BIOL 9: ENVIRONMENTAL BIOLOGY

Foothill College Course Outline of Record

Heading	Value
Effective Term:	Summer 2025
Units:	4
Hours:	4 lecture per week (48 total per quarter)
Degree & Credit Status:	Degree-Applicable Credit Course
Foothill GE:	Area 5: Natural Sciences w/ Lab, Area 7: Lifelong Learning
Transferable:	CSU/UC
Grade Type:	Letter Grade (Request for Pass/No Pass)
Repeatability:	Not Repeatable

Student Learning Outcomes

- Student will evaluate environmental issues and describe possible solutions at both the local and global level
- The student will be able to explain and provide examples of the movement of energy and matter through ecosystems and discuss human impacts that disrupt these processes.
- Student will evaluate their personal impact on the earth.

Description

An introduction to environmental biology and a survey of the biological and ecological principles needed to understand environmental issues. Global, national, and local perspectives on current issues, such as resource use, pollution, biodiversity, and impacts of human population growth.

Course Objectives

The student will be able to:

1. Describe the scope of environmental biology and its relationship to other sciences
2. Describe the scientific method and explain its uses and limitations as it pertains to environmental biology
3. Identify and apply basic biological and ecological principles
4. Describe the history and future trajectory of human population growth
5. Evaluate the implications of human population growth
6. Characterize air, water, and land resources, describe the threats to these resources, and evaluate possible solutions
7. Characterize biodiversity, describe threats to biodiversity, and evaluate approaches to conservation
8. Describe the status of food resources, including agriculture and fisheries
9. Evaluate alternative energy sources
10. Describe the roles of governmental agencies and non-governmental agencies in affecting environmental policy and patterns of resource use
11. Discuss contributions that an individual can make toward affecting environmental policy and sustainable use of resources
12. Critically evaluate media generated environmental information and contrasting viewpoints on environmental issues

Course Content

1. Scope of environmental biology
   a. History of resource use and conservation
   b. Characteristics of science
   c. Environmental biology as a scientific discipline
   d. Interdisciplinary nature of environmental biology
2. Scientific method
   a. Components of the scientific method
   b. Application and limitations in environmental biology
3. Basic biological and ecological principles
   a. Characteristics of life and life-sustaining processes, such as photosynthesis and cellular respiration
   b. Characteristics of the three domains of life
   c. Evolution, natural selection, and adaptation
   d. Population ecology: characteristics of populations, population growth models, limits to population growth, concept of niche
   e. Community ecology: species interactions, resource partitioning, succession
   f. Ecosystem ecology: energy flow, trophic structure, biogeochemical cycles, role of disturbance, survey of main aquatic and terrestrial ecosystems
4. Human population growth
   a. History and possible future trajectories
   b. Contrasting viewpoints on the limits of human population growth
   c. Patterns of population growth and resource use in more developed countries (MDC) versus less developed countries (LDC)
   d. Age structure pyramids
   e. Contributing factors, such as illiteracy, infant mortality, GNP, and attitudes regarding family, birth control, religion
5. Implications of human population growth
   a. Urbanization: definition, associated problems, possible solutions
   b. Environmental justice: definition, impacts on different ethnic groups
   c. Waste management: landfills, recycling, incineration, hazardous wastes, sewage
   d. Sustainability: definition, approaches to achieving sustainability, such as sustainable harvests and protection of resources
6. Natural resources
   a. Characteristics of the air (atmosphere) and threats
      i. Air pollution (smog, acid rain, etc.)
      ii. Ozone loss
      iii. Greenhouse effect
      iv. Climate change and global warming
      v. Consequences for human health
   b. Characteristics of the hydrosphere and threats to water resources
      i. Hydrologic cycle
      ii. Water pollution
      iii. Freshwater supply: groundwater vs. surface water, diversion and dams
      iv. Past, present, and future management of water as a resource

c. Land resources
    i. Forest management
    ii. Tropical vs. temperate deforestation
    iii. Management of rangelands
    iv. Soil erosion
7. Biodiversity
    a. Distribution of biodiversity
    b. Major reasons for loss of biodiversity
    c. Extinction and vulnerability factors for species
    d. Conservation efforts, including preserve design, captive breeding programs, sustainable harvests
8. Food resources
    a. Terrestrial and aquatic food resources
    b. Past, present, and future management of these resources
    c. The Green Revolution
    d. Genetically modified organisms
    e. Health and environmental implications of pesticides, fertilizers, and meat-based diets
9. Energy resources
    a. Definition and examples of nonrenewable, renewable, and perpetual
    b. Current MDC (more-developed countries) vs. LDC (less-developed countries) habits
    c. Management implications for future
    d. Role of technology in developing energy resources
10. Environmental policy and resource use
    a. Major pieces of US environmental legislation
    b. Role of non-governmental organizations in shaping environmental policy
11. Role of the individual
    a. How to find and evaluate information regarding environmental issues and policy
    b. How to write your congresspeople
    c. Identify and evaluate how lifestyle choices impact the environment

Lab Content

Not applicable.

Special Facilities and/or Equipment

1. Fully equipped multi-media lecture room. Students need internet access.
2. When taught via Foothill Global Access, on-going access to computer with email software and hardware; email address.

Method(s) of Evaluation

Methods of Evaluation may include but are not limited to the following:

One or more midterm exams
Final examination
Several written critiques of media generated environmental news and contrasting viewpoints of environmental issues
Advocacy project involving research and presentation of current environmental topic to the class

Method(s) of Instruction

Methods of Instruction may include but are not limited to the following:

Lecture
Discussion
Cooperative learning exercises
Oral presentations

Representative Text(s) and Other Materials

Fisher, Mathew, editor. Environmental Biology. 2021.

Types and/or Examples of Required Reading, Writing, and Outside of Class Assignments

1. Reading of textbook chapters on a weekly basis. Students will also be required to read and evaluate reporting of current environmental issues in current periodicals
2. Students will research and design an advocacy campaign for an environmental issue and/or participate in a service learning project off campus that involves volunteering with local restoration or other environmental projects
3. Students will complete personal impact assessments (for example, energy use, water use, ecological footprint analysis) at the beginning and end of the quarter and analyze changes

Discipline(s)

Biological Sciences