

# **El Camino College**

# **COURSE OUTLINE OF RECORD - Official**

# I. GENERAL COURSE INFORMATION

Subject and Number:         Biology 15           Descriptive Title:         Environmental Aspects of Biology	
Course Disciplines:	Biological Sciences
Division:	Natural Sciences
Catalog Description:	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.

# Conditions of Enrollment: Recommended Preparation

English 82

Course Length: Hours Lecture: Hours Laboratory: Course Units:	X Full Term Other (Sp 3.00 hours per week TE 0 hours per week TBA 3.00	pecify number of weeks): 3A	
Grading Method: Credit Status	Letter Associate Degree Credit		
Transfer CSU: Transfer UC:	<ul> <li>X Effective Date: Prior to July 1992</li> <li>X Effective Date: Prior to July 1992</li> </ul>		
General Education:			
El Camino College:	1 – Natural Sciences		
C C	Term:	Other: Approved	
CSU GE:	B2 - Life Science		
	Term:	Other: Approved	

# **II. OUTCOMES AND OBJECTIVES**

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

- 1. Students will understand and apply principles of the scientific method; recognizing an idea based on reproducible evidence.
  - 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
- and the certain field of the certain metabolic path of photosynthesis and cell respiration, or the relationships observed between autotrophs and heterotrophs in ecosystems.

Students will describe how biologically significant materials move between

3. the biotic and abiotic components of an ecosystem and the role living things play in the cycling of these nutrients.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <a href="http://www.elcamino.edu/academics/slo/">http://www.elcamino.edu/academics/slo/</a>.

# B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Define ecological terms and describe concepts of ecology including: species, population, community, ecosystem, niche, habitat, and biosphere.

Matching Items

2. Describe the structure and function of the major organic molecules in the body: carbohydrates, lipids, proteins and nucleic acids.

**Objective Exams** 

3. Describe major biogeochemical cycles such as water, carbon, nitrogen, and phosphorus, giving sources and importance of these nutrients.

Embedded questions

4. Describe major components of an ecosystem (abiotic and biotic) and how they affect the species distribution and succession.

**Objective Exams** 

5. Discuss the basic processes of photosynthesis and cellular respiration.

Essay exams

6. Describe the flow of energy through the environment via trophic levels and contrast the concepts of food webs, food chains, and food pyramids.

Embedded questions

7. 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.

Matching Items

 Identify and characterize representative species based on ecological roles, interrelationships (competition, predation, symbiosis, mutalism, parasitism), and life strategies such as"r" and "K" selection. Completion

9. Summarize current human population statistics such as total fertility rate, life expectancy, infant mortality, and total population.

Matching Items

10. Discuss factors affecting population size and distribution in various countries.

True/False

11. Explain biological evolution and concepts as they relate to endangered species, extinction, and speciation.

**Objective Exams** 

12. Discuss the consequences of biodiversity decline and the importance of gene pools and genetic banks.

Essay exams

 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.

True/False

 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.

Embedded questions

15. Discuss indoor and outdoor air pollution problems and solutions to these problems.

Homework Problems

16. Discuss current global atmospheric changes such as global warming and ozone depletion describing causes and predicted effects.

**Objective Exams** 

17. Identify human health hazards from pathogens, chemicals and behavior.

Matching Items

 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.

Essay exams

19. Identify ways to turn our society into a more environmentally sustainable one.

**Multiple Choice** 

# III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	1	I	Introduction to Environmental Biology A. Human population impact
			B. Human consumption
			C. Major human pollution disasters
Lecture	2	II	Ecological terms and concepts A. Terms: ecology, population, community, habitat, niche, ecosystem, biosphere, ecosphere

			B. Principles of ecosystem outline
Lecture	3	111	Energy and life A. Organic molecules
			B. Cellular energy and energy transformation
			C. Photosynthesis
			D. Cellular Respiration
Lecture	2	IV	Flow of Energy through life A. Food chains 1. Grazing 2. Detritus B. Food webs C. Food pyramids
Lecture	2	V	Species Interaction A. Predation, prey, predators
			B. Competition - limiting factors
			C. Symbiosis
Lecture	3	VI	Biomes
			A. Tundra
			B. Talga
			D. Temperate Beinferent
			D. Temperate Ramorest
			E. Chaparral
			G Desert - adaptations
			H. Rainforest
Lecture	2	VII	Ecological Succession
			A. Primary succession
			B. Climax community
			C. Secondary succession
Lecture	2	VIII	Nutrient Cycling, Biogeochemical Cycles A. Carbon
			B. Nitrogen
			C. Phosphorous
Lecture	2	IX	Population Dynamics A. Population growth
			B. Limiting factors
			C. Growth curves
Lecture	1	X	Reproductive Strategies A. R selection
			B. K selection
Lecture	1	XI	Evolution A. Natural Selection B. Charles Darwin C. Galapagos

