

HON 298-02 Special Topics - Science and Society

Spring 2005

Instructors

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Office Hours: T 3-5 pm, W 11:00-12:30, Th 11-12:30

Class Location: MO10, JE 339 Lab

Class Time: Tuesday – Thursday, 8:10-9:25 am: Tuesday, 9:35-10:50 am

Description:

This course will focus on the topic of energy and air quality, including the basic science and societal implications of how we use energy. We will examine the consequences of our reliance on fossil-fuels and its resultant impacts on Connecticut air quality.

Course Goals:

This course is designed to teach science by pursuing the following goals:

1. Scientific literacy
2. Understanding the controversy surrounding the solutions to scientific issues which impact society.
3. Students will make connections between different energy portfolios and their environmental, social and economic impact.
4. Goals will be accomplished through the study of air quality in CT.

Specific Objectives:

On completion of this course, students will be able to:

1. Design and conduct experiments to understand environmental processes.

Specific Objectives: (cont.)

2. Demonstrate a basic understanding of some fundamental chemical concepts driving environmental issues.
3. Construct probable scenarios of air quality due to the energy portfolio available.
4. Identify social and economic impact of different energy portfolios.
5. Demonstrate an ability to critically assess the science found in different media reports.

Assessment of Objectives

Students' ability to discuss scientific articles found in the popular media and professional journals. (Meaningful summary of content of article that student provides. Progressive ability to analyze what is presented in the article; merit, accuracy of reporting, biases, understanding or identifying information that would substantiate claims, knowing how to obtain further information on issue, identifying unanswered questions, outline social, political and economic issues pertaining to the article.) (Objective 5)

Complete some hands-on laboratory experiments. (Objectives 1&2)

Inquiry-based Projects – pH of rainwater based upon sample collection; sampling air particulates (Objective 1)

Written summaries of presentations regarding different energy portfolios and the social, economic and political impact of those portfolios. (Objectives 3&4)

Individual research papers and group presentation regarding the feasibility of using different energy portfolios. Students will write individual papers on one of the following: environmental, economic, social and political impact. Group will then draw conclusion regarding feasibility. (Objectives 3-5)

Homework assignments (article summaries) and quizzes (Objective 2)

Grades

<u>Assignment</u>	<u>Number</u>	<u>% of Total</u>
Quizzes	(3)	15%
Articles	(3)	25%
Projects	(2)	60%

Class Policies

Class attendance is mandatory. We expect students to attend all class sessions prepared to participate. We realize that genuine emergencies arise. If you must miss class due to a serious emergency, please notify an instructor *before* class (phone, email, FAX). Written assignments must be submitted on date when due.

Students should also be aware of the SCSU policy concerning academic honesty (SCSU Student Handbook). Cheating/Plagiarism will not be tolerated! Violators of this policy will fail this course.

If you need course adaptations or accommodations due to a disability, if you have emergency medical information to share, or if you need special arrangements in case the building must be evacuated, please notify an instructor ASAP. As a student with a disability, before you may receive accommodations in this class, you will need to make an appointment with the Disability Resource Center, located in EN B 222.

This document is an outline of the course and may be considered a “living syllabus.” As such, the instructors reserve the right to make revisions to the scheduled content, activities, quizzes and articles as appropriate. It is the responsibility of the student to be aware of any announced changes to the syllabus as outlined in this document.

All assigned readings and laboratory activities are available in a reading packet available for purchase from the Tyco Copy Center.

HON 298 Special Topics: Issues in Science and Society

January

Module 1 **Energy Sources and Consumption**

25, 27 Historical and current world and US energy use.
Future energy demands, role of developing nations.
Lab Activity: Chemistry and Energy pre-assessment
Readings: Bent et al. 2002. Chapter 1. Rules of the Game. pp. 11-36.

February

1, 3 Examining the role of fossil-fuels: Coal, Oil and

Natural Gas: Sources, Reserves, Pricing, Access.
Lab Activity: Chemistry and Energy basics
Readings: Enger and Smith, 2004. Chapter 10. Energy Sources. pp. 194-223.

8, 10 Alternative and renewable energy (solar, wind, nuclear, hydro, biomass).
Lab Activity: Article Discussions (1)
Readings: Enger and Smith, 2004. Chapter 10. Energy Sources pp. 194-223.

Module 2 **Sulfur Dioxide, Nitrogen Oxides and Acid Rain**

15, 17 Acid Base Chemistry, pH scale
Lab Activity: Acid Base Chemistry, pH scale
Readings: Boehnke and Delumyea, 2000. Experiment 3. The pH and Buffer Capacity of Environmental Waters. pp. 47-59.
Quiz #1

22, 24 SO₂ and NO_x, Sources
Lab Activity: Design of rain collection program and construction of rain collectors.
Readings: Enger and Smith, 2004. Chapter 17. Air Quality Issues. pp. 386-417. Boehnke and Delumyea, 2000. Experiment 23. Collection and Chemistry of Acid Rain. pp. 237-241.

March

- 1, 3 Effects of Acid Precipitation
Lab Activity: Design of rain collection program and construction of rain collectors.
Readings: Bush, 2000. Chapter 24. How Does Acid Deposition Affect Ecosystems? Boehnke and Delumyea, 2000. Experiment 23. Collection and Chemistry of Acid Rain. pp. 237-241.
- 8, 10 Effects of Acid Precipitation (Lakes and Buffering)
Lab Activity: Collection and Chemistry of Acid Rain (Method review)
Readings: Bush, 2000. Chapter 24. How Does Acid Deposition Affect Ecosystems? Boehnke and Delumyea, 2000. Experiment 23. Collection and Chemistry of Acid Rain. pp. 237-241.
- 15, 17 Reducing Acid Precipitation: SO₂ Allowance Trading
Lab Activity: Collection and Chemistry of Acid Rain (**field work, no lab class**)
- 22, 24 Spring Break
- 29 Reducing Acid Precipitation: SO₂ Allowance Trading
Conference organization
Lab Activity: Article Discussions (2); Field rainwater collection

April

- 1, 2 Acid in the Environment
Conference at Connecticut College
- 7 **Quiz #2**

Module 3 Particulates in Air Pollution

- 12, 14 Sources, History, Composition and Structure of Particulate Matter
Lab Activity: No Lab
Readings: U.S. EPA, 2003. The Particle Pollution Report. 26 pp.
- 19, 21 Particulates as Health Risks
Lab Activity: Bridgeport Power Plant visit 4/22
Readings: Boehnke and Delumyea, 2000.

Module 4

The Greenhouse Effect and Climate Change

26, 28

Introduction: The Mechanism of the Greenhouse Effect

Greenhouse Gasses: Sources, relative importance, sinks and projected influence on the global heat budget.

Readings: Bush, 2000. Chapter 23. Climate Change and Global Warming. pp. 360-378.

Acid Rain Report Due Tuesday 26th

May

3, 5

Potential Effects of Global Climate Change – Changing weather patterns, increased storm severity, coastal flooding, polar ice caps, biome migration and species extinction, impacts on agriculture, tropical diseases, food web disruption.

Lab Activity: Article Discussions (3)

Readings: Climate Change Action Plan 2001, 18 pp.

10, 12

Current and future US energy policy. Where do we go from here? Energy conservation, CO₂ emissions trading and the role of technology (efficiency) in reducing global CO₂ emissions.

Quiz #3. 12th reading day (Student Practice Presentation).

16-21

Student Group PowerPoint Presentations (Final)
Assignment Due