Online Ethics Center
FOR ENGINEERING AND SCIENCE

Ethical Issues in Civil and Environmental Engineering

Author(s)

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Description

A course syllabus for Ethical Issues in Civil and Environmental Engineering, CEE 174.

Body

I. Purpose and Format of Course

The purpose of this course is to enhance the student's ability to identify and critically analyze ethical, human value, and philosophical issues of the sorts that arise in or underlie contemporary civil engineering practice, whether in the environmental/water, structural, or construction areas. Through in-depth examination of case studies, the course will strive to do justice to the socio-technical complexity of such issues, identify moral rights and responsibilities of civil engineers, identify factors conducive to exemplary conduct and misconduct in civil engineering, and help students develop ways of avoiding or effectively coming to grips with such issues when they arise. Study of a wide variety of case studies and sessions with one or two guest practitioners of civil or environmental engineering

will be important aspects of the course.

CEE 174 will be run as a seminar. All students are expected to complete the reading before class and to participate actively in class discussions. With that in mind, enrollment will be limited to about 20 students.

II. Required Reading

1. R. McGinn, ed., *CEE 174 Course Reader* (Stanford Bookstore: Stanford, 1996)
2. D. Roodman and N. Lenssen, *A Building Revolution: How Ecology and Health Concerns Are Transforming Construction* (Worldwatch Institute: Washington, D.C., 1995).

- Note 1: CEE 174 must be taken for a letter grade.
- Note 2: While class will typically run from 3:15 to 4:45 P.M., on days when a video is shown, discussion will run until 5:05 P.M.

III. Calendar of Topics, Readings, and Viewings

Part 1: Foundational Materials

1 (Tu) 3/31 Introduction

1. Introduction to Ethical Issues in Civil Engineering
2. VIDEO 1: "The Truesteel Affair" (Association of Professional Engineers of Ontario [Canada])

2 (Th) 4/2 Historical Background on the Engineering Profession in General and Civil Engineering in Particular

1. T. Reynolds, "The Engineer in Nineteenth-Century America," and "The Engineer in Twentieth-Century America," from T. Reynolds, ed.,*The Engineer in America*, 7-26 and 169-190. 2. B. Seely, "A Republic Bound Together," *Woodrow Wilson Quarterly*, Winter 1993, 18-39. 3. E. Greenwood, "Attributes of a Profession," *Social Work*, July 1957, 45-55.

3 (Tu) 4/7 Ethics, Codes of Ethics, and Civil Engineering in the U.S.

1. NSPE Code of Ethics for Engineers (1993)

2. ASCE Code of Ethics(1993)
3. ABET Code of Ethics (1977)
4. B. Jakobsen, "Ethics and the American Society of Civil Engineers," Los Angeles, California, April 1955. 5. T. Broome, "Engineering Responsibility for Hazardous Technologies,"*Journal of Professional Issues in Engineering*, Vol. 113, No. 2, April 1987, 139-149. 6. S. Beder, "Engineers, Ethics, and Etiquette," *New Scientist*, 25 September 1993, 36-41.

Part 2: Twelve Contemporary Case Studies

4 (Th) 4/9 Case I: The Kansas City Hyatt Regency Hotel Pedestrian Walkway: Negligence, Communication, and the Division of Labor

1. K. Roddis, "Structural Failures and Engineering Ethics," *Journal of Structural Engineering*, Vol. 119, No. 5, May 1993, 1539-1555.
2. H. Petroski, "Accidents Waiting to Happen," from *To Engineer Is Human* (Vintage, 1992), 85-97.
3. H. Petroski, "The Kansas City Tragedy: There Is Not Always Strength in Numbers," *Technology Review*, August/September 1982, 29-30.
4. R. Rubin, L. Banick, and C. Thornton, "The Hyatt Decision: Two Opinions," *Civil Engineering,* September 1986, 69-72.

5 (Tu) 4/14 Case II: "Z Corp" and Toxic Waste Disposal

1. VIDEO 2: "Gilbane Gold" (National Institute for Engineering Ethics, National Society of Professional Engineers)

6 (Th) 4/16 Case III: Saving Venice From Flooding: Civil Engineers vs. Ecologists?

