

Las Positas College  
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## Course Outline for BIO 40

### HUMANS AND THE ENVIRONMENT

Effective: Fall 2019

#### I. CATALOG DESCRIPTION:

BIO 40 — HUMANS AND THE ENVIRONMENT — 3.00 units

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.

3.00 Units Lecture

#### **Strongly Recommended**

- Eligibility for ENG 1A -

#### **Grading Methods:**

Letter or P/NP

#### **Discipline:**

- Ecology or
- Biological Sciences

	<b>MIN</b>
<b>Lecture Hours:</b>	54.00
<b>Expected Outside of Class Hours:</b>	108.00
<b>Total Hours:</b>	162.00

#### II. NUMBER OF TIMES COURSE MAY BE TAKEN FOR CREDIT: 1

#### III. PREREQUISITE AND/OR ADVISORY SKILLS:

**Before entering this course, it is strongly recommended that the student should be able to:**

##### A. -Eligibility for ENG 1A

1. Use strategies to assess a text's difficulty, purpose, and main idea prior to the act of reading
2. Employ strategies that enable a critical evaluation of a text
3. Respond critically to a text through class discussions and writing
4. Use concepts of paragraph and essay structure and development to analyze his/her own and others' essays
5. Write effective summaries of texts that avoid wording and sentence structure of the original
6. Respond to texts drawing on personal experience and other texts
7. Organize coherent essays around a central idea or a position
8. Apply structural elements in writing that are appropriate to the audience and purpose
9. Provide appropriate and accurate evidence to support positions and conclusions
10. Produce written work that reflects academic integrity and responsibility, particularly when integrating the exact language and ideas of an outside text into one's own writing
11. Utilize effective grammar recall to check sentences for correct grammar and mechanics
12. Proofread his/her own and others' prose

#### IV. MEASURABLE OBJECTIVES:

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

- A. Explain basic ecological concepts involving energy flow, energy transformations by autotrophy and heterotrophy, decomposition and the cycling of matter, and interacting within and between populations
- B. Recall defining characteristics and examples of biomes, communities, and ecosystems
- C. Explain human food production, water quality and supply, atmospheric modification, energy supply and usage, and land use practices in the context of the ecological principals set forth in the course
- D. Show relationships between human actions and environmental issues and examine the impacts of environmental issues on human populations.
- E. Identify and describe major global, regional, and local environmental issues.
- F. Analyze the scientific basis of major environmental issues and identify and evaluate potential solutions.
- G. Analyze and interpret quantitative data and visual representations of data.

H. Use scientific methodologies and explain how the scientific method is used to better understand environmental issues.

## V. CONTENT:

- A. Population, Resources, Pollution: Overview
- B. Human population growth
- C. Principles of Sustainability
- D. Matter and energy resources: Basic concepts
- E. Ecosystem concept
  - 1. Energy flow
  - 2. Biogeochemical cycles
  - 3. Ecological niches and food webs
  - 4. Basic types of ecosystems
- F. Biome types and their problems
- G. Ecosystem change
  - 1. Population ecology and evolution
  - 2. Ecological succession
- H. Aquatic ecology
  - 1. Freshwater ecology
  - 2. Estuarine and marine ecology
- I. Water resources and water pollution
  - 1. California, US and global water usage
  - 2. Point and nonpoint sources of water pollution
- J. Land resources
  - 1. Public lands classification and management
  - 2. Forests and forest management
- K. Soil resources
- L. Food production
  - 1. Origins and growth of agriculture
  - 2. World agriculture systems
  - 3. The Green Revolution
  - 4. Sustainable agriculture and organic farming
- M. Biodiversity
  - 1. Endangered species
  - 2. Extinction
- N. Solid Waste Management
  - 1. Hazardous Waste Disposal
  - 2. Reduce, Reuse, Recycle and Rot
- O. Biotechnology
  - 1. Reproductive cloning
  - 2. Genetically Modified Organisms
- P. Economics and politics of resource use and conservation
  - 1. Tragedy of the Commons
  - 2. Ecological Footprint
  - 3. Sustainability
- Q. Climate Change, Air Pollution and Ozone Loss
  - 1. Climate Change
  - 2. Air Pollution
  - 3. Ozone Loss
- R. Non-renewable energy sources
  - 1. Coal, natural gas, oil
- S. Renewable energy sources
  - 1. Wind, solar, hydroelectric, biofuel

## VI. METHODS OF INSTRUCTION:

- A. **Student Presentations** -
- B. **Audio-visual Activity** - Utilization of video and other audio visual aids
- C. **Discussion** - Discussions and problem solving of significant and controversial issues
- D. Readings from the text, supplementary materials, primary source materials
- E. **Lecture** - Lecture and discussion on major themes and concepts
- F. **Field Trips** - with group or independent
- G. **Demonstration** - Demonstrations and simulations
- H. **Written Exercises** - Written assignments

## VII. TYPICAL ASSIGNMENTS:

- A. Reading and discussion
  - 1. Read Chapter 5, "Evolution, Biodiversity, and Community Processes." Be prepared to explain how you would respond to someone who says that they don't believe in evolution because it is "just a theory".
  - 2. Read Chapter 10, "Air and Air Pollution." Be prepared to discuss and defend your opinion on the possible weaknesses of the U.S. Clean Air Act.
  - 3. Read Chapter 3, "Ecosystems, What They Are and How Do They Work?" Explore examples of human's affect on food webs by addressing this key question: How has Global Warming, over-fishing, pesticides or genetic engineering disrupted food webs?
- B. Writing
  - 1. Research and write a term paper pertaining to one of the primary topic areas discussed in this course. Cite references in proper format by including a bibliography.
  - 2. Research and write a brief report discussing what happens to solid waste in your community. How much is land filled? Incinerated? Composted? Recycled? What technology is used in local landfills or incinerators? What leakage and pollution problems have local landfills or incinerators had?
- C. Collaborative learning
  - 1. As a group of 4 to 6 students select a controversial topic. Half of the group prepares arguments and explanations in favor of the issue, half the group will be arguing on the opposing side. Each partner has a designated part of the problem to present to the class. After the presentation the whole class will be involved in the discussion.
    - a. Example of a topic: Are aggressive international efforts needed to avoid global warming?
  - 2. The class is subdivided into groups of three. Each group discusses one specific question of a problem. More than one group is assigned to each question and the groups' conclusions about each question are compared and contrasted.
    - a. Examples of a topic: The WWF has asked you to evaluate the importance of mutualism to ecosystems as the organization is concerned about the present rate of extinction.
      - 1. Example questions: What would the world be like without seed dispersal by animals? What would the world be like without plant-microbial/fungal associations facilitating nutrient acquisition by plants?

VIII. EVALUATION:

**Methods/Frequency**

- A. Exams/Tests  
1-2 per semester
- B. Quizzes  
1 per module
- C. Papers  
at least 1 per semester
- D. Oral Presentation  
0-1 per semester
- E. Projects  
0-1 per semester
- F. Class Participation  
Weekly
- G. Class Work  
Weekly
- H. Home Work  
Weekly
- I. Other  
Written and problem solving exercises (Weekly)

IX. TYPICAL TEXTS:

1. Miller, G. Tyler. *Environmental Science*. 16th ed., Brooks/Cole, 2018.
2. Withgott, Jay , and Matt Laposata. *Environment: The Science Behind the Stories*. 6th ed., Benjamin Cummings, 2017.
3. Raven, Peter, and Linda Berg. *Environment*. 9th ed., John Wiley & Sons, 2015.

X. OTHER MATERIALS REQUIRED OF STUDENTS: