial setting.

## **COURSE OUTLINE:** (This is not a class schedule)

- I. Be able to recognize health hazards in the workplace
  - A. Introduction into Toxicology
  - B. Introduction to Epidemiology
  - C. Chemical exposure limits
    1. OSHA PEL's
    2. ACGIH TLV's
    3. NIOSH REL's
  - D. Physical Agent Exposure Limits
  - E. Biological Exposure Limits
  - F. Types of health Hazards
    1. Irritants
    2. Corrosives
    3. Asphyxiants
    4. Systemic Poisons
    5. Carcinogens
    6. Mutagens and Teratogens
    7. Physical Agents
  - G. Evaluating and Material Safety Data Sheet (MSDS)
  - H. Recognizing DOT Labels and Placards
- II. Chemical Effects by organ system
  - A. Pulmonary
  - B. Nervous
  - C. Digestive

- D. Hematopoietic
- E. Urinary
- F. Endocrine
- G. Reproductive
- H. Skin
- I. Eye

III. Hazard Communication

- A. OSHA Requirements
- B. Hazard evaluation
- C. Control methodology
- D. Training Programs

IV. Be aware of common evaluation techniques

- A. Personal Monitoring
- B. Area Monitoring
- C. Monitoring Techniques
  - 1. Air Sampling Pumps
    - a) Dust, Fumes, Mists
    - b) Gases and Vapors
  - 2. Instantaneous Monitoring
    - a) Gas Meters
    - b) Explosive meters
    - c) Detector tube monitoring
      - (1) Diffusion
      - (2) Active
  - 3. Heat Stress Equipment
    - a) Sling psychometers
    - b) Dosimeters
    - c) Wet Bulb Globe Temperatures (WBGT)
    - d) Be aware of means and methods that may be used to control the hazards.
  - 4. Radiation Measurements
    - a) Dosimeters
    - b) Direct Reading

V. Engineering Controls

- A. Ventilation
  - 1. General
  - 2. Local

- 3. Negative pressure systems
- B. Time, Distance, Shielding
- C. Airflow monitoring equipment

VI. Personal Protective Equipment

- A. PPE Audits
- B. Eye and Face
- C. Body
- D. Hands
- E. Respiratory system

VII. IH Audits and Surveys

- A. Techniques
- B. Methodology
- C. Data Collection
- D. Data analysis

Course outline is subject to change.

## STUDENT EVALUATION

- Two written examinations
  - Midterm
  - Final
- Assigned Hazard Assessment
  - Written report
  - Oral presentation
- Assigned homework
  
- Final letter grade will reflect the percent of the point total (500) achieved
  - Midterm 150 points
  - Final 200
  - Assigned Hazard Assessment
    - Written report 50
    - Oral presentation 50
  - Assigned homework 50