

**Title: 1B. Overview of Occupational Health and Safety**

**Goal:** Students will have an appreciation of overview of occupational health and safety.

**Module Objectives:** This module will provide the students with an overview of occupational safety and health with an introduction to nanotechnology. Topics that will be covered include: 1) Overview a) Brief historical overview; b) The safety movement; c) Definition of occupational Health and safety d) Objective of occupational safety 2) Industrial accidents a) Why does it happen?; b) Government agencies involved c) Three E's of safety d) Cost of accidents 3) Risk assessments; a) Definitions b) Single causation theories: b) Management failures and accident causation; 4) Nanotechnology: a) Definition; b) Standard terminology; c) nanoparticles; d) overview of its manufacturing process

**Prerequisites by Topic:**

- Understanding of Periodic Table
- Properties of bulk materials

**Required Text:**

**Reading: Write-up of this module**

**References:** [Refs. 25, 38-41]

**Student Learning Outcomes:**

- Brief historical safety movements.
- Theories of accident causation.
- Three E's of safety.
- Definition of risk assessment.
- Nanotechnology definition, its standard, its health hazard, and brief Nano manufacturing process

**Topics Covered:** (Green highlighted topics are priority#1, Yellow highlighted are if time permits)

- **Lecture I**
  - Overview of historical health and safety movement
  - Tragedies that are changing the safety movement
  - Objectives in occupational safety (hazard s and its danger)
  - Why do industrial accidents occur?
  - Cost of accidents
  - Three E's of safety
  - Risk assessment- frequency of occurrence vs. severity
    - Risk, causation

- **Lecture II**

- Single Accident causation- Domino theory
- Drug, depression and accident causation, warning signs
- Management failures and accident causation
- Nanotechnology
  - Definition
  - Standard terminology
  - Health hazards of nanoparticles
  - Manufacturing at the Nano scale

**Relationship to ABET Program Outcomes**

[Note: Please, refer ABET program outcomes list (a) through (l) in attached standard template.]

- (a) An ability to apply knowledge of mathematics, science, and engineering.
- (j) Knowledge of contemporary issues.