1. VIDEO 3: "Can Venice Survive Its Rescue?"
2. J. Lewin and A. Scotti, "The Flood-Prevention Scheme of Venice: Experimental Module," *Journal of the Institution of Water and Environmental Management*, Vol. 4, February, 1990, 70-77
3. D. Lascelles and R. Graham, "Venice: The City Sinking in Lethargy,"*Financial Times of London*, February 26, 1994.
4. Fred Pearce, "Turning Back the Tide: Engineers and Ecologists Are Divided On How To Save Venice," *The Independent*, February 19, 1995, 67

7 (Tu) 4/21 Cases IV and V: Sewage in Sydney and Water in Senegal

1. S. Beder, "The Use of the Ocean for the Disposal of Wastes," 8th Australasian Conference on Coastal and Ocean Engineering, 1987, 356-360
2. S. Beder, "Sun, Surf, and Sewage," *New Scientist*, July 14, 1990, 40-45

3. S. Beder, "Pipelines and Paradigms: the Development of Sewerage Engineering," Australian Civil Engineering Transactions, IEAust., Vol. CE35, No. 1, 3/93, 79-85

4. J. M. Wenn and A. Horsfield, "The Transfer of Technology Occasioned by the Senegal Village Water-Supply Project"

8 (Th) 4/23 Case VI: The Manhattan Westway Project: Upstream Acquiescence, Downstream Misconduct

1. R. McGinn, "Upstream Acquiescence, Downstream Misconduct: Engineers, Scientists, and the Manhattan Westway Project: 1971-1985"

2. S. Beder, "Environmental Impact Statements: The Ethical Dilemma For Engineers," National Engineering Conference, Institute of Engineers Australia, Canberra, 1990, 1-8

3. Packet of short articles on the trajectory of the Westway Project

9 (Tu) 4/28 Case VII and Case VIII:: Toxic Waste Facilities: New South Wales (AU) and Ward Valley (CA)

1. S. Beder, "Siting A Hazardous Waste Facility: the Tangled Web of Risk Communication," *Public Understanding of Science*, Vol. 1, 1992, 139-160

2. S. Beder, "The Burning Issue of Australia's Toxic Waste," *New Scientist*, June 8, 1991, 35-38

3. S. Decatur, "Who's Being Consulted? Science, Authority, and Politics in the Siting of a Waste Facility at Ward Valley" (unpublished ms.)

4. K. Noble, "Ecology War Brews in California Desert," *New York Times*, 11/19/95, p. 12

5. K. Noble, "U.S. Delays Opening Site For Dumping Atomic Waste,"*New York Times*, 2/16/96, A8

10 (Th) 4/30 Case IX: The Citicorp Center in N.Y.C.

1. VIDEO 4: "The Fifty-Nine Story Crisis: A Lesson in Professional Behavior"

2. J. Morgenstern, "The Fifty-Nine Story Crisis," *Journal of Professional Engineering Education and Practice*, January 1997, pp. 23-29.

11 (Tu) 5/5 Case X: The Great Mississippi River Flood of 1993

1. VIDEO 5: "Flood" (NOVA)

2. K. Schneider, "Floods Force Corps of Engineers Into Balancing Act On Mississippi," *NYT*, July 6, 1993, A1 and A10

3. J. Cushman Jr., "Report Urges Reversal of Policy On Flood Control," *NYT*, May 26, 1994, A1 and D20.

4. P. Williams, "Flood Control vs. Flood Management," *Civil Engineering*, May 1994, 51-54

5. M. Myers and G. White, "The Challenge of the Mississippi Flood," *Environment* , Vol. 35, no. 10, December 1993, 6ff.

6. R. Zimmerman and R. Coontz, "After the Deluge," *Sciences*, Vol. 34, no. 4 (July-August, 1994), 18-23

7. R. Platt, "Sharing the Challenge: Floodplain Management into the 21st Century," *Environment*, Vo. 37, No. 1, Jan/Feb 1995, 25-28

8. W. Stevens, "Restoring Wetlands Could Ease Threat of Mississippi Floods," *NYT*, 8/8/95

12 (Th) 5/7 Case XI: The Three Gorges Dam in China: Development, Environment, and Patrimony

1. A. Topping, "Ecological Roulette: Damming the Yangtze," *Foreign Affairs*, Sept./Oct. 1995, 132ff

2. P. Tyler, "Cracks Show Early in China's Big Dam Project," *New York Times*, 1/15/96, A1ff.

3. P. Tyler, "Chinese Dam's Forbidding Future Dooms Rich Past," *New York Times*, October 6, 1996, pp. 1 and 8.

4. Zeng Nian, "A Flood of Troubles," *New York Times*, 1/5/97, p. 34.

5. S. Faison, "Set To Build Dam, China Diverts Yangtze While Crowing About It," *New York Times*, 11/9/97, pp. 1ff

6. A. Topping, "Cracking the Wall of Silence," *New York Times*, 1/5/97, 40.

7. Staff, "Gigantism on the Yangtze," *New York Times*, 11/15/97, 16.

8. Probe International, "Appendix B: Probe International's Complaints to the Engineering Associations," in M. Barber, and G. Ryder, eds., Damming the Three Gorges, 2nd edition (Earthscan: Toronto, 1993), 162-167.

