



El Camino College  
COURSE OUTLINE OF RECORD – Official

<b>Course Acronym:</b>	BIOL
<b>Course Number:</b>	15
<b>Descriptive Title:</b>	Environmental Aspects of Biology
<b>Division:</b>	Natural Sciences
<b>Department:</b>	Biology
<b>Course Disciplines:</b>	Biological Sciences
<b>Catalog Description:</b>	Basic ecological and biological principles and concepts are emphasized in the study of the structure and function of ecosystems. Major ecological problems such as over-population, resource depletion and food production are related to endangered species and habitat degradation. Environmental pollution of air and water resources are considered in local areas as well as national and international situations. Air quality and global warming issues are considered. Students are encouraged to participate in local activities addressing environmental problems and restoring and improving local habitats.
<b>Prerequisite:</b>	
<b>Co-requisite:</b>	
<b>Recommended Preparation:</b>	Eligibility for English 1A
<b>Enrollment Limitation:</b>	
<b>Hours Lecture (per week):</b>	3
<b>Hours Laboratory (per week):</b>	0
<b>Outside Study Hours:</b>	6
<b>Total Course Hours:</b>	54
<b>Course Units:</b>	3
<b>Grading Method:</b>	Letter Grade only
<b>Credit Status:</b>	Credit, degree applicable
<b>Transfer CSU:</b>	Yes
<b>Effective Date:</b>	Prior to July 1992
<b>Transfer UC:</b>	Yes
<b>Effective Date:</b>	Fall 1995
<b>General Education: ECC</b>	Area 1 - Natural Sciences
<b>Term:</b>	
<b>Other:</b>	
<b>CSU GE:</b>	Area B2 - Physical Universe and its Life Forms: Life Science

	<b>Term:</b>
	<b>Other:</b>
	<b>IGETC:</b> Area 5B - Biological Science
	<b>Term:</b>
	<b>Other:</b>
<b>Student Learning Outcomes:</b>	<p><b>SLO #1 Scientific Method</b></p> <p>The student will understand and apply principles of the scientific method; recognizing an idea based on reproducible evidence.</p> <p><b>SLO #2 Content Knowledge (Energy Flow)</b></p> <p>Students will use basic energy principles to explain the flow of energy in living systems, such as those that occur in the cellular metabolic pathways of photosynthesis and cell respiration, or the relationships observed between autotrophs and heterotrophs in ecosystems.</p> <p><b>SLO #3 Content Knowledge (Materials Cycling)</b></p> <p>Students will describe how biologically significant materials move between the biotic and abiotic components of an ecosystem and the role living things play in the cycling of these nutrients</p>
<b>Course Objectives:</b>	<ol style="list-style-type: none"> <li>1. Define ecological terms and describe concepts of ecology including: species, population, community, ecosystem, niche, habitat, and biosphere.</li> <li>2. Define environmental science historic milestones and activists</li> <li>3. Distinguish between sound scientific sources, misinformation, and disinformation.</li> <li>4. Distinguish between closed and open systems and the emergent properties of a system</li> <li>5. Distinguish between different types of autotrophs and heterotroph, including different types of consumers and decomposers.</li> <li>6. Distinguish between the mechanisms that cause the greenhouse effect, global warming, and climate change.</li> <li>7. Describe the structure and function of the major organic molecules in the body: carbohydrates, lipids, proteins and nucleic acids.</li> <li>8. Describe the biogeochemical cycles for water, carbon, nitrogen, and phosphorus, including sources, importance, and effects of imbalances.</li> <li>9. Describe major components of an ecosystem (abiotic and biotic) and how they affect the species distribution and succession</li> <li>10. Discuss the basic processes of photosynthesis and cellular respiration.</li> <li>11. Describe the flow of energy through the environment via trophic levels and contrast the concepts of food webs, food chains, and food pyramids.</li> <li>12. Describe the major terrestrial biomes: tundra, taiga, deciduous forest, temperate rainforest, chaparral, desert, grassland, and tropical rainforest. Review the characteristic animals, plants, and human activities in each.</li> </ol>

