ECE/Phil 216   Engineering Ethics   **Spring 2004**

Note (September 10, 2009): This course is currently numbered ECE/PHIL 316. The course Home Page is now http://courses.ece.uiuc.edu/ece316.

Instructor for Section E3: Professor Michael C. Loui
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Office hours: by appointment

Course Home Page: http://courses.ece.uiuc.edu/ece216
The home page has links to resources in engineering ethics on the Web.

Classes:
Section E3: Tuesdays and Thursdays, 9:00 to 10:20 a.m., Room 170 Everitt Lab
Section E4: Tuesdays and Thursdays, 1:00 to 2:20 p.m., Room 170 Everitt Lab

Prerequisites: Junior standing and Rhet 105

Credit: 3 hours. Satisfies campus General Education requirements for Advanced Composition (formerly Comp II) and Humanities and the Arts (Historical and Philosophical Perspectives).

Course Objectives:
1. To develop moral reasoning skills
2. To read and think critically
3. To improve writing skills in an engineering context
4. To understand multiple perspectives and respect diverse opinions
5. To explore the fundamental structure of human personhood, the grounding of moral action, and the development of moral character as the precondition of integral performance in a profession
Detailed instructional objectives are listed at the Web site for the course.

Required Texts:
 Charles E. Harris, Michael S. Pritchard, and Michael J. Rabins, *Engineering Ethics*: *Concepts and Cases,* 2nd ed., Wadsworth/Thompson Learning, Belmont, Calif., 2000.
 Additional Readings course packet for ECE/Phil 216, Spring 2004, available through the IEEE Student Branch, Room 54 Everitt Lab.

Recommended Texts:
 Diana Hacker, *A Writer's Reference*, 5th ed., Bedford/St. Martin's, Boston, Mass., 2003.
 Joseph M. Williams, *Style*: *Ten Lessons in Clarity and Grace*, 7th ed., Addison Wesley Longman, New York, 2003.

Daily Papers:

To each class session, you will bring a typed, single-spaced, one-page reflection, generally upon the readings assigned for that day. These written reflections will help you prepare for discussions in class. Composing each daily paper should take you only 30 minutes.

Here are some suggestions for your daily papers. For each article among the readings, you may summarize the main points, identify the author's implicit assumptions and perspectives, and assess the strengths and weaknesses of the author's argument. You may formulate your own questions and possible answers. You may relate the readings to your experiences of the past and aspirations for the future. You may identify a particularly eloquent passage and explain why you consider it well written. Or you may paraphrase in your own words a passage that makes a particularly important point and elaborate on that point. Sometimes the topic for a daily paper will be specified.

We recommend that you complete both daily papers for a week by the Tuesday of that week, because graded response papers are due on Thursdays. You must submit a daily paper even for a class that you miss. Daily papers are checked and counted, but not graded.

Response Papers:

You will write a draft and a final version of each of five response papers. For each response paper, the previously submitted draft must accompany the final version. The draft will receive substantive comments, but only the final version will be graded. A grading rubric will accompany each assignment.

The response papers are designed to help you engage in the course material, integrate the material into your lives, and achieve the course objectives. The first response paper will be an essay on the responsibilities and characteristics of engineers. The next two response papers will be analyses of cases. The fourth response paper will analyze an article from the readings. For the last response paper, you will construct a new code of ethics, create a fictional case, or write a dialogue.

Each response paper should be double-spaced, in 12-point type, with one-inch margins. The length of each response paper will be specified with each assignment. On the final version, your name and the submission date should appear on a separate title page. Except for the first response paper, final versions will be posted on a Web board that will be accessible only to students in the course.

Papers are always due at the beginning of class. They must be submitted on paper (hard-copy); electronic submissions will not be accepted for credit, unless approved by the instructor. If you request that the instructor consider a late submission for full credit, you must include appropriate written documentation such as a note from a physician or a dean. If you submit a paper late without an acceptable excuse, the grade will be reduced by at least 50%.

Due dates for drafts and final versions of response papers:
P1 (first paper, two to three pages): Draft January 29; Final version February 12
P2 (case analysis, three pages): Draft February 5; Final version February 19
P3 (case analysis, three pages): Draft February 26; Final version March 11
P4 (article analysis, three pages): Draft March 4; Final version March 18
P5 (creative assignment, three or more pages): Draft April 1; Final version April 8

Research Paper:

You will write a research paper of eight or more pages. Detailed directions, with suggested topics, will be available later. You will also give a ten-minute oral presentation of your research paper in class. Due dates are given below. The research paper will replace the final examination.

Due dates for research paper:

Research question:	March 9
Annotated bibliography:	March 30
Thesis statement and synopsis:	April 6
Complete draft:	April 22
Oral presentations:	April 22, 27, 29, May 4
Final version:	May 4

Class Participation:

You are expected to participate actively in class. When students share ideas and experiences in class discussions, all students benefit. In many class sessions, students will collaborate to analyze cases, review each other's draft papers, compare answers to writing exercises, and participate in role-playing exercises.

Course Grading:

The following weights will be applied to different graded components to obtain a weighted total:

50% Response papers	15% Daily papers
25% Research paper	5% Oral presentation
5% Class participation	

The following cutoffs will be used to assign course grades. These cutoffs may be lowered, but they will not be raised:

95% A	90% A–	85% B+	80% B	75% B–
70% C+	65% C	60% C–	50% D	

Special Concerns and Academic Integrity:

If you have any concerns about factors such as a disability or a religious practice that may interfere with the successful completion of a course requirement by its deadline, please contact one of the instructors in advance.

The faculty of the Department of Electrical and Computer Engineering expects all students to conduct their academic work according to the highest ethical standards of the engineering profession. Violations of university standards of academic integrity will result in appropriate disciplinary action. See http://www2.uiuc.edu/admin_manual/code/rule_33.html.

