

ENV190/100: Introduction to Environmental Science
From Ecological and Sociological Perspectives
Wed. & Fri. 10:30--11:45

Instructor: Dr. Yoshitaka Kumagai (Office: A3-1)

Office Hours: Wed & Thurs. 3:30 pm –5:00 pm or by appointment

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Style of Class: Lecture

Credits: 3

Course Description:

This course is designed to introduce students to the basics of environmental science with emphasis on ecological and sociological perspectives. Environmental science is a multidisciplinary subject consisting of various fields, such as physics, chemistry, biology, geology, meteorology, sociology, political science, etc. For instance, understanding the global warming issue requires not only understanding the physical and chemical mechanisms of global warming but also understanding the interconnectedness of global warming with such as the conflicts between industrialized and developing countries, globalization, the value judgments which various cultures adopt, technological innovations, and the various life styles of people in various societies. It is important to understand that an understanding of the basics of the natural sciences is necessary to understand the relationships between causes and effects involved in various environmental issues, whereas an understanding of the social sciences is integral to understanding why these issues occur, and how they should be addressed, improved or resolved.

Objectives:

After completing this class, students are expected to understand 1) basic components and mechanism of ecosystems; 2) the basic scientific principles underlying environmental issues; (3) how various human activities impact the earth and why environmental issues have recently become so important; (4) the technologies associated with the major environmental issues and the technologies that may help resolve these problems; (5) the sociological factors influencing the environmental issues, and 6) understanding how sustainable environmental management practices should be developed.

Class Materials:

- “Living in the Environment: Principles, Connection, and Solutions” 16th edition. Tyler Miller Jr. and Scott E.Spoolman. Brooks/Cole, Cengage Learning

Grading Components:

Class Participation (10%) ^{Note1}

1 Presentation with a handout (10%) ^{Note2}

A report on field trip (10%)

4 Quizzes (20%)

Midterm Exam: (25 %)

Final Exam: (25%)

Grading Criteria

A: 90-100%

B: 80-89%

C: 70-79%

D: 60-69%

F: Less than 60%

Note 1: Students may be allowed to miss up to two class sessions. After that students lose 1% out of 10% per absence.

Note 2: Presentation topic will be assigned one week prior to a presentation date. Students are expected to use a Power Point for his/her presentation. The grade of presentation will be judged based upon the evaluations scored by Dr. Kumagai.

Class Schedule:

Each class will be carried out based on the reading assignment. Lectures will be given using various visual aids, such as Power Point presentations and videos. Informal discussion will be held during each class, in which the students and a professor will discuss the content of the lecture and various questions prepared by the professor.

Week 1: Introduction

Syllabus Review

Overview of the class

Week 2: Introduction

What is an environmentally sustainable society?

How can environmentally sustainable society grow economically?

How are our ecological footprints affecting the earth?

What is pollution, and what can we do about it?

Why do we have environmental problems?

What are four scientific principles of sustainability?

Reading Assignment: Chap. 1

Week 3: Ecosystems: What They Are and How Do They Work

What is ecology?

What keeps us and other organisms alive?

What are the major components of an ecosystem?

What happens to energy in an ecosystem?

What happens to matter in an ecosystem?

How do scientists study ecosystem?

Quiz 1

Reading Assignment: Chap. 3

Week 4: Golden Week! No Class

Week 5: Biodiversity and Evolution

What is biodiversity and why is it important?

Where do species come from?

How do geological processes and climate change affect evolution?

Week 6: Biodiversity and Evolution

- How do speciation, extinction, and human activities affect biodiversity?
- What is species diversity and why is it important?
- What roles do species play in ecosystems?

Reading Assignment: Chap.4

Week 7: Biodiversity, Species Interactions, and Population Control

- How do species interact?
- How can natural selection reduce competition between species?
- What limits the growth of populations?
- How do communities and ecosystems respond to changing environmental conditions?

Quiz 2

Reading Assignment: Chap. 5

Week 8: The Human Population and Its Impact

- How many people can the earth support?
- What factors influence the size of the human populations?
- How does population age structure affect its growth or decline?
- How can we slow human population growth?

Reading Assignment: Chap. 6

Week 9: Midterm Exam and Special Lecture

Week 10: Food, Soil, and Pest Management

- What is food security and why is it difficult to attain?
- How is food produced?
- What environmental problems arise from food production?
- How can we protect crops from pest more sustainably?
- How can we improve food security?
- How can we produce food more sustainably?

Quiz 3

Reading Assignment: Chap.12

Week 11: Water Resources

- Will we have enough usable water?
- Is extracting groundwater the answer?
- Is building more dams the answer?
- Is transferring water from one place to another the answer?
- Is converting salty seawater to freshwater the answer?
- How can we use water more sustainably?
- How can we reduce the threat of flooding?

Reading Assignment: Chap.13

Week 12: Nonrenewable Energy

What major sources of energy do we use?

What are the advantages and disadvantages of oil?

What are the advantages and disadvantages of natural gas?

What are the advantages and disadvantages of coal?

What are the advantages and disadvantages of nuclear energy?

Quiz 4

Reading Assignment: Chap.15

Week 13: Energy Efficiency and Renewable Energy

Why is energy efficiency an important energy resource?

How can we cut energy waste?

What are the advantages and disadvantages of solar energy?

What are the advantages and disadvantages of producing electricity from the water cycle?

What are the advantages and disadvantages of producing electricity from wind?

What are the advantages and disadvantages of biomass as an energy sources?

What are the advantages and disadvantages of geothermal energy?

What are the advantages and disadvantages of hydrogen as an energy sources?

How can we make a transition to a more sustainable energy future?

Reading Assignment: Chap.16

Week 14: Solid and Hazardous Waste

What are solid waste and hazardous waste, and why are they problems?

How should we deal with solid waste?

Why is reusing and recycling materials so important?

What are the advantages and disadvantages of burning or burying solid waste?

How can we make the transition to more a sustainable low-waste society?

Reading Assignment: Chap.21

Week 15: Review/Integration