

**PHILOSOPHY 325
ENGINEERING ETHICS**

BULLETIN INFORMATION

PHIL 325: Engineering Ethics (3 credit hours)

Course Description:

An investigation of ethical issues in engineering and engineering-related technology. Topics include whistleblowing, employee/employer relations, environmental issues, issues related to advances in information technology, and privacy.

SAMPLE COURSE OVERVIEW

Engineering ethics involves two related skills: the ability to analyze complex socio-political problems concerning the design, manufacturing, and use of technologies and their technological systems and the ability to communicate reasonably and persuasively about such analyses. In this course we develop both sets of skills through lectures, discussions, written and oral assignments, focusing on the examination of several case studies concerning real technologies in society.

ITEMIZED LEARNING OUTCOMES

Upon successful completion of Philosophy 325, students will be able to:

1. Identify the source and function of values through the investigation of technology in society.
2. Demonstrate an understanding of the importance of values, ethics, and social responsibility for the self and contemporary society within the framework of the engineering profession.
3. Demonstrate the ability to reflect on how values shape personal, professional, and community ethics and decision-making.
4. Identify and demonstrate appropriate means of communication for varied audiences and purposes.
5. Demonstrate the ability to reason clearly in speaking and writing to inform, persuade, and exchange views.
6. Articulate a critical and informed position on an issue and engage in productive and responsible intellectual exchanges that demonstrate the ability to grasp and respond to other positions as well as set forth their own.

SAMPLE REQUIRED TEXTS/SUGGESTED READINGS/MATERIALS

1. Sarah Pfatfeicher, *Lessons Amid the Rubble: An Introduction to Post-Disaster Engineering and Ethics* (Johns Hopkins University Press, 2010) ISBN: 0-8018-9720-3
2. David Zarefsky, *Strategic Public Speaking: A Handbook* (Pearson, 2007). ISBN: 9780205472086

3. NOTE: Chapters in Zarefsky are assigned out of order. Some chapters are assigned twice in order to return to review and discuss concepts introduced earlier in the semester. Students will also be encouraged to use the book as a reference, seeking information on the problems they encounter in planning and presenting their speeches.

4. General Readings:

- a. National Society for Professional Engineers Code of Ethics, available at <http://www.nspe.org/Ethics/CodeofEthics/index.html>
- b. Alan Gewirth, "Professional Ethics: The Separatist Thesis" *Ethics* (January 1986): 282-300.
- c. Thomas P. Hughes, "The Evolution of Large Technological Systems" In *The Social Construction of Technological Systems*, second edition (MIT Press, 2012) 46-76.
- d. Thomas Rogers, "The End Use Problem in Engineering Ethics," *PSA: Proceedings of the Biennial Meeting of the Philosophy of Science Association* Volume Two: Symposia and Invited Papers (1980): 464-480.
- e. Jon Schmidt, "Engineering Ethics as Virtue Ethics" *Structure* (May 2011) <http://www.structuremag.org/article.aspx?articleID=1247>
- f. L. Weed, "Is the Precautionary Principle a Principle?" *IEEE Technology and Society* Vol 21, no. 4, (2003): 45-58.
- g. Richard R. Nelson, "What is Private and What Is Public About Technology?" *Science, Technology, & Human Values* 14 (1989): 229-241.

5. Case Study readings (posted to Blackboard): In many cases, these are extensive readings. Students are expected to familiarize themselves with the cases to the extent necessary for informed discussion and oral presentation. Discovering how much information is needed is one of the skills students are expected to develop through this process. This serves the course requirement that students develop "critical approaches to topic selection, subject appropriate research, and the identification of controversy in complex issues." *THESE ARE SAMPLES OF THE TYPES OF CASES AND READING USED IN THE COURSE; ACTUAL CASES CHANGE EACH SEMESTER TO PROVIDE TOPICAL AND RELEVANT MATERIAL.*

