Fall 2019

PHIL 334-107: Engineering Ethics

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Syllabus

Course Information

Course: Engineering Ethics and Technological Practice: Philosophical Perspectives on Engineering
Number/section: PHIL 334 – 107
Semester: Fall 2019
Time: Wednesday, 6 p.m. to 8:50 p.m.
Location: Kupfrian 117
Instructor: Peter Heap
Email: pah5@njit.edu
Office hours: I’m available before and after class. Email me if you want to set an appointment

Description

Ethics is an integral part of the practice of engineering. Many, if not all, engineering tasks have an ethical component and incorporate a philosophical outlook. Although some engineering problems have a stronger ethical flavor while others are more weighted to the technical side, there is no clear dividing line between what is an ethical question and what is an engineering question. The problems are, indeed, similar in nature: engineers, ethicists and engineers thinking ethically must all work with incomplete information. They produce their best answers, not “right” answers, and their solutions are dependent on the context of the problem. The traditional view that engineering problems are purely technical and that ethics is someone else’s job is flawed. To engineer without ethics and without a philosophical understanding is to engineer badly.

This purpose of this class is to show how engineering is inseparable from ethics and philosophy. Students will:

• Discover how ethical and philosophical questions pervade engineering;
• Learn how to uncover the ethical and philosophical issues contained in engineering tasks;
• Think about the way in which engineering choices express ethical and philosophical standpoints;
• Improve their ability to analyze ethical problems in engineering; and
• Examine the ethical duties of engineers in the practice of their profession.

The course will emphasize case studies of particular examples in engineering. Rather than dictating ethical positions to students, it aims to equip them with the tools and abilities to think through engineering problems from an ethical perspective.
Books

You will need to buy the following books:


Other readings will be available via URLs, from the NJIT library website or by email.

Grading

Grading will be as follows:

- Class participation and attendance: 14%
- Forms of life case study: 11%
- First ethics case study: 11%
- Final ethics case study: 21%
- Mid-term exam: 12%
- Final exam: 31%

Class participation and attendance

Discussion is an important part of improving our understanding, clarifying our ideas and discovering different points of view. It also helps develop the valuable skill of being able to explain and defend a point of view. Debate will be encouraged in this course. The grade is 1% per week for every week except the final exam week, divided between attendance and participation. Total: 14% of grade.

Forms of life case study

The first case study will analyze a product or technology using the perspective of forms of life. It will have two parts, the identification of a case and sources, worth 1%, and description and analysis, worth 10%. Total: 11% of grade. For this assignment only you may revise and resubmit your work for a higher grade.

First ethics case study

The second case study will have two parts. Identification of a case and sources, worth 1%, and description and analysis using theories discussed in class, worth 10%. Total: 11% of grade.

Final ethics case study

The third case study will have two parts. Identification of a case and sources, worth 1%, and description and analysis using theories discussed in class, worth 20%. Total: 21% of grade.
Mid-term exam
The mid-term exam will be made up of four short essay questions worth 3% per question. You will have a choice of questions. Total: 12% of grade.

Final exam
The final exam will be made up of three short essay questions worth 3% per question, six multiple-choice questions worth 1% each and two longer essay questions worth 8% per question. You will have a choice of questions. The exam will cover the entire semester. Total: 31% of grade.

Grades
The maximum grade for the class is 100%. Letter grades will be assigned as follows:

- 90 to 100: A
- 70 to 74: C
- 85 to 89: B+
- 60 to 69: D
- 80 to 84: B
- 59 and less: F
- 75 to 79: C+

Deadlines
Work is due on the dates shown in the class schedule. Grades for late submissions will be reduced by one level for up to a week late (e.g. B+ to B) and two levels (e.g. B+ to C+) for more than a week late.

Plagiarism and Academic Integrity
Plagiarism or copying of any kind will not be tolerated. All work must be your own. Specifically, it must be your own thoughts and your own ideas expressed in your own words. Any use of other’s efforts must be credited via a citation. NJIT's policy is as follows:

Academic integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students’ office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will be subject to disciplinary action. This may include a failing grade of F and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu
Class Schedule

September 4
Introduction: Plan of the course, introduction to ethics and to ethics in engineering

September 11
Models of engineering: Engineering as commitment, engineers as professionals, engineering as responsibility
Professional ideals and business demands: Engineers’ two roles, the purpose of a corporation, the Revolt of the Engineers
Ethical theories: Deontological ethics, utilitarianism, virtue ethics and more

September 18
Case studies: Northern States Power, San Diego water purification
Two more models of engineering: Engineering as experimentation, engineering as pragmatic participation
Case studies: Samsung Galaxy Note 7, Teton Dam, the electricity grid
Introduction to forms of life
Mike W. Martin and Roland Schinzinger, “Engineering as Social Experimentation,” in Ethics in Engineering, sections 4.1 and 4.2, 88-106
September 25

**Case study:** Challenger disaster

**Forms of life, political technology**

**Case study:** Cellphones, social media


October 2

**Perceptions, safety, risk:** How technology changes perceptions, how we perceive technology, risks versus hazards

**Case studies:** Flight 956, Chernobyl and Three Mile Island


Federal Aviation Administration, American Airlines Flight 965 near Cali: Accident Overview. https://lessonslearned.faa.gov/ll_main.cfm?TabID=1&LLID=43&LLTypeID=2


- Forms of life case study: Identify a case

October 9

**Moral reasoning:** A five-step process

**Case study:** The Ford Pinto

Mike W. Martin and Roland Schinzinger, “Resolving Ethical Dilemmas” in *Ethics in Engineering*, 32-39

October 16

Review for mid-term exam

Cost-benefit analysis and utilitarianism: Working for a tobacco company, criticisms and responses


Forms of life case study: Analysis due

October 23

Midterm exam

Technological revolutions


Optional: Langdon Winner, “Building the Better Mousetrap” and “The Whale and the Reactor,” in The Whale and the Reactor, 61-84, 164-178 (These chapters will be discussed briefly but you are not expected to read them).


Atlas, the Next Generation. https://youtu.be/rVlhMGQgDkY

Otto and Budweiser: First Shipment by Self-Driving Truck. https://www.youtube.com/watch?v=Qb0Kzb3haK8


October 30

Whistleblowing: The ethical dilemma, when is it permissible, when is it required?


Forms of life case study: Resubmissions due

First ethics case study: Identify a case
November 6

Codes of ethics

Ethical relativism: Are ethical values the same everywhere and for everyone?

International business and offshoring

Case study: Bhopal

Case study: Tesla

Mike W. Martin and Roland Schinzinger, “Codes of Ethics,” in Ethics in Engineering, 44-53.


November 13

Autonomous systems


First ethics case study: Analysis due
November 20

**Engineering and the environment:** Attitudes to nature, the Invisible Hand, the Tragedy of the Commons, externalities, theories of environmental responsibility

**Case study:** Southern Co.’s clean coal project


- Final ethics case study: Identify a case

November 27

No class

December 4

**Professionalism, responsibility, honesty, codes of conduct**


- Final ethics case study: Analysis due

December 11

**Review for final exam**

**Weapons:** Just war theory, examples

**Personal fulfillment, personal values**


Mike W. Martin and Roland Schinzinger, Self-Realization and Self-Interest,” in *Ethics in Engineering*, 72-84

December 18

Final exam