	<ol style="list-style-type: none"> <li>13. Identify and characterize representative species based on ecological roles, interrelationships (competition, predation, symbiosis, mutualism, parasitism), and life strategies such as "r" and "K" selection.</li> <li>14. Summarize current human population statistics such as total fertility rate, life expectancy, infant mortality, and total population.</li> <li>15. Discuss factors affecting population size and distribution in various countries.</li> <li>16. Explain biological evolution and concepts as they relate to endangered species, extinction, and speciation.</li> <li>17. Discuss the consequences of biodiversity decline and the importance of gene pools and genetic banks.</li> <li>18. Describe aquatic ecosystems, both fresh and salt. Discuss water resources, legislation, the impact of human activities, and our own water distribution situation in Los Angeles.</li> <li>19. Describe water pollution problems and causes, and the major steps in treating drinking water, and the primary and secondary treatment of sewage in Los Angeles.</li> <li>20. Discuss indoor and outdoor air pollution problems and solutions to these problems.</li> <li>21. Discuss current global atmospheric changes such as global warming and ozone depletion describing causes and predicted effects.</li> <li>22. Identify human health hazards from pathogens, chemicals and behavior.</li> <li>23. Discuss the problems of solid and hazardous wastes affecting air, water, and soil. Explain the advantages and disadvantages of current solutions such as burning and burying.</li> <li>24. Identify ways to turn our society into a more environmentally sustainable one.</li> </ol>
<p><b>Major Topics:</b></p>	<p><b>I. Introduction to Environmental Biology (2 hour, lecture)</b></p> <ol style="list-style-type: none"> <li>A. Human population impact</li> <li>B. Human consumption</li> <li>C. Major human pollution disasters</li> </ol> <p><b>II. Ecological terms and concepts (3 hours, lecture)</b></p> <ol style="list-style-type: none"> <li>A. Terms: ecology, population, community, habitat, niche, ecosystem, biosphere, ecosphere</li> <li>B. Principles of ecosystem outline</li> </ol> <p><b>III. Energy and life (3 hours, lecture)</b></p>

- A. Organic molecules
- B. Cellular energy and energy transformation
- C. Photosynthesis
- D. Cellular Respiration

**IV. Flow of Energy through life (2 hours, lecture)**

- A. Food chains
  - 1. Grazing
  - 2. Detritus
- B. Food webs
- C. Food pyramids

**V. Species Interaction (2 hours, lecture)**

- A. Predation, prey, predators
- B. Competition - limiting factors
- C. Symbiosis

**VI. Biomes (3 hours, lecture)**

- A. Tundra
- B. Taiga
- C. Temperate Deciduous Forest
- D. Temperate Rainforest
- E. Grassland
- F. Chaparral
- G. Desert - adaptations
- H. Rainforest

**VII. Ecological Succession (1 hour, lecture)**

- A. Primary succession
- B. Climax community
- C. Secondary succession

**VIII. Nutrient Cycling, Biogeochemical Cycles (2 hours, lecture)**

- A. Carbon
- B. Nitrogen
- C. Phosphorous

**IX. Population Dynamics (2 hours, lecture)**

- A. Population growth
- B. Limiting factors
- C. Growth curves

**X. Reproductive Strategies (1 hour, lecture)**

- A. R selection

- B. K selection

**XI. Evolution (3 hour, lecture)**

- A. Natural Selection
- B. Charles Darwin
- C. Galapagos

**XII. Human Population Dynamics (4 hours, lecture)**

- A. Human birth rate
- B. Human death rate
- C. Percent annual growth rate
- D. Double time
  - 1. Less developed countries
  - 2. More developed countries
- E. Fertility rate
- F. U.S. Population stabilization
- G. ZPG
- H. Migration
- I. Age structure
  - 1. Rich and poor gap

**XIII. Problems of Overpopulation (2 hour, lecture)**

- A. World hunger
- B. Resources
- C. Population urbanization
- D. Mega cities
- E. Transportation

**XIV. Overpopulation Solutions (3 hours, lecture)**

- A. Economic development
- B. Demographic transition
- C. Family planning

**XV. Endangered Species (6 hours, lecture)**

- A. Biological diversity
- B. Endangered species
- C. Threatened species
- D. Extinction
- E. Reasons for wildlife preservation
- F. Human causes for endangerment
- G. Wildlife conservation

**XVI. Water Resources (3 hours, lecture)**

- A. Importance of water
- B. Properties of water
- C. Hydrologic cycle

- D. Water habitats
- E. Marine habitats
- F. Surface water supply problems
- G. Ground water supply problems
- H. Redistribution
- I. Water conservation

**XVII. Water Pollution (3 hours, lecture)**

- A. Point source vs. Non-point source pollution
- B. Disease causing agents
- C. Drinking water treatment
- D. Organic waste and sewage
- E. Waste water treatment
- F. Inorganic chemical pollution
- G. Organic chemical pollution
- H. Oil pollution
- I. Thermal pollution
- J. Radioactive waste
- K. Legislative response