6. Fuel Cell Technology

- a. Kevin C. Elliott, "Hydrogen Fuel-Cell Vehicles, Energy Policy and the Ethics of Expertise" *Journal of Applied Philosophy* Vol 27 no. 4 (2010):376-393.
- b. White House Press Release, 'Hydrogen fuel: A clean and secure energy future', 30 January 2003; available at <http://www.whitehouse.gov/news/releases/2003/01/print/20030130-20.html>.
- c. G.W. Bush, 'Hydrogen fuel initiative can make "fundamental difference" ', Remarks at The Nation Building Museum, Washington, DC, 6 February 2003; available at: <http://www.whitehouse.gov/news/releases/2003/02/print/20030206-12.html>.
- d. Ogden, 'High hopes for HYDROGEN', *Scientific American* 295 (September 2006): 94-101
- e. Keith & A. Farrell, 'Rethinking hydrogen cars', *Science* 301 (18 July 2003): 315-316.

7. Love Canal

- a. Eckardt C. Beck and EPA, "The Love Canal Tragedy," EPA Journal January 1979, <http://www.epa.gov/history/topics/lovecanal/01.html>
 - b. UB Libraries--Archives, "About the Love Canal" <http://library.buffalo.edu/libraries/specialcollections/lovecanal/index.html>
 - c. YouTube, "Love Canal (2 Parts) from Modern Marvels Engineering Disasters," <http://www.youtube.com/watch?v=vKIM9sE0t6I&noredirect=1>
 - d. <http://www.youtube.com/watch?v=MXSE9kcBQCI&feature=relmfu>
8. World Trade Center
- a. David Berreby, "Engineering Terror," *New York Times* September 10, 2010 <http://www.nytimes.com/2010/09/12/magazine/12FOB-IdeaLab-t.html>
 - b. *New York Times Magazine*, "Towering Ambition: How the Towers Stood and Fell," http://www.nytimes.com/interactive/2002/09/08/magazine/20020908_911_TO WERS_GRAPHIC.html
 - c. Thomas W. Eagar and Christopher Musso, "Why Did the World Trade Center Collapse? Science, Engineering, and Speculation," *JOM* 53 (2001): 8-11.
 - d. NST Engineering Laboratory, "World Trade Center Disaster Study," <http://www.nist.gov/el/disasterstudies/wtc/>
9. Hyatt Regency Walkway Collapse
- a. Piotr D. Moncarz and Robert K. Taylor, "Engineering Process Failure: Hyatt Walkway Collapse," *Journal of Performance of Constructed Facilities* 14 (2000): 46-50.
 - b. MATDEL, "Building Collapse Cases/Hyatt Regency Walkway," http://matdl.org/failurecases/Building_Collapse_Cases/Hyatt_Regency_Walkway
 - c. NatGeo, "Hyatt Walkway Collapse" on Youtube: <http://www.youtube.com/watch?v=yoGGMdktsRM>
10. Three Mile Island
- a. U.S. NRC, "Background on the Three Mile Island Accident," <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/3mile-isle.html>
 - b. Dickinson College, "Three Mile Island Emergency," www.threemileisland.org
 - c. Film: *The China Syndrome* (1979)
 - d. *The American Experience, Meltdown at Three Mile Island* (PBS documentary)
 - e. Samuel Walker, *Three Mile Island* (Berkeley: University of California Press, 2004) (ch. 2 "The Regulation of Nuclear Power")
 - f. Union of Concerned Scientists, "Clean Energy: Three Mile Island's Puzzling Legacy" http://www.ucsusa.org/clean_energy/nuclear_safety/page.cfm?pageID=183
 - g. University of Pittsburgh, Center for Politics Case Study: "The Media's Role in High Risk Conditions: Community Right to Know versus Public Information Management" <http://www.iop.pitt.edu/documents/casestudies/Thornburgh5.pdf>
11. Challenger

- a. Diane Vaughan, "Regulating Risk: Implications of the Challenger Accident," *Law and Policy* 11 (1989): 330-349.
- b. Diane Vaughan, "Autonomy, Interdependence, and Social Control: NASA and the Space Shuttle *Challenger*," *Administrative Science Quarterly* 35 (1990): 225-257.