Daily Schedule:
HPR = Harris, Pritchard, and Rabins
AR = Additional Readings

Class #1   Tu 1/20   Course overview. Characteristics of an ideal engineer.
                              ***Gilbane Gold* video.**

Class #2   Th 1/22   Engineering as a profession: historical and social context.
                              Epistemology, metaphysics, and ethics in engineering.
HPR Chapter 1: Engineering ethics: making the case
AR 1: Greenwood, Attributes of a profession
AR 2: Davis, A history of engineering in the United States

Class #3   Tu 1/27   Professionals and clients. Writing exercises: concision
NSPE Code of Ethics, http://www.nspe.org/ethics/codeofethics2003.pdf (179 KB)
AR 3: Bayles, Obligations between professionals and clients

Class #4   Th 1/29   Common morality and professional ethics. Factual and
                              conceptual distinctions. Moral character. Draft of P1 due.
HPR Chapter 2: Framing the problem
AR 4: Covey, Inside-out, and The seven habits—an overview

Class #5   Tu 2/3   Casuistry, line-drawing, analysis of cases. Creative middle-way
                              solutions. Consultant from Writers' Workshop.
HPR Chapter 3: Methods for moral problem solving

Class #6   Th 2/5   Consequentialism and utilitarianism. Deontological approaches:
                              duties, rights, respect for persons. Draft of P2 due.
HPR Chapter 4: Organizing principles

Class #7   Tu 2/10   Role playing cases. Writing exercises: actions.
AR 5: Williams, Actions

Class #8   Th 2/12   Responsibility. Virtue ethics. Final version of P1 due.
HPR Chapter 5: Responsible engineers
AR 6: Ladd, Collective and individual moral responsibility in engineering

Class #9   Tu 2/17   The engineer's moral responsibility for safety. Peer editing of P2.
AR 7: Nissenbaum, Computing and accountability
AR 8: Alpern, Moral responsibility for engineers
AR 9: Florman, Doing good

Class #10   Th 2/19   Honesty, moral autonomy. Confidentiality scenarios.
                              Final version of P2 due. INFORMAL EARLY FEEDBACK.
HPR Chapter 6: Honesty, integrity, and reliability

Class #11   Tu 2/24   Patents, trade secrets, copyrights. Writing exercises: cohesion.
AR 10: McFarland, Intellectual property, information, and the common good
AR 11: Warwick, Is copyright ethical?

Class #12   Th 2/26   Moral Kombat: debate on a conflict of interest case.
              Draft of P3 due.
AR 12: Luebke, Conflict of interest as a moral category

Class #13   Tu 3/2   Engineering as experimentation. Writing exercises: coherence.
AR 13: Koen, Toward a definition of the engineering method
AR 14: Petroski, The ups and downs of bridges
AR 15: Martin and Schinzinger, Engineering as social experimentation

Class #14   Th 3/4   Risk, safety, and liability. Draft of P4 due.
HPR Chapter 7: Risk, safety, and liability in engineering

Class #15   Tu 3/9   Engineers and employers. Ford Pinto case. Peer editing of P3.
              Research paper question due.
HPR Sections 8.1–8.5, pp. 175–188
AR 16: DeGeorge, Ethical responsibilities of engineers in large organizations

Class #16   Th 3/11   *Challenger* case. Boisjoly video. Final version of P3 due.
AR 17: Bell and Esch, The fatal flaw in flight 51-L
HPR Section 8.6, pp. 188–191: The Challenger case

Class #17   Tu 3/16   Loyalty, duties of justice and duties of benevolence.
              ***The Truesteel Affair* video. Peer editing of P4.**
AR 18: Baron, The moral status of loyalty
AR 19: Duska, Whistle-blowing and employee loyalty
HPR Section 8.7, pp. 191–194

Class #18   Th 3/18   Whistle-blowing. BART case. Final version of P4 due.
AR 20: James, Whistle-blowing: its moral justification
AR 21: Davis, Avoiding the tragedy of whistleblowing
AR 22: Friedlander, The case of the three engineers vs. BART
HPR Sections 8.8–8.10, pp. 194–203

3/22 to 3/26   Spring Break

Class #19   Tu 3/30   Codes of ethics: history, purpose. Writing exercises: emphasis.
              Research paper annotated bibliography due.
AR 23: Ladd, The quest for a code of professional ethics
AR 24: Davis, Thinking like an engineer

Class #20   Th 4/1   Examine contemporary codes of ethics. Draft of P5 due.
**   Role play of an electronic intellectual property case.**
AR 25: Gotterbarn, Miller, and Rogerson, Software engineering code of ethics
Hewlett-Packard Standards of Business Conduct,
http://www.hp.com/hpinfo/globalcitizenship/csr/sbcbrochure.pdf (3.4 MB)

Class #21   Tu 4/6   Computer ethics: privacy. Peer editing of P5.
**   Research paper thesis statement and synopsis due.**
AR 26: Tavani, Privacy and security

Class #22   Th 4/8   Computer ethics: social impacts of computers.
**   Feminist approaches to ethics. Final version of P5 due.**
AR 27: Adam and Ofori-Amanfo, Does gender matter in computer ethics?
AR 28: Johnson, Ethics and the Internet II: social implications and social values

Class #23   Tu 4/13   International issues in engineering ethics.
**   *Incident at Morales* video.**
HPR Chapter 10: International engineering professionalism

Class #24   Th 4/15   Obligations of the profession. Choosing a vocation.
**   Writing exercises: shape.**
HPR Chapter 11: Engineering professionalism and ethics: issues old and new
AR 29: Winner, Engineering ethics and political imagination
Florman, Toward the new millennium

Class #25   Tu 4/20   LeMessurier video.
AR 30: Morgenstern, The fifty-nine-story crisis

Class #26   Th 4/22   Student presentations. Full draft of research paper due.

Class #27   Tu 4/27   Student presentations. Discussion of drafts of research papers.

Class #28   Th 4/29   Student presentations.

Class #29   Tu 5/4   Student presentations. Final version of research paper due.

