

NEW YORK CITY COLLEGE OF TECHNOLOGY
The City University of New York School of Arts & Sciences
Department of Social Science Course Outline

Course code: PHIL 3212

Course title: Engineering Ethics

Class hours/credits: 3 class hours, 3 credits

Prerequisite: Previous philosophy course or department approval

Pathways: Individual and Society

Catalog Description: This course will involve a philosophical evaluation of the goals, methods, standards and values involved in engineering. It will cover the ethical and political implications of engineering and its role in work, leisure and in transforming the environment. The course will concentrate on analysis and case studies involving problematic moral situations with relevance to engineering, or involving engineering decisions.

RECOMMENDED/TYPICAL/REQUIRED TEXTBOOK (S) and/or MATERIALS*

Engineering Ethics: Concepts and Cases, 5th ed. by Harris, C., Pritchard, M., & Rabins, M., eds. Wadsworth, 2004

*suggested text; instructors may choose their own.

COURSE INTENDED LEARNING OUTCOMES/ASSESSMENT METHODS

LEARNING OUTCOMES	ASSESSMENT METHODS*
1. Understand the basic methods of philosophy, and the relevance of these to questions in engineering	1. Class participation, paper, exams
2. Learn basic ethical theories, and attain the ability to apply these to various issues in engineering	2. Class participation, paper, exams
3. Analyze, critique, and evaluate various trends in engineering, and assess their overall relationship to other aspects of society such as capitalism, globalization, professional accountability, etc.	3. Class participation, paper
4. Be able to reflect critically and thoughtfully on the philosophical aspects of specific issues in engineering, such as biotechnology, weapons of mass destruction, risk and experimentation, etc.	4. Class participation, paper

* *may vary slightly per instructor to suit their own needs*

PATHWAYS INDIVIDUAL AND SOCIETY LEARNING GOALS

1. Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the relationship between the individual and society, including, but not limited to, anthropology, communications, cultural studies, history, journalism, philosophy, political science, psychology, public affairs, religion, and sociology.
2. Examine how an individual's place in society affects experiences, values, or choices.
3. Articulate and assess ethical views and their underlying premises.
4. Articulate ethical uses of data and other information resources to respond to problems and questions.

GENERAL EDUCATION LEARNING OUTCOMES/ASSESSMENT METHODS

LEARNING OUTCOMES	ASSESSMENT METHODS*
1. KNOWLEDGE: Develop knowledge from a range of disciplinary perspectives, and develop the ability to deepen and continue learning.	1. Class participation, paper, exams
2. SKILLS: Acquire and use the tools needed for communication, inquiry, analysis, and productive work.	2. Class participation, paper, exams
3. INTEGRATION: Work productively within and across disciplines.	3. Class participation, paper
4. VALUES, ETHICS, AND RELATIONSHIPS: Understand and apply values, ethics, and diverse perspectives in personal, civic, and cultural/global domains.	4. Class participation, paper, exams

** may vary slightly per instructor to suit their own needs*

SCOPE OF ASSIGNMENTS and other course requirements*

Assignments should test students' comprehension of assigned readings; critical thinking skills; ability to analyze cases; ability to verbally communicate ideas and facts; and retention of theories, concepts, principles, and cases discussed in class. Assignments should also give students an opportunity to reflect on their own beliefs and values.

** may vary slightly per instructor to suit their own needs*

METHOD OF GRADING – elements and weight of factors determining the students’ grade*

Exam 1	30%
Exam 2	30%
Final or paper	40%

** may vary slightly per instructor to suit their own needs*

ATTENDANCE POLICY

It is the conviction of the Department of Social Science that a student who is not in a class for any reason is not receiving the benefit of the education being provided. Missed class time includes not just absences but also latenesses, early departures, and time outside the classroom taken by students during class meeting periods. Missed time impacts any portion of the final grade overtly allocated to participation and/or any grades awarded for activities that relate to presence in class.

Instructors may including a reasonable “Participation” grade into their final grade calculations for this course.

STUDENT ACCESSIBILITY

City Tech is committed to supporting the educational goals of enrolled students with disabilities in the areas of enrollment, academic advisement, tutoring, assistive technologies, and testing accommodations. If you have or think you may have a disability, you may be eligible for reasonable accommodations or academic adjustments as provided under applicable federal, state, and/or city laws. You may also request services for temporary conditions or medical issues under certain circumstances. If you have questions about your eligibility and/or would like to seek accommodation services and/or academic adjustments, please email the [Student Accessibility Center](#).

COMMITMENT TO STUDENT DIVERSITY

The Department of Social Science complies with the college wide nondiscrimination policy and seek to foster a safe and inclusive learning environment that celebrates diversity in its many forms and enhances our students’ ability to be informed, global citizens. Through our example, we demonstrate an appreciation of the rich diversity of world cultures and the unique forms of expression that make us human.

ACADEMIC INTEGRITY POLICY STATEMENT

Students and all others who work with information, ideas, texts, images, music, inventions, and other intellectual property owe their audience and sources accuracy and honesty in using, crediting, and citing sources. As a community of intellectual and professional workers, the College

recognizes its responsibility for providing instruction in information literacy and academic integrity, offering models of good practice, and responding vigilantly and appropriately to infractions of academic integrity. Accordingly, academic dishonesty is prohibited in The City University of New York and at New York City College of Technology and is punishable by penalties, including failing grades, suspension, and expulsion. The complete text of the College policy on Academic Integrity may be found in the catalog.

SAMPLE SEQUENCE OF TOPICS AND TIME ALLOCATIONS*

WEEK ONE: Introduction: Philosophy and its relation to engineering

OBJECTIVES:

- 1) To explain meanings of ‘philosophy.’
- 2) To illustrate logical method of philosophy.
- 3) To define and explain meanings of ‘technology.’
- 4) To elaborate upon the ways technology generates philosophical problems.

Reading: Harris, et al. ch. 2.

Topics:

- Philosophy as the quest for the rational justification of our basic beliefs about distinctive human activities and culture: art, religion, politics and law, social structure and morality, knowledge and science, education, and so forth.
- Philosophy’s logical structure; arguments; premises and conclusion; validity.
- In different ages philosophy responds to the human condition with different emphases. In the seventeenth century science was the most formidable influence on philosophy. In our century technology has provoked much philosophical reflection.
- Philosophy seeks to clarify what “engineering” means to us; what thought processes feed into it; how we should respond to it. Philosophy asks us to explain and justify our ideas about the moral problems raised by engineering and the principles we use when we praise or condemn it.
- Practical reasoning, analysis and decision theory.

WEEK TWO: Engineering as an Epistemological and Ethical Problem

OBJECTIVES

- 1) To distinguish engineering from pure and applied science.
- 2) To distinguish engineering from practical activity.
- 3) To state several criteria for engineering effectiveness.
- 4) To analyze ideas of mechanical engineering, chemical engineering and other specific kinds.
- 5) Be able to distinguish practical reasoning, analysis and decision theory.
- 6) To distinguish between particular moral judgments and general moral principles.
- 7) To distinguish among claims based on reason, emotion, and popular opinion.
- 8) To know what is required to justify amoral judgment.

- 9) To discuss the role of engineering in preparing for the technology of the future.

Reading: Harris, et al. ch. 3.

Topics:

- Differences between modern engineering and that of earlier ages (history).
- Defining the nature of engineering in relation to pure and applied sciences.
- The logic of engineering rules and their basis in scientific laws.
- Distinguishing engineering from practical activity in general.
- The relationship between engineers and machines.
- Is there a distinct attitude, or way of thinking of engineers?
- Effectiveness, durability, accuracy of measurement and other possible criteria of the general aim of engineering.
- The different forms of engineering in different branches of engineering.
- The inevitability of the student facing technological problems, decision-making and side effects in the future.
- Engineering gives us new power. Do we need a heightened sense of responsibility, or even duty (to those unborn, to others, to Nature, to animals, etc.) to go with it?
- Is there a single right answer to an ethical quandary in engineering?

WEEK THREE: Ethical Theory

OBJECTIVES

- 1) To define ethics.
- 2) To distinguish between applied and general normative ethics.
- 3) To explain the difference between the different types of general normative ethics: deontological, character, divine command and teleological theories.
- 4) To critically discuss the different types of teleological ethical theories.
- 5) To critically discuss the different types of deontological ethical theories.