12. Fukushima Daiichi Nuclear Power Plant

- a. Jake Adelstein and David McNeill, "Meltdown: What Really Happened at Fukushima?" *The Atlantic Wire* 2-21-2012
<http://www.theatlanticwire.com/global/2011/07/meltdown-what-really-happened-fukushima/39541/>
- b. Engineering Ethics Blog, "Nuclear Power Meltdown in Japan?" Sunday, March 13, 2011
<http://engineeringethicsblog.blogspot.com/2011/03/nuclear-power-meltdown-in-japan.html>
- c. Cryptome, "Aerial Photo: Fukushima Daiichi Nuclear Power Plant," 24 March 2011, <http://cryptome.org/eyeball/daiichi-npp/daiichi-photos.htm>
- d. Eliza Strickland, "24 Hours at Fukushima" *IEEE Spectrum*, November 2011, <http://spectrum.ieee.org/energy/nuclear/24-hours-at-fukushima/0>

13. Therac-25

- a. Nancy G. Leveson and Clark S. Turner, "An Investigation of the Therac-25 Accidents," *IEEE Computer* 26 (1993): 18-41.

14. BP Oil Spill

- a. National Commission on the BP Deepwater Horizon Oil Spill and Offshore Drilling, *Deepwater: The Gulf Oil Disaster and the Future of Offshore Drilling*
http://www.oilspillcommission.gov/sites/default/files/documents/DEEPWATER_ReporttothePresident_FINAL.pdf
- b. The National Academics, "Interim Report on Causes of the Deepwater Horizon Oil Rig Blowout and Ways to Prevent Such Events," (2010)
www.nap.edu/catalog/13047.html

15. ABS

- a. Peter Hattwig, "Cost-Benefit Analysis of Simplified ABS," Presented at the International Congress and Exposition, Detroit, Michigan, February, 1985
- b. Johnson, Ann. *Hitting the Brakes: Engineering Design and the Production of Knowledge*. Durham, N.C.: Duke University Press, 2009. Epilogue: Chapter 9

16. Ford Explorer Rollovers

- a. Keith Brandsher, "Risky Decision/A Special Report.; Study of Ford Explorer's Design Reveal a Series of Compromises" *New York Times* December 7, 2000
<http://www.nytimes.com/2000/12/07/business/risky-decision-special-report-study-ford-explorer-s-design-reveals-series.html?pagewanted=all&src=pm>
- b. "Testimony of Joan Claybrook for Public Citizen Before the Senate Committee on Commerce, Science, and Transportation January 24, 2002"
http://www.citizen.org/documents/Joan_Claybrook%27s_Testimony_on_CAFE.pdf
- c. "Engineering Analysis Report and Initial Decision Regarding EA00-023: Firestone Wilderness at Tires—U.S. Department of Transportation National Highway Traffic

Safety Administration Safety Assurance Office of Defects Investigation October 2001”

<http://www.google.com/url?sa=t&rct=i&q=&esrc=s&source=web&cd=1&ved=0C CIQFjAA&url=http%3A%2F%2Fwww.nhtsa.gov%2Fnhtsa%2Fannounce%2Fpress%2FFirestone%2Ffirestonereport.pdf&ei=0U1PUJrdFsX50gGPhYHACQ&usg=AFQj CNGEB0vl qk EZ7T0PNVw-8bOUPa8A>

- d. Frontline, “Transcript: Rollover: The Hidden History of the SUV” Program # 2013 February 21, 2002.