Finals Week   Course wrap-up. INSTRUCTION EVALUATION.
Section E3: 9:00 a.m., Friday, May 7
Section E4: 1:30 p.m., Saturday, May 8

1. E. Greenwood, Attributes of a profession, Chapter 6, pp. 67–77, in *Ethical Issues in Engineering*, ed. D. G. Johnson, Prentice-Hall, Englewood Cliffs, N.J., 1991.

2. M. Davis, A history of engineering in the United States, Chapter 2, pp. 18–30, in *Thinking Like an Engineer: Studies in the Ethics of a Profession*, Oxford University Press, New York, 1998.

3. M. D. Bayles, Obligations between professionals and clients, Chapter 4, pp. 69–80, in *Professional Ethics*, 2nd ed., Wadsworth, Belmont, Calif., 1989.

4. S. R. Covey, Inside-out, pp. 15–45, and The seven habits—an overview, pp. 46–53, in *The Seven Habits of Highly Effective People*, Simon and Schuster, New York, 1989.

5. J. M. Williams, Lesson 3: actions, pp. 33–52, in *Style: Ten Lessons in Clarity and Grace*, 7th ed., Addison Wesley Longman, New York, 2003.

6. J. Ladd, Collective and individual moral responsibility in engineering: some questions, *IEEE Technology and Society Magazine*, vol. 1, no. 2, pp. 3–10, June 1982.

7. H. Nissenbaum, Computing and accountability, *Communications of the ACM*, vol. 37, no. 1, pp. 73–80, Jan. 1994.

8. K. D. Alpern, Moral responsibility for engineers, *Business and Professional Ethics*, vol. 2, no. 2, pp. 39–48, 1983.

9. S. C. Florman, Doing good, Chapter 9, pp. 151–163, in *The Introspective Engineer*, St. Martin's Griffin, New York, 1996.

10. M. C. McFarland, Intellectual property, information, and the common good, pp. 252–262, in *Readings in Cyberethics*, ed. R. A. Spinello and H. T. Tavani, Jones and Bartlett, Sudbury, Mass., 2001.

11. S. Warwick, Is copyright ethical? An examination of the theories, laws, and practices regarding the private ownership of intellectual work in the United States, pp. 263–279, in *Readings in Cyberethics*, ed. R. A. Spinello and H. T. Tavani, Jones and Bartlett, Sudbury, Mass., 2001.

12. N. Luebke, Conflict of interest as a moral category, *Business and Professional Ethics Journal*, vol. 6, no. 1, pp. 66–81, Spring 1987.

13. B. V. Koen, Toward a definition of the engineering method, *Engineering Education*, vol. 75, no. 3, pp. 150–155, Dec. 1984.

14. H. Petroski, The ups and downs of bridges, Chapter 13, pp. 158–171, in *To Engineer is Human: The Role of Failure in Successful Design*, St. Martin's Press, New York, 1985.

15. M. W. Martin and R. Schinzinger, Engineering as social experimentation, Chapter 3, pp. 80–95, in *Ethics in Engineering*, McGraw-Hill, New York, 1996.

16. R. T. DeGeorge, Ethical responsibilities of engineers in large organizations: the Pinto case, *Business and Professional Ethics Journal*, vol. 1, no. 1, pp. 1–14, 1981.

17. T. E. Bell and K. Esch, The fatal flaw in Flight 51-L, *IEEE Spectrum*, vol. 24, no. 2, pp. 36-51, Feb. 1987.

18. M. Baron, The moral status of loyalty, Chapter 19, pp. 225–240, in *Ethical Issues in Engineering*, ed. D. G. Johnson, Prentice-Hall, Englewood Cliffs, N.J., 1991.

19. R. Duska, Whistle-blowing and employee loyalty, Chapter 20, pp. 241–247, *in Ethical Issues in Engineering*, ed. D. G. Johnson, Prentice-Hall, Englewood Cliffs, N.J., 1991.

20. G. G. James, Whistle-blowing: its moral justification, Chapter 22, pp. 263–278, *in Ethical Issues in Engineering*, ed. D. G. Johnson, Prentice-Hall, Englewood Cliffs, N.J., 1991.

21. M. Davis, Avoiding the tragedy of whistleblowing, *Business and Professional Ethics Journal*, vol. 8, no. 4, pp. 3–19, Summer 1988.

22. G. D. Friedlander, The case of the three engineers vs. BART, *IEEE Spectrum*, vol. 11, no. 10, pp. 69–76, Oct. 1974.

23. J. Ladd, The quest for a code of professional ethics: an intellectual and moral confusion, Chapter 12, pp. 130–136, in *Ethical Issues in Engineering*, ed. D. G. Johnson, Prentice-Hall, Englewood Cliffs, N.J., 1991.

24. M. Davis, Thinking like an engineer: the place of a code of ethics in the practice of a profession, *Philosophy and Public Affairs*, vol. 20, no. 2, pp. 150–167, Spring 1991.

25. D. Gotterbarn, K. Miller, and S. Rogerson, Software engineering code of ethics is approved, *Communications of the ACM*, vol. 42, no. 10, pp. 102–107, Oct. 1999.

26. H. T. Tavani, Privacy and security, Chapter 4, pp. 65–95, in *Internet Ethics*, ed. D. Langford, St. Martin's Press, New York, 2000.

27. A. Adam and J. Ofori-Amanfo, Does gender matter in computer ethics? *Ethics and Information Technology*, vol. 2, pp. 37–47, 2000.

28. D. G. Johnson, Ethics and the Internet II: social implications and social values, Chapter 8, pp. 199–233, in *Computer Ethics*, 3rd ed., Prentice Hall, Upper Saddle River, N.J., 2001.

29. L. Winner, Engineering ethics and political imagination, Chapter 32, pp. 376–385, in *Ethical Issues in Engineering*, ed. D. G. Johnson, Prentice-Hall, Englewood Cliffs, N.J., 1991.

