

EH 520
Environmental Health
Fall Semester, 2006

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Introduction

It is not enough for the University to train competent technical practitioners and researchers. Students need to be aware of the issues and problems in the world around them that define the context that will influence their professional careers now and in the future. At the same time, students need to realize the potential (and imperative!) that they will have to participate in the solution of environmental and occupational health problems. This is increasingly difficult without some awareness of areas beyond the typically narrow disciplinary focus of a student's course work and research. In the fast-paced environment of today's research world, it is all too easy for scientists to lose sight of the policy issues and health needs that drive the research agenda as a whole. Advancing public health requires a broad perspective of the scientific and policy context within which decisions are made and problems are addressed. Specialization has become the norm at the same time that multidisciplinary approaches are increasingly needed to solve complex environmental and occupational health problems.

This course will provide students with an opportunity to explore some of the important current topics in the field of environmental and occupational health. A vast set of laws, regulations and public agencies has evolved as a societal response to the need for protection of the environment and worker health. Conflicting interests, needs and opinions often result in controversy over the best approach to solving problems. Few environmental health issues have unequivocal answers that will satisfy the public, interest groups or politicians. It is, therefore, essential that environmental health scientists and public health professionals be aware of and capable of effectively communicating the science behind the issues.

Environmental health scientists and public health professionals are continually confronted with new problems. Changes in populations, "new" diseases, novel chemicals and the public's demands for protection against health hazards pose challenges to science and public policy alike. The ways that scientific knowledge can be used to support sound decisions will be illustrated by consideration of current issues in environmental and occupational health, often drawn from today's headlines. This will provide insight into how we can contribute to rational discussion of issues as well as providing a sound scientific basis for solving problems.

Objectives

Students successfully completing this course will be able to:

- describe basic scientific concepts that underlie contemporary problems in environmental and occupational health and responses to those problems **EO 6.2.1, EO 6.2.2**
- identify exposure pathways and major categories of hazards in the workplace and environment **EO 6.2.2**
- articulate approaches and options for dealing with environmental health problems **EO 6.2.7**
- describe the major provisions of important U.S. laws and identify regulatory agencies that help protect environmental and occupational health **EO 6.2.8, EO 6.2.10**
- express positions reflecting scientific, policy and social viewpoints related to current issues in environmental and occupational health **EO 6.2.7**
- describe the role of environmental health scientists in meeting information needs for effective and rational regulation **EO 6.2.9**

Course Structure

One class session each week will consist of a lecture on an environmental or occupational health topic. The topics will cover a class of environmental or occupational health hazard or a medium involved in exposure to hazards. The lectures will cover the health hazards involved, the pertinent scientific basis for limiting environmental and public health effects of the agents, the regulatory responses and the roles of public agencies and the regulated community for the challenges posed. The following class session will feature a presentation by the instructor of an issue of current public interest related to the weekly topic. The instructor will facilitate discussion of this issue with the students. This will allow exploration of the policy questions involved, the scientific issues that underlie the problem and the role of environmental health science in helping to provide needed answers.

Resources

In lieu of a text, reading material is made available to students through the course WebCT site. Links to Web sources are provided in most cases. Copies of other material that is not openly available are provided directly from the WebCT site. Information about regulatory topics is usually found on Federal agency Web sites. Industry and advocacy group Web sites are also used. Discussion topic resource material is drawn from the above sources and general readership media.

Contact Information

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Office Hours

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Class Schedule

Tuesdays and Thursdays, 11:00 AM to 12:15 PM, Microbiology A114

Course Requirements

1. *current awareness*

Each week, students submit a copy of a report from the mass media released during the preceding week that relates to some area of environmental or occupational health protection. This can be a newspaper or magazine clipping, or a copy of a newspaper or television report, news release, etc. from the Web. The report must be from a source intended for general distribution to the public (rather than a technical publication).

2. *information exercises*

Students will access environmental and occupational health information on the Web for submission. Information resources will be related to the week's topic.

3. *discussions*

All students are required to participate in discussion of the weekly current topic. This will require review of the assigned reading material.

4. *written assignments*

Effective communication of scientific issues is a key to achieving rational and technically sound resolution of environmental health problems.

- a. One of the media reports submitted for the current awareness requirement will be the focus of a short paper that examines how the article covers the environmental or occupational health significance of the topic.
- b. Students will write a short “Letter to the Editor” in response to one of the media reports submitted for the current awareness requirement. This will highlight additional issues related to the report or identify important policy implications of the story.

Detailed information regarding these assignments will be provided.

