

Title: 7A. Nanotechnology in Health and Medicine

Goal: Students will know potential risks of nanotechnology in health and medicine.

Module Objectives: This module will provide the students with an overview of the issues of nanotechnology in health and medicine. Topics that will be covered include: 1) What are the issues?; 2) Context described a) Pharmaceuticals and therapeutics; b) Diagnostics and imaging; c) Nanoscale surgery; d) Implants and tissue engineering; e) Multifunctional nanodevices and nanomaterials; f) Personalized medicine; g) Broader health care system – 3) Framing ethical questions; 4) Assessing options for action; 5) Finding common ground.

Prerequisites by Topic:

- Understanding of Basic Human Anatomy
- Basic High school Level Chemistry

Required Text: N/A

Reading: Write-up of this module

References: [Refs. 14-17, 29-34]

Student Learning Outcomes:

- Students will know what are the issues of nanotechnology in health and medicine
- Students will appreciate role of nanotechnology in various fields of health and medicine industry such as pharmaceuticals and therapeutics, diagnostics and imaging, nanoscale surgery, and implants and tissue engineering
- Students will be able to frame ethical questions and assessing actions while using nanotechnology in health and medicine

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

- **Lecture I**
 - Issues of nanotechnology in health and medicine
 - Context described
 - Pharmaceuticals and therapeutics
 - Diagnostics and imaging
 - Nanoscale surgery
 - Implants and tissue engineering
 - Multifunctional nanodevices and nanomaterials
 - Personalized medicine
 - Broader health care system

- **Lecture II**
 - Framing ethical questions
 - Assessing options for action
 - Finding common ground

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