30. J. Morgenstern, The fifty-nine-story crisis, *The New Yorker*, pp. 45–53, May 29, 1995.

For each response paper and the research paper, you will first develop and submit a complete draft. You may use any writing process to develop the draft; you should plan and compose the draft carefully over several days. The draft that you submit should not be the first version out of the printer, but it should have already undergone some revision. When you submit a draft response paper, you should also submit your notes, outlines, and rough early versions. You may include a list of questions about the draft that you want the instructor to address.

The instructors will comment on the submitted draft to guide your revisions toward the final version. In their comments, the instructors will focus on the arguments and the overall presentation. The instructors will not edit your writing to correct errors of grammar and mechanics—you will be responsible for these errors. As you revise your draft, you should not merely correct individual errors and amend individual words; you may alter the overall organization and recast entire paragraphs to improve their coherence.

When you submit the final version of a paper, you should also submit the draft that the instructor reviewed. Only the final version will receive a grade.

Each submission should represent your own work. You may obtain suggestions on your paper from other students, but plagiarism is unacceptable. That is, you must not represent the ideas or words of other authors as your own.

In your papers, the reasoning should be sound, based on appropriate evidence and principles. The ideas should be clear and well organized. The tone and style should be appropriate for the assignment. Each paragraph should have a clear purpose, with a logical sequencing of sentences and a variety of sentence structures. Each sentence should be graceful and coherent. Each word should be chosen precisely; there should be no superfluous words. The grammar, punctuation, and spelling should conform to accepted usage.

The recommended textbooks by Hacker and by Williams offer excellent guidance and advice on writing.

Professor Hillmer's Perspective on the Characteristics of Good Writing: Clarity, Substance, and Revision

Good writing is *clear* and *substantive*. In examining the structure and process of good writing, it is evident that there is a profound reciprocal interrelation between the degree to which a person has probed and comprehended the substance of a given issue and the corresponding clarity with which an individual is able to express one's thoughts in well-crafted prose.

Clear writing and clear thinking are intimately connected. Clear and precise writing requires focused and sustained reflection; yet one's grasp of the essential meaning and substance of a particular concept or position is clarified and developed in the process of writing. Clear thinking is the precondition and cornerstone of clear writing, but it is through the labor of substantive reflection—actualized in the task of writing—that an idea is often crystallized and given conceptual expression. The act of writing is thus one of the primary ways in and through which one learns the art of clear, rigorous, and substantive thinking.

Writing is a difficult and arduous process. Good writing requires the important discipline of *revision*: writing and re-writing, thinking and re-thinking, with hammer and chisel in hand. Ludwig Wittgenstein once wrote: "Everything that can be thought at all can be thought clearly. Everything that can be said can be said clearly." Likewise, I would add: "Everything that can be

written can be written clearly." Yet not without the labor of revision. Hence, *patience*, *persistence*, and *perseverance* are indispensable character qualities that sustain and empower a good writer.

Professor Loui's Pet Peeves

Unclear referents for pronouns

Example: "As a girl, I liked to play with computers, *which* was not supported by my parents. Fortunately, a teacher in high school saw that I was good at *it* and advised me to major in engineering. *This* was more difficult than I had imagined."

Revision: "As a girl, I liked to play with computers, but my parents didn't support my interests. Fortunately, a teacher in high school noticed my talent with computers and advised me to major in engineering—advice that was more difficult to follow than I had imagined." [Paraphrased from an example by John C. Bean.]

Dangling participle

Example: "Typing on my computer, the alarm rang."
Revision: "As I typed on my computer, the alarm rang."

Fused participle

Example: "Do you mind *me playing* the piano?"
Revision: "Do you mind *my* playing the piano?"

Shifting stance

Example: "American *corporations* hire engineers to develop new weapons. The *public* demands increasingly sophisticated weapons. Many *engineers* have moral reservations about participating in weapons development. *Weapons* of mass destruction raise particular concerns because they kill indiscriminately. Some *engineers* avoid careers in weapons development."

Revision: "Although *engineers* are hired by American corporations to fulfill the public's demands for increasingly sophisticated weapons, many *engineers* have moral reservations about developing new weapons, particularly weapons of mass destruction, which kill indiscriminately. Because of these moral concerns, some *engineers* avoid careers in weapons development."

Guidelines for Gender-Inclusive Usage

Use gender-inclusive language in your writing, unless the gender of the specific person is known. Avoid, however, cumbersome devices such as slashes (*he/she, his/her*), alternating usage (*he* in one paragraph, and *she* in the next), and the repetitive use of the conjunction "*or*" (*he or she, his or her*). Here are some basic methods:

1. Use the noun
2. Use the plural
3. Delete the pronoun
4. Use an article or conjunction: *a, an, the, but, and*
5. Use the following relative pronouns: *who, whom, whose*
6. Use the passive
7. Rewrite the sentence

Example #1: "The final judge of a young *man's* gradual advance is as much or more *his* employer as *his* professional colleagues." [Layton]
Revision: "The final judge of *the engineer's* gradual advance is as much or more *the*

employer as professional colleagues." **(1, 3, 4)**

Example #2: "An engineer should prepare *his* drawings carefully."
Revisions: "*Engineers* should prepare *their* drawings carefully." **(2)**
"Drawings should be prepared carefully." **(2, 6)**

Example #3: "If a consulting engineer has worked for a competitor, then *he* should disclose the possible conflict of interest to *his* potential client."
Revision: "A consulting engineer *who* has worked for a competitor should disclose the possible conflict of interest to *a* potential client." **(5, 4)**

In this assignment you will write an essay that describes your understandings about the responsibilities and characteristics of professional engineers at the beginning of the course, based on the responses to these questions that you wrote in class on January 20:

1. What are the characteristics of the ideal professional engineer? What are the engineer's most important professional responsibilities? Give specific examples. Explain your reasoning.

2. What people and experiences have shaped your understanding of these characteristics and responsibilities? How have they done so? Describe specific incidents or actions you have taken. Possible sources could include relatives, friends, employment, courses, student organizations, etc.

