SUS 102 : INTRODUCTION TO ENVIRONMENTAL SCIENCE AND SUSTAINABILITY

Transcript title

Intro to Environmental Science

Credits

4

Grading mode

Standard letter grades

Total contact hours

60

Lecture hours

30

Lab hours

30

Course Description

Examines the science behind current environmental issues and sustainable solutions to problems. Focuses on ecological systems and case studies from Oregon and the Pacific Northwest. Labs may include field trips.

Course learning outcomes

1. Describe sustainability from a scientific perspective.
2. Apply Intergovernmental Panel on Climate Change socio-ecological scenarios and climate model outputs for the Pacific Northwest to predict how human actions affect frequency and intensity of drought, fire, and other ecological parameters.
3. Determine effects of climate scenarios on ecosystem services across alpine, forested, rangeland, agricultural, and freshwater systems in the Pacific Northwest.
4. Explain the effects of anthropogenic factors, such as pollution, nitrogen deposition, grazing, accelerated movement of species, genetically modified organisms, and pesticides on sustainability of ecosystems in the Pacific Northwest.
5. Analyze the role of biodiversity and species conservation in disease ecology and stability of ecosystems.
6. Sustainability outcome: Explain the interconnectedness of environmental, social, and economic systems in the context of ecosystem ecology in the Pacific Northwest.

Content outline

1. What is sustainability science?
   a. How to apply scientific process to measuring sustainability with respect to long term maintenance of ecosystem services
2. Climate change
   a. Intergovernmental Panel on Climate Change emissions scenarios and climate models
   b. Application of scenarios to regional and local predicted changes in the Pacific Northwest
   c. Analysis of data on number and severity of droughts through time
   d. Connection of climate change to of ecological and social systems in the Pacific Northwest (PNW)
3. Alpine environments
   a. Ecosystem service: recreation
   b. Changing snowpack
   c. Nitrogen deposition and eutrophication effects on lakes
   d. Case Study: Water Quality in PNW
4. Rangelands
   a. Ecosystem service: food, carbon storage
   b. Grazing in ecosystems and regenerative grazing
   c. Methane emissions
   d. Invasive species
5. Agriculture
   a. Ecosystem service: food
   b. Pollinators: native, honeybees, colony collapse
   c. Science of genetically modified organisms
   d. Pesticides and persistence in the ecosystem
   e. Nitrogen cycle, fertilizer, energy, eutrophication
6. Forests
   a. Ecosystem service: products, recreation, clean air, carbon storage
   b. Analysis: Fire history in the PNW
   c. Case Study: Fire behavior and vegetation management
7. Freshwater
   a. Ecosystem services: clean water, fishing, recreation, filtration of pollutants
   b. Pollution, nitrite, and septic systems
   c. Case study: Freshwater systems and pollution in PNW
   d. Case study: Freshwater systems and invasive species in PNW
8. Biodiversity
   a. Diversity-stability hypothesis
   b. Biodiversity crisis
   c. Quantifying biodiversity
   d. Case study: biodiversity and emerging infectious disease
   e. Case study: Endangered species in PNW
   f. Case Study: Breeding programs in PNW
9. Pollution
   a. Case Study: Pollution in PNW

Required materials

Textbook or printed coursepack may be required.

General education/Related instruction lists

- Science Lab