BIOL 145: ENVIRONMENTAL SCIENCE

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2024
Credits:	3
Total Contact Hours:	54
Lecture Hours :	54
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	108
Total Student Learning Hours:	162
Strongly Recommended:	BIOL 105 or BIOL 105H; ENGL 101.
District General Education:	B1. Natural Sciences - Life Sciences
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

Catalog Course Description

A lecture course exploring contemporary global environmental concerns. Basic concepts covered will include the Earth's life support systems, population dynamics, environmental pollution, food production, and natural resource utilization. Emphasis will be placed on recognizing global environmental problems and exploring various solutions for them. 54 lecture hours.

Course Objectives

- identify and analyze the characteristics of the global life support systems
- recognize current global environmental resource problems and evaluate possible solutions
- understand what global climate change is, reasons/evidence for climate change, and possible solutions to stop/reverse global climate change
- define problems with air and water pollution

Major Course Content

1. Introduction to environmental science; population, resources, environmental degradation, and pollution

2. Human cultural changes of the last 40,000 years; the throw-away world view in industrial societies; a sustainable-Earth world view

3. Forms and quality of matter and energy; physical and chemical laws; energy efficiency and use; environmental resource problems

4. The Earth's life support systems; ecosystems and how they work; energy flow and matter recycling in ecosystems; roles and interactions of species in ecosystems

5. Major types of terrestrial ecosystems; aquatic ecosystems; response to stress of living organisms, populations, and community ecosystems; human impact on ecosystems

6. Human population dynamics; factors affecting population size; population age structure; population distribution; methods of regulating population change; case studies of population regulation

7. The atmosphere and air pollution; outdoor and indoor air pollution; smog and acid deposition; effects of air pollution on living organisms and materials; controlling air pollution

8. Introduction to climate; global warming for the greenhouse effect; depletion of ozone in the stratosphere; climate, biodiversity, and nuclear war

9. Water resources and water pollution; supply renewal, and use of water resources; water management; water pollution of streams, lakes, oceans, groundwater; controlling water pollution

10. Soil components, types, properties; soil erosion, soil conservation and land use control; excess salts and water contamination of soil; hazardous wastes contamination of soil

11. World food resources; work agricultural systems; major world food problems; methods of increasing world food production; increasing fish catch and fish farming; incentives for increasing world food production; sustainable-Earth agriculture

12. Pesticides and pest control; types and uses of pesticides; the case for and against pesticide use; pesticide regulation in the U.S. ; alternative methods of insect control

13. Land resources; importance of forests; tropical deforestation and the fuel wood crisis; public lands in the U.S. ; forest management and conservation; rangelands

14. Wild plant and animal resources; why preserve wild plant and animal species; how species become depleted and extinct; protecting species from extinction; wildlife management; fisheries management

15. Perpetual and renewable energy resources; evaluating energy resources; improving energy efficiency; solar energy for heat and electricity; water for producing electricity and storing heat; wind power; energy from biomass; geothermal energy; hydrogen as a possible energy source

16. Non-renewable energy resources; oil and natural gas; coal; non-renewable nuclear fission; breeder nuclear fission and nuclear fusion; developing and energy strategy for the U.S.

17. Non-renewable mineral resources and solid waste; geologic processes and minerals; locating and extracting minerals; environmental impact of mining, processing, and using mineral resources; global supply of mineral resources; the throw away approach, wasting resources; increasing and extending resources

18. Epilogue: Achieving a sustainable-Earth society

Suggested Reading Other Than Required Textbook

None

Examples of Required Writing Assignments

Answer a short essay question on an exam such as: Imagine during the summer a stand of deciduous and evergreen trees that are in a forest

adjacent to a coal burning facility. The sulfur particulates released into the air from coal burning interacts with atmospheric water and produces sulfuric acid that damages the surfaces of leaves within this stand of trees. How do you think this pollution would affect the plants net primary productivity (NPP)? Be sure to also explain what primary productivity (PP) is and why is a positive NPP so important to a plant?

Examples of Outside Assignments

Selected questions from the end of each chapter covered in the course are to be answered and turned in for a grade.
Questions Examples:
1. What are the “stabilization wedges” suggested by Pacala and Socolow at Princeton University (see table 9.2)? How many wedges do we need to accomplish to flatten our CO2 emissions?
2. What is the greenhouse effect, and how does it work?
3. Why are we worried about greenhouse gases?

Instruction Type(s)

Lecture, Online Education Lecture

IGETC Area 5: Physical and Biological Sciences

5B. Biological Science