3. To what extent do you feel that you have these characteristics and are prepared for these responsibilities? Why or why not? How would you know that you are a professional engineer? Give specific criteria.

Your essay should have at least 400 words and run two to three pages, double-spaced. With the draft, submit your "Notes for P1" sheet. For further instructions, see the general Writing Guidelines distributed in class on January 20 and posted on the course Web site.

For the final version (only), put your name, the submission date, and an appropriate title on an additional cover page. When you submit the final version of P1, include the draft read by your instructor. The final version will be graded according to the following criteria and standards for writing, not for the content.

Clarity and Organization
3: Overall organization is apparent with transitions. Paragraphs are coherent. Ideas are clear.
2: Each paragraph has a clear purpose. Sentences usually follow a logical sequence.
1: Paragraphs are too choppy or too long, but main ideas are generally evident.
0: Organizational faults interfere with the clarity of the paper.

Sentences and Diction
3: Graceful sentences with appropriate variety of structures. Words are chosen precisely. Writing is vigorous and engaging.
2: Occasionally awkward or vague. Active verbs; few superfluous or poorly chosen words. Some pronouns without clear referents.
1: Several cumbersome and vague sentences, pronouns without referents. Wordy, excessive nominalizations, weak verbs.
0: Many convoluted and unclear sentences. Too wordy, many weak verbs.

Mechanics and Grammar
3: No errors of spelling, grammar, punctuation, or usage.
2: Minor errors of mechanics and grammar.
1: Several instances of solecisms and substandard usage (more than two per page).
0: Many errors of grammar and usage (more than three per page).

Miscellaneous
1: Follows instructions: draft and final version on time, draft included with final version, etc
0: No paper submitted.

For response paper P2, choose one of the following cases in the HPR textbook and analyze it:

> Case 12: Drinking in the Workplace
> Case 32: Oil Spill?
> Case 37: Pulverizer
> Case 55: Wonderful Development?

Identify the affected parties, their rights, their responsibilities, and salient moral issues. Identify relevant factual and conceptual issues, social constraints, and additional information. Formulate possible courses of action. Evaluate the strengths and weaknesses of those actions using appropriate criteria: consequentialist or deontological tests, virtues, moral principles, line-drawing, or analogies.

In the HPR textbook, Cases 3 (Auditory Visual Tracker), 6 (Catalyst), 8 (The Co-Op Student), 11 (To Dissent or Not to Dissent?), 14 (Employment Opportunity), and 33 (Parkville) include exemplary analyses.

Assume that you are an internal ethics consultant for the organization at which the case has occurred. You have been asked by managers at the organization to analyze the case and to recommend possible solutions. Because the managers are familiar with the case, you should ***not*** begin with a long summary of the case; in your arguments, however, you should cite specific facts from the case. The managers who will read your report have not taken a course on ethics, and they do not know fancy words such as "deontological."

Because your readers have a limited attention span, your paper P2 should be only three pages long, double-spaced. For the final version, put your name, the submission date, and an appropriate title on an additional cover page, e.g.,

<div align="center">

Response Paper P2
Analysis of Case 32: Oil Spill?

</div>

Include the draft of P2 with the final version, which will be graded according to the criteria and standards below. For further instructions, see the general Writing Guidelines distributed in class on January 20 and posted on the course Web site.

Grading Criteria

Moral analysis
3: Completely and specifically identifies affected parties, their rights, and their responsibilities; identifies key moral issues
2: Identifies important affected parties, rights, responsibilities, and moral values
1: Identifies some affected parties, rights, responsibilities, and moral values but may miss some
0: Fails to identify many parties, rights, responsibilities; misunderstands moral issues

Contextual analysis
3: Thoroughly distinguishes relevant factual and conceptual issues; lists social and legal constraints; and identifies missing information

2: Identifies the most important issues and constraints
1: Identifies some issues
0: Fails to identify relevant issues

Actions
2: Creatively proposes several reasonable actions
1: Suggests one or more reasonable actions
0: Proposed actions, if any, are not reasonable or feasible

Evaluation
3: Thoroughly evaluates strengths and weaknesses of actions: consequentialist or deontological tests, virtues, line-drawing, analogies, etc. Uses specific, concrete examples.
2: Evaluates actions substantively, but may miss major advantages or disadvantages
1: Some attempt to evaluate actions
0: No evaluation

Clarity and Organization
3: Overall organization is apparent with transitions. Paragraphs are coherent. Ideas are clear for intended readers.
2: Each paragraph has a clear purpose. Sentences usually follow a logical sequence.
1: Paragraphs are too choppy or too long, but main ideas are generally evident.
0: Organizational faults interfere with the clarity of the paper.

Sentences and Diction
3: Graceful sentences with appropriate variety of structures. Words are chosen precisely. Writing is vigorous and engaging.
2: Occasionally awkward or vague. Active verbs; few superfluous or poorly chosen words. Some pronouns without clear referents.
1: Several cumbersome and vague sentences, pronouns without referents. Wordy, excessive nominalizations, weak verbs.
0: Many convoluted and unclear sentences. Too wordy, many weak verbs.

Mechanics and Grammar
3: No errors of spelling, grammar, punctuation, or usage.
2: Minor errors of mechanics and grammar.
1: Several instances of solecisms and substandard usage (more than two per page).
0: Many errors of grammar and usage (more than three per page).

RESPONSE PAPER P3

For response paper P3, choose one of the following cases in the HPR textbook and analyze it:

> Case 13: Disaster Relief
> Case 35: Price Is Right?
> Case 40: Side-Saddle Gas Tanks
> Case 50: Walkway Disaster

Identify the affected parties, their rights, their responsibilities, and salient moral issues. Identify relevant factual and conceptual issues, social constraints, and additional information. Formulate possible courses of action for the main actor(s). Evaluate the strengths and weaknesses of those actions using appropriate criteria: consequentialist or deontological tests, virtues, moral principles, line-drawing, or analogies.