Reading: Harris, et al. ch. 4.

Topics:

- The role of ethical theory and the main approaches to ethics
- Utilitarianism
- Deontological Theories
- “Virtue” Ethics

WEEK FOUR: Ethical Theory (cont.)

OBJECTIVES:

- 1) To distinguish between cultural and ethical relativism, and moral nihilism.
- 2) To critically discuss the classical and contemporary versions of natural law ethics.
- 3) To critically discuss the classical and contemporary versions of Social Contract Ethics.

Reading: Harris, et al. ch. 10.

Topics:

- Self-Interest and Egoism
- Cultural Relativism
- Social Contract Theory
- Natural Law and Divine Command Theory

WEEK FIVE: Professional codes and accountability

OBJECTIVES

- 1) To critically discuss the need for an engineering ethic.
- 2) To critically examine Professional Codes for engineers, using moral theories.
- 3) To explain both professional responsibilities and rights.
- 4) To critically examine both the need for industrial standards and their adequacy.
- 5) To explain the ethical need for preventive measures in engineering.

Reading: Harris, et al. ch. 1.

Topics:

- Why is there a need for an engineering ethic?
- Codes of ethics and professional responsibilities
- Rights of engineers
- Industrial standards.
- Preventive ethics

Exam 1

WEEK SIX: Technology and Social Problems

OBJECTIVES

- 1) To distinguish mechanical and social Engineering.
- 2) To critically discuss the issues of social justice as they relate to the engineering profession.
- 3) To examine the impact of science and technology on society and the economy.
- 4) To critically discuss the relation of modern technology to political life.
- 5) To discuss the impact of engineering on traditional values and religion.
- 6) To answer questions about whether some political systems foster technology more than others and how we should respond to this.
- 7) To define capitalism and explain its rise and persistence in relation to technology, and the specific problems of choice the rise of capitalism creates.
- 8) The student will state their informed expectations of future technological changes and their social effects.
- 9) To name some modern engineering projects and discuss in detail their moral, political, spiritual side effects.

Reading: Supplemental Text on Social Engineering.

Topics:

- Social Engineering
- Do all groups benefit equally from engineering? Can this question be answered in general?
- Science (economics) as a technology
- Political Implications of Engineering
- Does engineering technology increase authoritarianism or does it promote (if only through education) democratic dialogue?
- Concept of the malleability of human nature and technology as a means to obtaining this
- Does technology and its thought modes weaken our individual sense of significance and power (and possible connection of this to religion)?
- Technology destroys traditional values. It cannot be employed to create any new values.

WEEK SEVEN: Moral dilemmas faced by engineers in the workplace

OBJECTIVES

- 1) To critically discuss the ethical and moral responsibilities of engineers in the workplace.
- 2) To critically discuss and analyze the responsibilities to society of engineers.
- 3) To explain the legal responsibilities of engineers.
- 4) To critically examine moral issues surrounding the unpredictability of effects.
- 5) To distinguish and discuss both collective social responsibility and individual responsibility.

Reading: Harris, et al. ch. 8.

Topics:

- Ethical and moral responsibilities of engineers in the workplace
- Responsibilities to society
- Legal responsibilities of engineers
- The Challenger disaster as a case study
- Unpredictability of effects: does this alleviate responsibility?
- Is collective social responsibility independent of the individuals who compose society?

WEEK EIGHT: Industrial Engineering

OBJECTIVES

- 1) To demonstrate how engineering is affecting the mental/physical balance in work.
- 2) Identify Taylorism and its effect on the workplace.
- 3) To critically discuss automation and its effects.
- 4) Summarize major insights about the relation of engineering, morality, the values of life.
- 5) To discuss modern engineering's destructive effects on human moral, social, political, work and leisure life and how, at the same time, it has enriched these same areas of life.