<http://www.pbs.org/wgbh/pages/frontline/shows/rollover/etc/script.html>

17. Hoover Dam

- a. Donald C. Jackson, “Engineering in the Progressive Era: A New Look at Frederick Haynes Newell and the U.S. Reclamation Service,” *Technology and Culture* 34 (1993): 539-574.
- b. Kirk Johnson and Dean E. Murphy, “Drought Settles In, Lakes Shrinks and West’s Worries Grow,” *New York Times* May 2, 2004 (Sunday)
<http://www.nytimes.com/2004/05/02/us/drought-settles-in-lake-shrinks-and-west-s-worries-grow.html?pagewanted=all&src=pm>
- c. Dean E. Murphy, “Editorial: Where Engineering Trumps Nature, Science Seeks a Balance,” *New York Times* May 2, 2004 (Sunday)
<http://www.nytimes.com/2004/05/02/us/where-engineering-trumps-nature-science-seeks-a-balance.html>

18. Arsenic Water Contamination

- a. Allan H. Smith, Elena O. Lingas, and Mahfuzar Rahman, “Contamination of Drinking-water by arsenic in Bangladesh: A Public Health Emergency,” *Bulletin of the World Health Organization* 78 (2000): 1093-1103)
- b. Mustafa Moinuddin, “Drinking Death in Groundwater: Arsenic Contamination as a Threat to Water Security for Bangladesh”—Conference Paper “Program in Arms Control, Disarmament, and International Security”—University of Illinois at Urbana-Champaign, May 2004
- c. Cafer T. Yavuz et al, “Pollution Magnet: Nano-Magnetite for Arsenic Removal from Drinking Water,” *Environmental Geochemistry Health* 32 (2010): 327-334.
http://kelty.org/or/papers/Kelty_et al_PollutionMagnet_2010.pdf

SAMPLE ASSIGNMENTS AND/OR EXAMS

1. **Oral Presentations of Cases**— For each case study discussion (13 over the semester), there will be 4 students appointed to be discussion leaders or discussants, who will introduce the various dimensions of the case in order to generate some discussion. Every student will present once and act as a discussant once. The discussion leaders will prepare and deliver a 4-6 minute speech constituting an informative introduction to the case, explaining what happened, why, and who the responsible parties are (providing an opportunity to offer informative speaking). The leaders will also identify the values in the case discuss their sources and functions, show how they played important roles and shaped decision making in the case. The two discussants are to prepare and present 4-6 minute speeches that provide specific normative claims about the case; their

presentations will be argumentative. They should discuss what actors in the case should have done and why and anticipate counter arguments. This speech requires ethical analysis and reasoning, discussion of how values ought to inform decision making and professional standards. Furthermore, it requires the application of argumentation, engaging the audience of the class, and provides an opportunity to reflect on ethical choices at hand in the case. The students not assigned to the case will exercise their critical listening skills and in the second half of the discussion will be invited to engage in a productive and responsible exchange with the presenters

- a. Every student will give one 4-6 minute presentation as a discussion leader and one as a discussant.

2. **Homework Assignments** – There are four homework assignments; these are moderately large, well-defined, projects. Each is given in the form of a decision worksheet (a model developed at USC by Charlie Pierce and Juan Caicedo in the department of Civil and Environmental Engineering) and a format that most of USC engineering students are now familiar with. For example, one decision worksheet (probably the last one due, since it requires sophisticated skills developed over the course of the semester) asks the students to consider what to do in the case of the GM side-saddle gas tank recall. They must estimate the cost of the recall, calculating the cost of the repair, considering the number of vehicles in service, and any other related costs. They must then design a solution that can be retrofit onto the vehicles. Lastly they must video-record themselves providing a 5 minute speech to the CEO of GM arguing in favor of the recall and providing the ethical reasoning in support of a decision to recall. Other worksheets are similar and each will include oral communication dimensions on video, as well. Assignments facilitate assessment of ethical reasoning, the identification of relevant values and professional standards, their sources, functions, and importance. In addition, homework assignments help to provide assessment mechanisms of students' ability to demonstrate appropriate means of communication for different audiences. This accounts for four graded assessments.
3. **Quizzes** – Each week there is a quiz requiring students to reflect on the week's reading assignment and the case study being discussed. These quizzes provide an opportunity to assess the development of skills in identifying values, norms, and ethical principles and their sources and functions; to demonstrate how values affect individuals and societies in specific cases; and to reflect on the ways that values inform community ethics and decision making. They also cover the textbook to ensure compliance with the reading in the Public Speaking text and assess students' understanding of basic principles of public speaking. There will be 13 quizzes total; they are listed in the course outline. (NB -- Quizzes are taken online using Blackboard, so do not use class time. This has been the practice in PHIL 325 for the past year.)
4. **Writing assignment** – In preparation for the final oral project, students must write a 2,000 word essay (approximately 7-10 pages) exploring a ethical case study. The case study should be that has NOT been well developed in the engineering ethics literature