In the HPR textbook, Cases 3 (Auditory Visual Tracker), 6 (Catalyst), 8 (The Co-Op Student), 11 (To Dissent or Not to Dissent?), 14 (Employment Opportunity), and 33 (Parkville) include exemplary analyses.

Assume that you are an internal ethics consultant for the organization at which the case has occurred. You have been asked by managers at the organization to analyze the case and to recommend possible solutions. Because the managers are familiar with the case, you should ***not*** begin with a long summary of the case; in your arguments, however, you should cite specific facts from the case. The managers who will read your report have not taken a course on ethics, and they do not know fancy words such as "deontological."

Because your readers have a limited attention span, your paper P3 should be only three pages long, double-spaced. For the final version, put your name, the submission date, and an appropriate title on an additional cover page, e.g.,

<div align="center">

Response Paper P3
Analysis of Case 50: Walkway Disaster

</div>

Include the draft of P3 with the final version, which will be graded according to the criteria and standards below. For further instructions, see the general Writing Guidelines distributed in class on January 20 and posted on the course Web site.

Grading Criteria

Moral analysis
3: Completely and specifically identifies affected parties, their rights, and their responsibilities; identifies key moral issues
2: Identifies important affected parties, rights, responsibilities, and moral values
1: Identifies some affected parties, rights, responsibilities, and moral values but may miss some
0: Fails to identify many parties, rights, responsibilities; misunderstands moral issues

Contextual analysis
3: Thoroughly distinguishes relevant factual and conceptual issues; lists social and legal constraints; and identifies missing information

2: Identifies the most important issues and constraints
1: Identifies some issues
0: Fails to identify relevant issues

Actions
2: Creatively proposes several reasonable actions
1: Suggests one or more reasonable actions
0: Proposed actions, if any, are not reasonable or feasible

Evaluation
3: Thoroughly evaluates strengths and weaknesses of actions: consequentialist or deontological tests, virtues, line-drawing, analogies, etc. Uses specific, concrete examples.
2: Evaluates actions substantively, but may miss major advantages or disadvantages
1: Some attempt to evaluate actions
0: No evaluation

Clarity and Organization
3: Overall organization is apparent with transitions. Paragraphs are coherent. Ideas are clear.
2: Each paragraph has a clear purpose. Sentences usually follow a logical sequence.
1: Paragraphs are too choppy or too long, but main ideas are generally evident.
0: Organizational faults interfere with the clarity of the paper.

Sentences and Diction
3: Graceful sentences with appropriate variety of structures. Words are chosen precisely. Writing is vigorous and engaging.
2: Occasionally awkward or vague. Active verbs; few superfluous or poorly chosen words. Some pronouns without clear referents.
1: Several cumbersome and vague sentences, pronouns without referents. Wordy, excessive nominalizations, weak verbs.
0: Many convoluted and unclear sentences. Too wordy, many weak verbs.

Mechanics and Grammar
3: No errors of spelling, grammar, punctuation, or usage.
2: Minor errors of mechanics and grammar.
1: Several instances of solecisms and substandard usage (more than two per page).
0: Many errors of grammar and usage (more than three per page).

For response paper P4, choose one of the following articles from the Additional Readings and analyze it critically.

> AR 6: Ladd, Collective and individual moral responsibility in engineering
> AR 7: Nissenbaum, Computing and accountability
> AR 8: Alpern, Moral responsibility for engineers
> AR 9: Florman, Doing good
> AR 10: McFarland, Intellectual property, information, and the common good
> AR 11: Warwick, Is copyright ethical?
> AR 12: Luebke, Conflict of interest as a moral category
> AR 13: Koen, Toward a definition of the engineering method
> AR 14: Petroski, The ups and downs of bridges
> AR 15: Martin and Schinzinger, Engineering as social experimentation

You should summarize the important ideas in the article, identify the author's implicit assumptions or perspectives, and evaluate the strengths and weaknesses of the author's arguments. Your analysis may either support or contravene the author's arguments. Your analysis should include specific, concrete examples, evidence, and reasons.

Your paper P4 should be three pages long, double-spaced. For the final version (only), put your name, the submission date, and an appropriate title on an additional cover page, e.g.,

Response Paper P4
Analysis of "The ups and downs of bridges" by Petroski

Include the draft of P4 with the final version, which will be graded according to the criteria and standards below.

For further instructions, see the general Writing Guidelines distributed in class on January 20 and posted on the course Web site.

Grading Criteria

Accurate summary of article
3: Complete, accurate summary, emphasizing important points
2: Competent summary; may miss some major points
1: Superficial understanding
0: Misunderstands the author

Identification of implicit assumptions and perspectives
2: Identifies several subtle assumptions or perspectives
1: Identifies an implicit assumption correctly
0: No implicit assumptions correctly identified

Analysis of strengths and weaknesses
3: Unusually thorough, inventive, fully justified
2: Supports well-developed arguments through evidence and specific examples
1: Analysis with insufficient support, unwarranted generalizations

0: Analysis is absent

Creativity
2: Creative use of materials; e.g., relates to life experiences or ideas in other courses
1: Some attempt to relate materials to other experiences or ideas, but not wholly successful
0: No creativity demonstrated

Clarity and Organization
3: Overall organization is apparent with transitions. Paragraphs are coherent. Ideas are clear.
2: Each paragraph has a clear purpose. Sentences usually follow a logical sequence.
1: Paragraphs are too choppy or too long, but main ideas are generally evident.
0: Organizational faults interfere with the clarity of the paper.

Sentences and Diction
3: Graceful sentences with appropriate variety of structures. Words are chosen precisely. Writing is vigorous and engaging.
2: Occasionally awkward or vague. Active verbs; few superfluous or poorly chosen words. Some pronouns without clear referents.
1: Several cumbersome and vague sentences, pronouns without referents. Wordy, excessive nominalizations, weak verbs.
0: Many convoluted and unclear sentences. Too wordy, many weak verbs.

Mechanics and Grammar
3: No errors of spelling, grammar, punctuation, or usage.
2: Minor errors of mechanics and grammar.
1: Several instances of solecisms and substandard usage (more than two per page).
0: Many errors of grammar and usage (more than three per page).