5. *term paper*

Students will select an environmental or occupational health topic (with the instructor’s approval) as the focus of a 5-10 page paper. The paper will review the agent(s) involved, the relevant exposure scenarios, strategies for controlling the hazards and the basis for regulation and/or management of the hazards. It will be in the format of a briefing paper for a decision-maker (with responsibilities relevant to the specific subject). Additional details will be provided.

6. *final examination*

A comprehensive final exam will test the student’s knowledge of the material covered in the course including: sources of environmental health hazards, regulatory structures used for environmental and occupational health protection, basic scientific concepts involved in environmental and occupational health. The exam will test both objective knowledge and the ability to synthesize information covered in the course to express scientific and/or policy opinions.

Student Evaluation

The requirements for the course will be weighted as follows to derive a student’s grade for the course:

current awareness of environmental and occupational health issues (article submissions)	15%
information exercises (submissions)	15%
discussion participation (quantity and quality of contributions)	15%
written assignment 1 (article review)	8%
written assignment 2 (comment letter)	12%
term paper (environmental and occupational hazard)	15%
final examination (comprehensive, essay questions)	20%

The final letter grade will be assigned as follows: 93.4-100%=A, 90.0-93.3%=A-, 86.7-89.9%=B+, 83.4-86.6%=B, 80.0-83.3%=B-, 76.7-79.9% =C+, 73.4-76.6%=C, 70.0-73.3%=C-, 60.0-69.9%=D, <60.0%=F.

date	lecture	topics	discussion issue
Aug 22, 24	Overview of Environmental and Occupational Health	nature of agents, health effects, exposure assessment, mitigation strategies	the role of science in environmental and occupational health
Aug 29,31	Toxic Substances	principles of toxicology, toxic effects, TSCA, EPCRA, TRI	polybrominated diphenyl ethers: fire retardants and POP's?
Sep 5, 7	Air	air pollutants, sources, inhalation exposure, respiratory diseases, CAA, criteria pollutants	ground level ozone problems in Colorado's Front Range
Sep 12, 14	Waste Water	priority pollutants, CWA, WQS, TMDL, NPDES	produced water from coal bed natural gas development
Sep 19, 21	Drinking Water	drinking water sources, SDWA, disinfection, contaminants	meeting the arsenic challenge
Sep 26, 28	Hazardous Waste	sources, hazards, remedial action, RCRA, CERCLA	"natural attenuation" vs. dredging for remediation of contaminated sediments
Oct 3, 5	Agricultural Chemicals	pesticides, dietary exposure, worker exposure, FIFRA, FQPA	human health hazards of exposure to atrazine in surface and ground water
Oct 10, 12	Radiation Health	basic radiation concepts, biological effects, protection	radon exposure and hazard
Oct 17, 19	Radioactive Materials	natural and anthropogenic radiation sources	disposal of low-level waste at the Last Chance landfill site
Oct 24, 26	Concepts in Occupational Health and Safety	exposure assessment, OSHA	engineering controls vs. personal protective equipment
Oct 31, Nov 2	Occupational Exposure to Chemical and Biological Hazards	workplace exposures, control methods, biological monitoring	diesel exhaust exposure standards
Nov 7, 9	Physical Hazards in the Workplace	ergonomics, noise, vibration, radiation	Federal ergonomic standard
Nov 14, 16	Infectious Disease	important diseases, transmission, control	changes in vector-borne disease occurrence as a consequence of climate change
Nov 28, 30	Food Safety	food-borne disease, control strategies, FDCA, HACCP	food irradiation
Dec 5, 7	Environmental and Occupational Health in Emergency and Disaster Response	emergency planning, hazard assessment, worker protection	occupational health protection during disaster recovery operations: local first responders or emergency response teams?
16	final examination		

Glossary

CAA	Clean Air Act	NPDES	National Pollutant Discharge Elimination System
CERCLA	Comprehensive Emergency Response Compensation and Liability Act	OSHA	Occupational Safety and Health Act
CWA	Clean Water Act	RCRA	Resource Conservation and Recovery Act
EPCRA	Emergency Planning and Community Right-to-Know Act	SDWA	Safe Drinking Water Act
FDCA	Food Drug and Cosmetic Act	TMDL	Total Maximum Daily Load
FIFRA	Federal Insecticide Fungicide and Rodenticide Act	TRI	Toxic Release Inventory
FQPA	Food Quality Protection Act	TSCA	Toxic Substances Control Act
HAACP	Hazard Analysis of Critical Control Points	WQS	Water Quality Standards