



PSC 10 - Introduction to Environmental Science

Catalog Description

Transfer Status: CSU/UC

Unit(s): 4.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)

Lab: 51.00 Contact hours/0.00 Out of class hours/51.00 Total hours/1.00 Unit(s)

Total: 102.00 Contact hours/102.00 Out of class hours/204.00 Total hours/4.00 Unit(s)

Course Description: Introduction to environmental issues from a scientific perspective, focusing on physical, chemical, and biological processes within the Earth system, the interaction between humans and these processes, and the role of science in finding sustainable solutions. Topics include ecological principles, biodiversity, climate change, sustainability, renewable and non-renewable energy, water resources, air and water pollution, and solid waste management. The concepts will be reinforced with an integrated laboratory program. (C-ID ENVS 100).

Objectives

Upon successful completion of this course, the student should be able to:

1. Explain the role of biodiversity and population dynamics in ecosystems.
2. Use scientific methodologies and explain how the scientific method is used to better understand environmental issues.
3. Explain how matter and energy change as they cycle through ecosystems and society.
4. Explain the hydrologic cycle and use modern laboratory techniques and equipment to analyze water sources.
5. Describe soils and their role in food production and use laboratory methods to characterize their physical and biological properties.
6. Analyze the scientific basis of major environmental issues and identify and evaluate potential solutions.
7. Critically evaluate the use of both renewable and nonrenewable energy resources.
8. Analyze and interpret quantitative data and visual representations of data.
9. Show relationships between human actions and environmental issues and examine the impacts of environmental issues on human populations.
10. Identify and describe major global, regional, and local environmental issues.

Course Content

Topic Titles / Suggested Time Topic

Lecture

<u>Topics</u>	<u>Lec Hrs</u>
Scientific Methodologies, Environmental Science and Sustainability	3.00
Matter and Energy	3.00
Description and Structure of Ecosystems	3.00
Biodiversity and Evolution	2.00
Species Interactions and Population Dynamics	3.00
Human Population	3.00
Water Resources and Conservation	6.00
Water Pollution, Treatment and Management	3.00
Soils and Food Production	4.00
Electricity Production, Fossil Fuels and Nuclear Energy	6.00
Renewable Energy	6.00
The Atmosphere, air pollution and Climate Change	6.00
Municipal Solid Waste	3.00

Total Hours: 51.00

Lab

<u>Topics</u>	<u>Lab Hrs</u>
The Scientific Method, Measuring Techniques and Quantitative Analysis	5.00
Conservation of Energy	3.00
Photosynthesis	6.00

Topics	Lab Hrs
Field Trip: Characterizing Ecosystems (Riparian Woodland)	3.00
Modeling Human Population Growth	3.00
Groundwater Study	3.00
Water Quality Analysis	6.00
Electricity and Commercial Power Production	3.00
Soil Analysis	4.00
Nuclear Chemistry	3.00
Renewable Energy	3.00
Home Energy Consumption and Efficiency	3.00
Atmospheric Variables and Greenhouse Gases	3.00
Field Trip: Sustainability Tour, Sierra Nevada Brewery or Tour of Neal Road Landfill	3.00
Total Hours:	51.00

Methods of Instruction

- A. Collaborative Group Work
- B. Demonstrations
- C. Field Trips
- D. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- E. Instructor Demonstrations
- F. Lecture

Methods of Evaluation

- A. Exams/Tests
- B. Quizzes
- C. Papers
- D. Homework
- E. Lab Projects
- F. Essays and research papers

Examples of Assignments

Reading Assignments

1. Read the chapter on matter and energy in your text and complete the corresponding homework assignment. Be prepared for an in class discussion on the following: a. The building blocks of matter: atoms and atomic structure, ions and molecules. b. A detailed discussion on the law of conservation of matter, energy and the 2nd law of thermodynamics. c. Examples of how these laws impact ecosystems and our way of life.
2. Read about a current event in environmental science such as a recent article involving alternative energy, new green technology, or an environmental issue published either in the news or an environmental science journal and verbally present your findings to the class.

Writing Assignments

1. Carefully read the USGS San Joaquin Delta article and write a 3-4 page paper characterizing the environmental issues related to the Delta. Each paper must include: a. A detailed explanation of the cause of subsidence in the Delta. b. An explanation of the different flood control methods used in that area. c. A description of the consequences of alteration of the Delta. d. Recommendations on sustainable solutions that you think might mitigate the problems described above.
2. Write a 5-6-page paper on the environmental topic of your choice. These topics may include but are not limited to: Climate Change, Pollution issues, Agriculture and food production, water issues and alternative energy. Papers must include: a title, thesis statement, a detailed description of the problem, a description of the consequences of the problem and a proposal for solving the problem that is sustainable and based on sound science. Papers must also include at least 3 references from credible peer-reviewed journals.

Out-of-Class Assignments

1. Attend one of the science seminar lectures held in the Physical Sciences building at CSU Chico. Take detailed notes during the seminar and write a one page summary of the lecture. Be prepared for a class discussion on the topic.
2. Collect a water sample from one of the local natural water bodies listed in the lab manual. Collect 500ml in one of the sterile containers provided in class. Be sure to record the temperature, date and time of collection and the exact location the sample was taken. We will perform a variety of water quality tests on these samples in lab.

Recommended Materials of Instruction

Miller, G.T., Spoolman, S.E. (2019). Environmental Science. *Cengage, Boston, MA, 16th*. 978-1337569613.

Sincoff, S., Ferguson, C.B. (2022). Environmental Science Laboratory Manual. *Butte College*. N/A.

Karr, Susan. (2021). Scientific American Environmental Science: For a Changing World. *Macmillan Learning, 4th*. 978-1-319-24562-7.

Minimum Qualifications

Earth Science (Masters Required)

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Date: 03/21/2022