Miscellaneous
1: Follows instructions: draft and final version on time, draft included with final version, etc.
0: No paper submitted.

For response paper P5 you may construct a new code of ethics, create a fictional case, or write a dialogue.

- *Code of ethics*. Write a new code of ethics for engineering, a branch of engineering, or another profession. Structure your code as a list of statements, with a brief explanation after each statement. You might explain how specific provisions of your code improve over other professional codes of ethics.
- *Fictional case, Dialogue*. In a case or dialogue, illustrate issues of engineering ethics. At the end, in roughly 25% of the total length of the paper, state the important ethical questions that you think your case or dialogue raises. You do **not** need to write a full analysis.

Your paper P5 should be three or more pages long, double-spaced. For the final version, put your name, the submission date, and an appropriate title on an additional cover page, e.g.,

Response Paper P5
How to Succeed in Ethics Without Really Trying:
A Dialogue in One Short Act

When you submit the final version of P5, include the draft read by your instructor and the draft read by a fellow student on April 6. The final version will be graded according to the criteria and standards stated below.

Grading Criteria

Substance
4: Code, case, or dialogue covers many important aspects of professional ethics
2: Code, case, or dialogue covers some important aspects of professional ethics
0: Code, case, or dialogue covers few important aspects of professional ethics

Analysis
4: Insightful explanations or questions, demonstrates understanding of subtleties
2: States reasonable explanations or identifies natural questions
0: Analysis is absent

Creativity
2: Demonstrates striking novelty
1: Moderately creative
0: Conventional, pedestrian

Clarity and Organization
3: Overall organization is apparent with transitions. Paragraphs are coherent. Ideas are clear.
2: Each paragraph has a clear purpose. Sentences usually follow a logical sequence.
1: Paragraphs are too choppy or too long, but main ideas are generally evident.
0: Organizational faults interfere with the clarity of the paper.

Sentences and Diction

3: Graceful sentences with appropriate variety of structures. Words are chosen precisely. Writing is vigorous and engaging.

2: Occasionally awkward or vague. Active verbs; few superfluous or poorly chosen words. Some pronouns without clear referents.

1: Several cumbersome and vague sentences, pronouns without referents. Wordy, excessive nominalizations, weak verbs.

0: Many convoluted and unclear sentences. Too wordy, many weak verbs.

Mechanics and Grammar

3: No errors of spelling, grammar, punctuation, or usage.

2: Minor errors of mechanics and grammar.

1: Several instances of solecisms and substandard usage (more than two per page).

0: Many errors of grammar and usage (more than three per page).

Miscellaneous

1: Follows instructions: draft and final version on time, draft included with final version, provided substantive comments on another student's draft, posted final version on Web board, etc.

0: No paper submitted.

The final research paper is the compositional apex of the course. This project will enable you to study in depth a specific topic in engineering ethics not covered in the course. You will find and read relevant scholarly articles and books, and you will write a paper to support a thesis.

Students who work on similar topics may discuss their ideas with each other and share references. To avoid conscious or unconscious plagiarism, however, these students should not read each other's writing.

Important Dates

To encourage you to start early and to make continual progress, we have set the following milestones:

Topic and research question:	March 9
Annotated bibliography:	March 30
Thesis statement and synopsis:	April 6
Complete draft:	April 22
Oral presentations:	April 22, 27, 29, May 4
Final version:	May 4

Each submission will be returned at the next class meeting. Only the final version of the term paper will receive a grade.

In the recommended text *A Writer's Reference* by Diana Hacker, you will find excellent advice on preparing a research paper in Section R, "Researching," and on composing a paper in Section C, "Composing and Revising."

Topic and research question

First, find a research topic related to engineering ethics, then formulate a specific question to guide your work. Choose a topic in which you are genuinely interested. Your research question should be well defined and focused. Here are some subjects for you to consider, but ask your own specific question. All research projects require the approval of an instructor.

Law and Professionalism in Engineering Practice

Should all engineers be licensed?

Why have unions been unsuccessful in enrolling engineers?

Can a conscientious engineer testify as a partisan expert witness?

What are the moral reasons for encouraging the acceptance of women in engineering?

Do intellectual property laws and licensing requirements inhibit innovation in information technologies?

Moral Issues in Bioengineering and the Environment

Though economically efficient, are pollution credits ethical?

Should patents be permitted for genetically engineered bacteria?

Should gene therapy be allowed? Research on cloning mammals?

In countries whose environmental standards are weaker than in the United States, what levels of pollution should be considered ethical?

Technology and Society

Is planned obsolescence in the public interest?

How should Intel have handled the controversy over the Pentium chips?

What are the moral implications of increasing automation in the workplace?

How do Japanese customs and values affect the conduct of business and engineering in Japan?

Should large corporations transfer low skill jobs to developing countries whose labor costs are lower than in the United States?

Bibliography

Your bibliography should include selected articles from scholarly journals or books, because professional journals and university presses have high standards of editorial review. It is likely that several professors trying to achieve tenure have already published something about your topic. You should read and understand their work, but you do not need to agree with them. Consider your project as part of ongoing research and discussion in a larger scholarly community.

For the annotated bibliography, include one or two sentences about each item. The bibliography in the final version need not have these annotations.

To find relevant, authoritative articles and books, you can use electronic databases of articles. Some journals now have online versions to which the university library subscribes. You may also consult a reference librarian.

You may use material from popular magazines and the Web, but you should take special care to evaluate those sources critically. Material published in magazines and posted openly on the Web is more likely to be inaccurate and biased.

Thesis Statement and Synopsis

Your thesis statement should be an assertion, such as "Although pollution credits appear to condone environmental degradation, they are an ethical national policy," or "With the end of the Cold War, it is unethical for engineers to participate in the development of nuclear weapons," or "The fundamental ethical value in Japanese business is loyalty."