(and not one assigned in the class). Typically these cases are recent and often local to South Carolina, often examinations of issues what are currently unfolding. Students must do research on the case, using journalistic and other sources (e.g., official reports if available), and use ethical reasoning to construct a case study with an ethical recommendation. The essay should identify the values of relevance and their sources, show why these values are important for the community in question, and demonstrate the relevance of these values for decision making. The essay allows assessment of the students' ability to reason clearly in writing to inform, persuade, and exchange views.

- 5. Final project** – For the final project, students will transform their research paper into an oral presentation with a visual aid (a poster). The form of this assignment will be a conference style poster session in which each student presents a poster and a speech about the case their paper explored. Each student will present their case study on a poster and present a 10 minute speech about the case, identifying values and their sources, showing the importance of these values to self and community, and reflecting on the ways values shape and ought to shape decisions. The speech and visual aid must provide evidence of the student's ability to reason normatively using ethical theories and frameworks. Students will then answer the instructor's questions about their case. In addition, the session will be open to USC faculty and students, who will provide additional opportunities for intellectual exchanges, albeit ungraded ones. The last two classes will be used to rehearse speeches in small groups, and provide peer commentary on the speeches, including both content and presentation style. This assignment facilitates assessment of the students' ability to reason clearly in speaking, and to inform, persuade and exchange views, as well as to articulate an informed position and engage in critical exchanges that demonstrate the ability to grasp and respond to other positions. Students are graded on their in-class rehearsal, written feedback to their peers during rehearsals, the final speech and their poster.

SAMPLE COURSE OUTLINE WITH TIMELINE OF TOPICS, READINGS/ASSIGNMENTS, EXAMS/PROJECTS

SECTION I: FRAMING ENGINEERING ETHICS

Introduction: What is ethics? How can we identify relevant values and their sources and functions? What is effective, informative, and persuasive public communication?

VSR: Preparation for identifying values, norms, and principles.

CSM: Preparation for identifying and demonstrating appropriate means of communication for varied audiences, and for the principles of listening with respect to fulfilling the obligations of an audience member.

Reading Assigned (due end of the week): Zarefsky, ch. 1 (Intro)

Where do engineers come from? What are they responsible for? Why do societies need them? Why do engineers need the public trust?

VSR: Preparation for how values inform the way professionals understand themselves; core competency needed to analyze and use ethical codes.

CSM: Identification of audiences for argumentative and informative speech.

Reading Assigned (due end of the week): NSPE Code of Ethics

Ethical Obligations and the Engineering Profession

VSR: Discussion of the problem of public trust and expert knowledge justifying the demand for specific ethical training for engineers; core competency needed to analyze and use professional standards and professional and disciplinary ways of self-governance oriented toward decision-making

CSM: Discussion of the types of oral communication engineers are expected to perform professionally and the audiences for those types.

Reading Assigned: Zarefsky: ch. 3 (Audience)

Analyzing the Ethics of Technology: Avoiding technological determinism through Core-System-Society Models

VSR: Presentation of an analytical method for ethical reasoning and decision-making.

CSM: Preparation for basic principles of informative modes of speaking.

Reading: Hughes, "Large Technological Systems"

Applying the Core-System-Society Model

VSR: Working through a case study using the C-S-S model to examine how specific values do and ought to inform decision-making, practices and policies.

