

Title: 4A. Ethical Methods and Processes

Goal: To review knowledge of major ethical theories and introduce tools for assessing science, technology, and engineering.

Module Objectives: Review of: 1) Major Ethical Theories; 2) The Precautionary Principle. Introduce students to: 1) Tools for Assessments of Ethics in Technology and Engineering Practice; 2) The Pragmatist Approach to Engineering Ethics; 3) The Global Dimensions of Nanotechnology

Prerequisites by Topic:

- Module 2A
- Module 3A

Required Texts:

- van de Poel, Ibo and Lambèr Royakkers, “The Ethical Cycle” in *Ethics, Technology, and Engineering*, (Malden, MA: Wiley-Blackwell, 2011) 133-160, excerpts.
- Emison, Gerald A. “American Pragmatism as a Guide for Professional Ethical Conduct for Engineers,” *Science and Engineering Ethics* (2004) 10:2, 225-233.
- Salamanca-Buentello, Fabio, et al, “Nanotechnology and the Developing World,” in Deborah G. Johnson and Jameson M. Wetmore eds. *Technology and Society: Building our Sociotechnological Future*, (Cambridge,MA: MIT Press, 2009) 475-484.

Required Text:

Reading: Write-up of this module

References: [Refs. 14-17, 20, 23]

Student Learning Outcomes:

- Be able to explain the nature of professional and personal responsibility
- Be able to recognize the ethical dimensions of decisions, actions, and policies
- Be able to distinguish between cultural or individual preferences and ethically relevant situations and practices.
- Be able to employ major ethical theories – Pragmatism
- Be able to utilize The Ethical Cycle
- 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
- Demonstrate 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 4:
 - Review of Ethical Theories: Deontology, Utilitarianism, Virtue Ethics
 - Pragmatism and Engineering Ethics (Emison, Gerald A)
 - Introducing The Ethical Cycle (van de Poel, Ibo and Lambèr Royakkers)

- **Lecture II:** Developing an Ethical Framework 5:
 - Global Dimensions (Salamanca-Buentello, Fabio, et al)
 - The Ethical Cycle (van de Poel, Ibo and Lambèr Royakkers)

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.