Lecture	3	XII	<ul> <li>Human Population Dynamics <ul> <li>A. Human birth rate</li> <li>B. Human death rate</li> <li>C. Percent annual growth rate</li> <li>D. Double time <ul> <li>1. Less developed countries</li> <li>2. More developed countries</li> <li>E. Fertility rate</li> <li>F. U.S. Population stabilization</li> <li>G. ZPG</li> <li>H. Migration</li> <li>I. Age structure</li> <li>1. Rich and poor gap</li> </ul> </li> </ul></li></ul>
Lecture	1	XIII	Problems of Overpopulation A. World hunger B. Resources C. Population urbanization D. Mega cities E. Transportation
Lecture	2	XIV	Overpopulation Solutions A. Economic development B. Demographic transition C. Family planning
Lecture	6	XV	Endangered Species A. Biological diversity B. Endangered species C. Threatened species D. Extinction E. Reasons for wildlife preservation F. Human causes for endangerment G. Wildlife conservation
Lecture	3	XVI	<ul> <li>Water Resources <ul> <li>A. Importance of water</li> <li>B. Properties of water</li> <li>C. Hydrologic cycle</li> <li>D. Water habitats</li> <li>E. Marine habitats</li> <li>F. Surface water supply problems</li> <li>G. Ground water supply problems</li> <li>H. Redistribution</li> <li>I. Water conservation</li> </ul> </li> </ul>
Lecture	9	XVII	Water Pollution 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
Lecture	3	XVIII	Clean Air A. Atmospheric components
			B. Atmospheric oxygen and Ozone
			C. Atmospheric layers
			D. Inversion layers
			E. Major air pollution disaster
Lecture	3	XIX	Air Pollution A. Primary vs. Secondary pollutants
			B. Oxides of carbon
			C. Compounds of sulfur, SO2, SO3, H2S
			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
Lecture	3	XX	Global Changes A. Acid rain
			B. Acid fog
			C. Global warming
			D. Ozone depletion in stratosphere
Total L	ecture Hours	54	
Tota	al Laboratory Hours	0	
Total Hours 54		54	

# **IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS**

# A. PRIMARY METHOD OF EVALUATION:

Substantial writing assignments

# B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

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.

# C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

- 1. Draw and label a food pyramid and discuss what relation it has to the second law of thermodynamics.
- 2. In a paragraph, explain why ozone depletion in the stratosphere is a problem.

# D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

- Essay exams
- Other exams
- Quizzes
- **Reading reports**
- Written homework
- Homework Problems
- Term or other papers
- **Multiple Choice**
- Completion
- Matching Items
- True/False
- Other (specify):
- **Environmental Project Article Assignment**

# **V. INSTRUCTIONAL METHODS**

Discussion Field trips Guest Speakers Internet Presentation/Resources Lecture Multimedia presentations

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

Study Required reading Written work Observation of or participation in an activity related to course content

# Estimated Independent Study Hours per Week: 6

# **VII. TEXTS AND MATERIALS**

### A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS Karr/Houtman/Interlandi. <u>Environmental Science for Changing World</u>. 2nd ed. MacMillan Education and Scientific American, 2015.

# B. ALTERNATIVE TEXTBOOKS

# C. REQUIRED SUPPLEMENTARY READINGS

# D. OTHER REQUIRED MATERIALS

### **VIII. CONDITIONS OF ENROLLMENT**

Α.

# Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification		
B. Requisite Skil	ls		
Requisite Skills			

### C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
Course Recommended Preparation English-82	

### D. Recommended Skills

### Recommended Skills

Students should be able to read and identify the major topics of a textbook. ENGL 82 - Identify at the paragraph level the topic sentence, supporting details, transitions and patterns of organization of short reading selections. ENGL 82 -

Employ basic study skills and reading strategies to explain at the literal level the content of a text.

# E. Enrollment Limitations

Enrollment Limitations and Category Enrollment Limitations Impact

Course created by Jeanne Bellemin on 02/01/1986.

**BOARD APPROVAL DATE:** 

LAST BOARD APPROVAL DATE:

Last Reviewed and/or Revised by Bryan Carey on 09/09/2015