

Title: 6A. Environmental Sustainability

Goal: Students will have an appreciation of overview of environmental sustainability.

Module Objectives: This module will provide the students with an overview of environmental sustainability with the application of nanotechnology. Topics that will be covered include:
1) Sustainability a) Definition; b) Preventing environmental degradation- climate change, depletion of natural resources; 2) Environmental Management a) Ocean; b) Freshwater c) Land d) Atmosphere e) Energy 3) Nanotechnology and Environmental sustainability;
a) Benefits b) Air and water pollutions: c) Chemical and biological; 4) Safety, Health and the Environment: a) EPA recommendation; b) Clean Air Act; c) Hazardous waste reduction
d) Eco-friendly application of nanotechnology

Prerequisites by Topic:

- Understanding of Periodic Table
- Properties of bulk materials

Required Text:

Reading: Write-up of this module

References: [Refs. 14-17, 25-28]

Student Learning Outcomes:

- Environmental sustainability.
- Issues of nanotechnology.
- Environmental risks.
- Potential benefits for sustainable development.
- Finding common ground

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

- **Lecture I:**
 - Definition of sustainability
 - Preventing environmental degradation
 - Climate change, depletion of natural resources)
 - Environmental management-ocean, freshwater, land, atmosphere
 - Nanotechnology and environmental sustainability
 - Is nanotechnology environmental friendly?
 - Benefit the environment by nanotechnology
 - The sustainability of nanotechnology – air and water pollutions, chemical and biological
- **Lecture II:**
 - Safety, health and the environment
 - Recommended by EPA

- Clean Air Act, types of environment, indoor environment quality
- Hazardous waste reduction
 - Environmental Management System(EMS)
 - Common ground (ISO)
 - Eco-friendly application of nanotechnology

Relationship to ABET Program Outcomes

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

- (f) An understanding of professional and ethical responsibility
- (j) Knowledge of contemporary issues.