**XVIII. Clean Air (3 hours, lecture)**

- A. Atmospheric components
- B. Atmospheric oxygen and Ozone
- C. Atmospheric layers
- D. Inversion layers
- E. Major air pollution disaster

**XIX. Air Pollution (3 hours, lecture)**

- A. Primary vs. Secondary pollutants
- B. Oxides of carbon
- C. Compounds of sulfur, SO<sub>2</sub>, SO<sub>3</sub>, H<sub>2</sub>S
- D. Particulates, SPM
- E. Particulates and human health
- F. Lead
- G. Oxides of nitrogen
- H. Photochemical oxidants
- I. Hydrocarbons
- J. Indoor air pollution
- K. Noise pollution
- L. History of air pollution legislation

**XX. Global Consequences (3 hours, lecture)**

- A. Acid rain
- B. Acid fog
- C. Global warming
- D. Ozone depletion in stratosphere

<b>Total Lecture Hours:</b>	54
<b>Total Laboratory Hours:</b>	0
<b>Total Hours:</b>	54
<b>Primary Method of Evaluation:</b>	1) Substantial writing assignments
<b>Typical Assignment Using Primary Method of Evaluation:</b>	Turn in a current newspaper or magazine article relating to human population dynamics. Write a two-page essay describing how the article relates to that specific topic.
<b>Critical Thinking Assignment 1:</b>	Draw and label a food pyramid and discuss what relation it has to the second law of thermodynamics.
<b>Critical Thinking Assignment 2:</b>	In a paragraph, explain why ozone depletion in the stratosphere is a problem
<b>Other Evaluation Methods:</b>	Completion, Essay Exams, Homework Problems, Matching Items, Multiple Choice, Other Exams, Quizzes, Reading Reports, Term or Other Papers, True/False, Written Homework
<b>Instructional Methods:</b>	Discussion, Field trips, Guest Speaker Lectures, Multimedia presentations
<b>If other:</b>	Internet Presentation/Resources
<b>Work Outside of Class:</b>	Observation of or participation in an activity related to course content (such as theatre event, museum, concert, debate, meeting), Required reading, Study, Written work (such as essay/composition/report/analysis/research)  Service Learning Hours (minimum of 5 for the semester) such as volunteer time at a local city park, nature preserve, beach clean-up, etc.
<b>If Other:</b>	
<b>Up-To-Date Representative Textbooks:</b>	Karr. Environmental Science for Changing World. 4th ed. .Copyright 2021. Macmillan Higher Education
<b>Alternative Textbooks:</b>	Example of on-line links and also for OER resources:  1) Environmental Biology  by Mathew Fisher  2021  Orange Coast Community College  <a href="https://bio.libretexts.org/Bookshelves/Ecology/Environmental_Biology_(Fisher)">https://bio.libretexts.org/Bookshelves/Ecology/Environmental_Biology_(Fisher)</a>  2) <b><u>Title: Enhancement Exercises for Biology + Biology 2e</u></b>

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<b>Required Supplementary Readings:</b>	
<b>Other Required Materials:</b>	
<b>Requisite:</b>	
<b>Category:</b>	
<b>Requisite course(s): List both prerequisites and corequisites in this box.</b>	
<b>Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).</b>	
<b>Requisite Skill:</b>	
<b>Requisite Skill and Matching Skill(s): Bold the requisite skill(s). If applicable</b>	
<b>Requisite course:</b>	
<b>Requisite and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s).</b>	
<b>Requisite Skill:</b>	Eligibility for English 1A
<b>Requisite Skill and Matching skill(s): Bold the requisite skill. List the corresponding course objective under each skill(s). If applicable</b>	<b>Students should be able to read and identify the major topics of a textbook.</b>  Identify at the paragraph level the topic sentence, supporting details, transitions and patterns of organization of short reading selections.  Employ basic study skills and reading strategies to explain at the literal level the content of a text.
<b>Enrollment Limitations and Category:</b>	
<b>Enrollment Limitations Impact:</b>	
<b>Course Created by:</b>	Jeanne Bellemin



<b>Date:</b>	02/01/1986
<b>Original Board Approval Date:</b>	
<b>Last Reviewed and/or Revised by:</b>	Bryan Carey
<b>Date:</b>	03/28/2022
<b>Last Board Approval Date:</b>	06/20/2022