Reading: Pfatteicher, Lessons Amid the Rubble, ch. 1, Zarefsky, ch. 5 (Research)

HOMEWORK #1 due.

SECTION II: ETHICAL THEORIES

Philosophical Approaches to Ethics: Consequentialism

VSR: Presentation, using examples, of a method for ethical analysis.

CSM: Preparation for identifying controversy in complex issues and preparing reasoned arguments about these disputes.

Reading: Rogers, "The End Use Problem in Engineering Ethics", Zarefsky, ch 6 (Reasoning)

Philosophical Approaches to Ethics: Deontology

VSR: Presentation, using examples, of a method for ethical analysis.

CSM: Preparation for identifying controversy in complex issues and preparing reasoned arguments about these disputes.

Reading: Gewirth, "Professional Ethics"

Philosophical Approaches: Virtues

VSR: Presentation, using examples, of a method for ethical analysis.

CSM: Preparation for identifying controversy in complex issues and preparing reasoned arguments about these disputes.

Reading: Schmidt, "Engineering Ethics as Virtue Ethics"

Philosophical Approaches: Pragmatism

VSR: Presentation, using examples, of a method for ethical analysis.

CSM: Preparation for identifying controversy in complex issues and preparing reasoned arguments about these disputes.

Reading: Pfatteicher, ch. 2, Zarefsky, ch. 2 (Listening)

HOMEWORK #2 DUE

SECTION III: PUBLIC SPEAKING

The problem of expertise and earning the public trust

VSR: Preparation for understanding social practices related to responsibility, accountability, and justice coupled with reasons why engineers ought to hold specific norms and values regarding their social responsibility.

CSM: Presentation of critical approaches to the identification of audiences and principles of listening and understanding audiences' constraints in order to engage responsibly with diverse audiences.

Reading: Zarefsky, ch.11 (presenting)

Planning Public Speaking

CSM: Considerations of how to develop a rhetorical approach and strategy for a variety of different audiences

Reading: Zarefsky, ch. 4.4-4.6 (Developing a Strategic Plan), 13 (Informing)

Modes of ethical reasoning for public communication

VSR: Summary of the ethical theories, frameworks and approaches presented in the first four weeks; types of ethical arguments

CSM: Application of these modes of reasoning to public speaking.

Reading: Zarefsky, ch. 10 (Styles), Pfatteicher, ch. 3

SECTION IV: REASONING AND PRESENTING CASE STUDIES

Whistle-Blowing and Loyalty

VSR: Consideration of the reasons why individuals should hold certain values and how these values should inform decision making.

CSM: Identification of controversy in complex issues and effective methods of informing, persuading, and exchanging views.

Reading: Hyatt Case Study Materials

HOMEWORK #3 DUE.

Discussion Section: Hyatt Walkway Collapse

Reading: Zarefsky ch. 15.3 (Persuading), Pfatteicher, ch. 4.

Risk and Risk Assessment

VSR: Consideration of a method for ethical analysis, reasoning, and decision-making.

CSM: Identifying and explaining informative speaking about risk-oriented technological controversies.

Reading: Challenger Case Study Materials

Discussion Section: Challenger Explosion

Reading: Zarefsky, ch. 10 (Style)

Risk and Risk Perception

VSR: Consideration of a method for ethical analysis, reasoning, and decision-making and the reasons individuals with different values and epistemic frameworks might disagree with it.

CSM: Discussion of communication focused on audiences' constraints, listening, and modes of persuasive speech aimed at groups who may not share the values of the speaker regarding controversial topics involving the different perception of risk.

Reading: Three Mile Island Case study Materials

Discussion Section: Three Island Island

Reading: Zarefsky, ch. 11 (Presenting)

Product Use and Misuse

VSR: Consideration of values, norms, beliefs that guide technological practices.

CSM: Preparation for work in identifying, explaining, and applying principles of informative speaking.

Reading: Antilock Braking Systems Case Study Materials

Discussion Section: Antilock Braking Systems

Reading: Zarefsky, ch. 14 (Persuading)

Liability, Persuasive speech about responsibility

VSR: Consideration of the way societies cope with failure and controversy.

