Introduction to Nanotechnology Safety – Module 3A

Title: 3A. Societal Impacts

Goal: To enhance student knowledge of the social and ethical dimensions of science, engineering, and technology.


Prerequisites by topic:
- Module 2A

Required Texts:
- Professional Codes of Ethics:
  - American Institute of Chemical Engineers
  - Institute of Electrical and Electronics Engineers
  - ABET (formerly – Accreditation Board for Engineering and Technology)
  - American Society of Civil Engineers
  - American Society of Mechanical Engineers
  - Society of Manufacturing Engineers
  - International Council on Systems engineering
  - National Society of Professional Engineers
  - Association for Computing Machinery

Required Text:
Reading: Write-up of this module
References: [Refs. 14-17, 20]

Student Learning Outcomes:
- Be able to explain the roles and limits of professional Codes of Ethics
- Be able to compare engineering practice and medical experimentation
- Be able to recognize the ethical dimensions of decisions, actions, and policies
- Be able to differentiate between personal values and professional ethics
- Be able to identify Professional Engineering Societies and explain their role
- Be able to employ major ethical theories – Virtue Ethics
- Be able to discuss and debate the ethical dimensions of decisions, actions, and policies
- Be able to propose possible solutions to ethical concerns
- Be able to compare and evaluate differing possible solutions using the Precautionary Principle
- Develop critical thinking skills and judgment
• Develop an ethical identity to carry forward to working life

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

• Lecture I: Developing an Ethical Framework 2: Engineering as Social Experimentation
  o Engineering Practice and Medical Experiments (Martin and Schinzinger)
  o The Precautionary Principle (Foster, Vecchia, and Repacholi)

• Lecture II: Developing an Ethical Framework 3:
  o Virtue Ethics (Harris)
  o Codes of Ethics and their Limits (notes and PowerPoint)
  o Nanotechnology and Privacy

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

(c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical constraints as well as considerations of public health and safety, manufacturability, and sustainability.

(f) An understanding of professional and ethical responsibility.

(g) An ability to communicate effectively.

(h) The broad education necessary to understand the impact of engineering solutions in a global economic, environmental, and societal context.

(i) A recognition for the need for and an ability to engage in lifelong learning.

(j) A knowledge of contemporary issues.