Your synopsis should sketch the main arguments that you plan to advance in support of your thesis, and the counter-arguments that you plan to address. The synopsis should be about two pages long.

Oral Presentations

You will make a ten-minute oral presentation of your project in class at the end of the semester. You may use the overhead projector. A schedule will be distributed later.

Format of the Research Paper

Excluding a cover page and references, the text of your paper should be eight or more pages long, double-spaced, in 12-point type, with one-inch margins. Each page should be numbered. To number pages automatically in Microsoft Word, look in the "Insert" menu for the "Page Numbers" function.

In the text, you may use headers to identify sections and subsections, such as the introduction and the conclusion. The introduction should end with the thesis statement. The conclusion should summarize the main points of the paper.

Cite all sources that you have consulted. You may use any reasonable format for citations and references: APA, Chicago Manual of Style, IEEE, MLA, etc. You may place references either in footnotes or in a separate bibliography at the end of the paper.

Group Discussion of Research Papers

The entire class will be divided into groups of three students. Within each group, the students will be working on different topics.

You will take three copies of a complete draft of your paper to the class meeting on April 22. Your paper will be read by the two other members of your group and by your instructor. (Thus, you will read the papers of the other two members of your group.) On April 27, you will discuss the draft of your research paper with the other students in your group. Divide the class time equally among the papers in your group. The following "Rules" are adapted from C. Myers and T. B. Jones, *Promoting Active Learning: Strategies for the College Classroom,* Jossey-Bass, San Francisco, 1993.

Rules for Readers

1. You have a unique opportunity to share in the growth of classmates in your group. It is an honor and a privilege. Treat it as such by speaking with thought and respect.

2. You do not have to agree with what the other person is trying to communicate. If you feel there is a legitimate weakness in the content or presentation, say so. But do not disagree merely for the sake of expressing your own point of view. Treat other students with dignity and kindness.

3. If you see technical errors (spelling, punctuation, and so on), note them in the margin of the paper and give it to the writer after the discussion. Group time is best spent on focusing on elements such as organization and idea development. A checklist appears below.

Rules for Writers

1. Listen carefully to the responses of your classmates. Remember, they are trying to help you communicate better.

2. If people ask for clarification, remember, they are not attacking you. Hear what they are asking and try to help them understand what you are trying to say.

3. Do not be paralyzed by feedback. First drafts are almost universally horrible and need a lot of work. This is your paper, and it will be better to the degree that you incorporate your classmates' feedback.

Checklist for Review of Research Paper Draft

Thesis and Arguments

    Is the thesis statement clear?
    Are terms and concepts defined precisely?
    Are the arguments in support of the thesis sound?
    Is there sufficient factual evidence in support of the thesis?
    Have possible counter-arguments been considered and addressed?
    Do all arguments focus on the thesis?

Organization

    Is the structure of the paper evident?
    Are the transitions between sections and paragraphs logical?
    Is each paragraph coherent?
    Does each sentence have a clear purpose?

Style and Mechanics

    Is the tone appropriate?
    Do the sentences flow gracefully, with a variety of sentence structures?
    Are the grammar and English usage idiomatic?
    Are words chosen carefully?
    Are there any superfluous words?

Are the spelling and punctuation correct?
Are references cited properly?

Final Version

  Based on the comments and discussion during the last class meeting, you will revise your paper and submit the final version to your instructor on May 4. For the final version, the cover page should include your mailing address. With the final version, you should also submit the drafts read by the instructor and by the other students in your group. We expect to return the research paper at the class meeting during Finals Week; if you are unable to pick up your paper during Finals Week, the instructors will mail it to you at the address on the cover page.

Grading

Moral and Contextual Analysis
4: Analyzes moral issues thoroughly from multiple perspectives. Makes careful moral distinctions. Thoroughly identifies and explains relevant factual and conceptual issues. Lists social and legal constraints.
2: Identifies the some issues and constraints
0: Fails to identify relevant issues

Arguments for Thesis
4: Provides convincing arguments for thesis statement. Uses consequentialist, deonotological, line-drawing, analogies, or virtue-based reasoning appropriately. Uses facts and specific examples. Evaluates sources critically.
2: Provides reasonable arguments for thesis statement.
0: Provides weak arguments for thesis statement.

Counter-Arguments
4: Identifies and addresses counter-arguments with full success. Uses consequentialist, deonotological, line-drawing, analogies, or virtue-based reasoning appropriately. Uses facts and specific examples. Evaluates sources critically.
2: Identifies some counter-arguments and responds with partial success.
0: Neglects counter-arguments.

Creativity and Insight
2: Demonstrates striking novelty and insight. Understands subtle issues.
1: Moderately creative and insightful.
0: Conventional, pedestrian treatment of issues.

Clarity and Organization
3: Overall organization is apparent with transitions. Paragraphs are coherent. Ideas are clear.
2: Each paragraph has a clear purpose. Sentences usually follow a logical sequence.
1: Paragraphs are too choppy or too long, but main ideas are generally evident.
0: Organizational faults interfere with the clarity of the paper.

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2: Minor errors of mechanics and grammar.
1: Several instances of solecisms and substandard usage (more than two per page).
0: Many errors of grammar and usage (more than three per page).

Format and Documentation
1: Introduction leads to thesis statement. Conclusion summarizes key points. Body of paper cites sources appropriately. Bibliography includes all cited references.
0: Deficient in one or more aspects.

Cooperation
1: Provided detailed, substantive comments on drafts of other students' research papers.
0: Few or no comments provided.

The oral presentation of your research paper will be graded on a basis of 5 total points:

Content
2: Stated thesis explicitly. Explained arguments and counter-arguments thoroughly
1: Stated thesis. Outlined some arguments and counter-arguments.
0: Did not present paper.

Presentation
2: Spoke clearly and fluently. Visual aids, if any, were helpful.
1: Speaking was sometimes awkward or unclear.
0: Confusing or unclear presentation.

Creativity
1: Demonstrated ingenuity and creativity in content or presentation.
0: No creativity demonstrated.