CSM: Preparation for work in identifying, explaining, and applying principles of argumentative speaking.

Reading: Ford Explorer Rollover Case Study Materials

Discussion Section: Ford Explorer Rollover

Reading: Zarefsky, ch. 7,8 (Organizing the Speech)

Tort Litigation

VSR: Consideration of the legal definitions of responsibility

CSM: Principles of argumentative speaking and reasoning in the courtroom

Reading: Love Canal Case Study Materials

Discussion Section: Love Canal

Reading: Zarefsky, ch. 3 (Audience)

Regulation, Revisiting Question of Audience

VSR: Preparation for considering the implications of following or failing to follow values/norms/ideals.

CSM: Identification of controversy in complex issues and the construction of argumentative and informative strategies with regard to the controversies.

Reading: Therac-25 Case Study Materials

Discussion Section: Therac-25

Reading: Zarefsky, ch. 11.5 (Practicing Presentations)

Governance

VSR: Preparation for considering the implications of following or failing to follow values/norms/ideals.

CSM: Identification of controversy in complex issues and the construction of argumentative and informative strategies with regard to the controversies.

Reading: Fuel Cell Technology Case Study Materials

HOMEWORK #4 DUE.

Discussion Section: Fuel Cell Technology

Reading: Zarefsky, ch. 6.8-9 (Reasoning)

Corporate Responsibility

VSR: Preparation for consideration of the way specific values /norms/ideals ought to inform decision-making and policies.

CSM: Discussion about corporate audiences and their obligations.

Reading: BP Macondo Well Explosion and Oil Spill Case Study Materials

Discussion Section: BP Macondo Well Explosion and Oil Spill

Reading: Pfatteicher, ch. 5

Environmental Ethics

VSR: Presentation, using examples, of methods for ethical analysis concerning the environment.

CSM: Preparation for identifying controversy in complex issues and preparing reasoned arguments about these disputes.

Reading: Hoover Dam Case Study Materials

Discussion Section: Hoover Dam

Reading: Pfatteicher, ch. 6

PAPER DUE.

Environmental Ethics (con't): Antropo-, Bio-, and Eco-Centrist Accounts,

Reading: Typhoon Guchol and Fukushima Daiichi Radiation Leak Case Study Materials

Discussion Section: Typhoon Guchol and Fukushima Daiichi Radiation Leak

Globalization

VSR: How specific values ought to inform decision making, practices and policies concerning engineering in the developing world.

CSM: Questions of listening and speaking to internationally diverse audiences.

Reading: World Trade Center Case Study Materials

Discussion Section: World Trade Center

Appropriate Technologies

VSR: How local values should inform the choices about technologies, focusing on the developing and poor world

CSM: Listening and Speaking to diverse audiences

Reading: Arsenic Contamination in Bangladesh Case Study Materials

Discussion Section: Arsenic Contamination in Bangladesh

Reading: Zarefsky, ch. 12 (Visual Aids)

Visual Display of Information as a persuasive technique: Revisiting the Challenger decision

VSR: A discussion of the way presentation techniques contributed to the disastrous decision to launch the Challenger in 1986

CSM: How visual aids support reasoning and public presentations.

Final Speech rehearsals, including audience commentary

Preparing the course's final assignment of a public presentation and a poster.

Final Speech rehearsals, including audience commentary

Final Speech rehearsals, including audience commentary

Final Project, presented during final exam period(s): Each student present an ethical case using a poster as a visual aid, as would be standard practice in a conference session. Students will be expected to provide a speech of approximately ten minutes that addresses the societal, political, economic, and ethical implications of a significant controversy related to a contemporary engineering and/or technological decision/project. *NB – Because more than one section of PHIL 325 is taught each term, there will be multiple instructors assessing the presentations simultaneously (as in a conference poster session). This will allow the approximately 20 presentations to be performed and assessed in the 150 minute exam period.*