Reading: Supplemental Text (possibly through the use of such films as “Modern Times.”) Topics:

- Engineering and the nature of modern work
- Taylorism
- Automation and its effects
- Automation and the future of technology

WEEK NINE: Experimentation and Risk

OBJECTIVES

- 1) To critically discuss the concept of risk and the ethical issues involved.
- 2) To identify the risks associated with nuclear power.
- 3) To discuss risk-benefit analysis critically.
- 4) To critically discuss “Acceptable risk” and safety.
- 5) Be able to identify ways to assess and reduce risk.
- 6) To identify and critically evaluate the dangers to the public of engineering experiments.
- 7) To identify prominent examples of experiments gone awry and their impact.
- 8) Relate ethical theories and risk assessment to issues of engineering experimentation.
- 9) To discuss risk, safety, cost vs. benefits.

Reading: Harris, et al. ch. 7.

Topics:

- Nuclear power and its risks
- Risk-benefit analysis
- “Acceptable risk?” and safety
- Assessing and reducing risk
- Personal and public Risk
- “Three Mile Island” as a case study
- Are new moral theories needed to make sense of our nuclear dilemma?
- The case of Chernobyl and experimentation by engineers

WEEK TEN: Conflicts of Interests; Whistle Blowing

OBJECTIVES

- 1) To identify cases of conflicts of interests.
- 2) To critically assess the ethical dilemmas involved.
- 3) To state the responsibilities of engineers.
- 4) To explain when and how whistle blowing may be appropriate.
- 5) To discuss conflicts of interests, whistle blowing and when the latter is ethical.

Reading: Harris, et al. ch. 6.

Topics:

- What are the ethical responsibilities of engineers if engineering defects are covered up?
- The conflicts of career vs. saving lives

- Dishonesty
- Confidentiality

Exam 2

WEEK ELEVEN: Biotechnology

OBJECTIVES:

- 1) To identify the moral dilemmas posed by recent technological developments.
- 2) Analyze and explain the distinction between genetic engineering and other kinds.
- 3) To critically examine the risks and safety of genetic engineering.
- 4) Evaluate the ethics of cloning.
- 5) To discuss the role of the state and the law in dealing with these issues.
- 6) To discuss the extension of the concept of engineering to life and thought: bio- and genetic engineering.

Reading: Supplemental Text on genetic engineering.

Topics:

- Moral dilemmas posed by recent technological developments especially in medicine and the role of the state and law in their solution (or rather treatment).
- Cloning: is it engineering?
- The ethical dimension of cloning.
- Genetic engineering: is it safe?

WEEK TWELVE: Environmental Impact

OBJECTIVES

- 1) Analyze the destructive impact of engineering projects of all kinds on the environment.
- 2) To discuss the concepts of ecology.
- 3) To critically examine the idea of economic growth and the destruction of nature.
- 4) To explain the problems of increases in population and the role of engineering as a solution.
- 5) To explain the difficulties of decision-making by engineers assessing public and environmental impact.

Reading: Harris, et al. ch. 9.

Topics:

- Population increase and the destruction of nature.
- Is technology destructive of society, morality, nature etc.?
- Concepts of ecology
- Idea of economic growth and its link to the destruction of nature.
- Lack of consideration of limits of resources for economic growth
- The contribution that the development of ecologically benign technologies could make to environmental sustainability.

WEEK THIRTEEN: Weapons of Mass Destruction

OBJECTIVES

- 1) Analyze the ethical issues involved in the engineering of weapons of mass destruction.
- 2) To argue the pro and con of designing such weapons.
- 3) Analyze and defend the responsibilities of engineers in relation to public policy.
- 4) To discuss the ethics of designing dangerous weapons.

Reading: Supplemental Texts on Atomic Weapons, Biological Warfare and Chemical Warfare.

Topics:

- Should engineers participate at all in the design of WMD?
- What are the responsibilities of engineers in relation to public policy?

WEEK FOURTEEN: Computer Ethics OBJECTIVES

- 1) Be able to identify the main moral problems surrounding the design and use of computers.
- 2) To critically examine the “right to privacy” and the threats from hacking and viruses.
- 3) Analyze the ethical role of both hardware and software engineers.
- 4) To discuss the extension and the use of computers as “thinking machines.” Reading: Harris, et al. ch. 5.

Topics:

- Moral Issues surrounding the engineering of computers
- Privacy and Hacking
- Viruses

WEEK FIFTEEN: Summary, Discussion, FINAL EXAM

**guidelines from which instructors may select or adapt*

Revised by Peter Parides, Spring 2021