Title: 2A. Ethics of Science and Technology

Goal: To introduce students to social and ethical dimensions of science, engineering, and technology.


Prerequisites by Topic: None

Required Texts:

Reading: Write-up of this module

References: [Refs. 14-17, 20]

Student Learning Outcomes:
- Be able to explain social and ethical impacts of scientific and technological change
- 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 distinguish between cultural or individual preferences and ethically relevant situations and practices.
- Be able to employ major ethical theories – Deontology(Kantian Ethics) and Utilitarianism/Consequentialism
- 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
- 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: Science, Technology, and Change**
  - a fourth technological revolution (Drexler)
  - the formal and material dimensions (Jonas)
  - false problems (Ellul – notes and PowerPoint)
  - business (Layton)

- **Lecture II: Developing an Ethical Framework 1:**
  - Why Ethics? – past problems
    - Biomedical – Tuskegee
    - Chemical/Agricultural – DDT
    - Construction – Kansas City Hyatt Regency
    - Aerospace – Challenger
  - Negative and Positive Duties
  - Introducing Two Approaches (Harris, Pritchard, and Rabins):
    - Deontology
    - Consequentialism
      - Why Engineers are Utilitarian (Nelson and Peterson)

**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.