9. P. Williams and J. Veltrop, "The Debate Over Large Dams," *Civil Engineering*, August 1991, 43-48.

13 (Tu) 5/12 The Emerging Ethic of Water Conservation

1. VIDEO 6: "The Last Oasis" (PBS Series: "Cadillac Desert")

14 (Th) 5/14 Case XII: Building Green: The Audubon Building

1. VIDEO 7: "Green Building: the Audubon House"

2. J. Beyea, "Audubon House," *U.S. Green Building Conference* -- 1994, 83-89

3. D. Roodman and N. Lenssen, Building Revolution: *How Ecology and Health Conerns Are Transforming Construction*, Worldwatch Report # 124, March 1995, 5-55

4. R. Schwolsky, "Building Green: Environment-Friendly Housing Development," *Builder*, Vol. 18, No. 2, Feb. 1995, 136ff

15 (Tu) 5/19 No class meeting: finish work on presentations

16 (Th) 5/21 The Ethics of Expert Witness Testimony

1. J. Anderson, "Ethics and the Expert Witness," Compendium of Technical Papers, 56th Annual Meeting of Institute of Trans portation Engineers, 1986, 122-124
2. J. Bachner, "Facing Down the Hired Gun," Journal of Performance of Constructed Facilities, Vol. 2, No. 4, Nov. 1988, 190-198

17 (Tu) 5/26 Guest: Dr. Douglas McKay

Part 3: Student Case Study Presentations

18 (Th) 5/28 Student Presentations I

19 (Tu) 6/2 Student Presentations II

1. National Committee on Environmental Engineering, Australia, "Environmental Principles for Engineers," (Institution of Engineers, Australia: 11 National Circuit, Barton, 1992).
2. A. Ansari, "The Greening of Engineers: A Cross-Cultural Experience"

Final Exam Period: June 5-10

IV. Directions for Research Projects and In-class Presentations

In late May and early June, seminar members will make in-class presentations. Each presentation, lasting 15 minutes, must focus on a specific, original case study of an incident or episode involving an ethical issue or conflict in contemporary civil or environmental engineering practice, in either the structural, environmental/water, or construction area. (Note: The case presented may illustrate exemplary conduct in civil engineering rather than misconduct or problematic conduct.) The case study may be based on one or more kinds of research, e.g., scholarly books, courtroom records, interviews with engineer participants and others involved in the situation under scrutiny, etc. Regardless of the kind of case chosen and type of conduct analyzed, the presentation must include the following:

1. appropriate background information;
2. identification of the ethical issue or conflict in question;

3. elaboration and probing analysis of the issue or conflict (e.g., of its genesis, structure, and trajectory; evaluation of the strengths and weaknesses of the arguments made on both sides; indication of what actions were and could have been taken with what actual and possible outcomes); and
4. delineation of noteworthy morals or lessons about ethical issues in engineering extracted from the case presented.

Each presenter team must submit a case study write-up of about 2,000 words -- include a word count! -- carefully describing, unpacking, analyzing, and drawing suitable conclusions from the case presented in class. Please identify the sources and resources used in putting together the presentation and hand in the originals or copies of the articles, interview transcripts, court case decisions, used. Your written report must be polished and perfected, in terms of content and form, as if it were going to be published as is in a book of case studies of ethical issues in civil and environmental engineering to be used for future versions of CEE 174 and similar courses. I strongly advise you to begin searching for a specific case early on in the course!

V. Course Grading

Class Participation: 40%, Case Study Presentation: 30%, Case Study Write-Up: 30%

Notes

Spring Quarter, 1997-98

TTh 3:15-4:45

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Rights

Resource Type

Instructor Materials

Parent Collection

Syllabi

Topics

Case Study Method

Discipline(s)

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Environmental Engineering
Teaching Ethics in STEM

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