

ESS 0014 - NATURAL HISTORY, ECOLOGY AND CONSERVATION

Catalog Description

Also known as BIOL 14

Advisory: Eligibility for ENGL 1A

Hours: 108 (54 lecture, 54 laboratory)

Description: Introduction to the study of biology and ecology of organisms and ecosystems of the world, with an emphasis on California. Special focus on significance of functioning ecosystems and human influence on the environment. May include field trips during or in lieu of lab time. (CSU, UC)

Course Student Learning Outcomes

- CSLO #1: Evaluate and assess the biophysiological characteristics and limiting factors of the major ecosystems of California.
- CSLO #2: Evaluate the impacts of humans on the environment.
- CSLO #3: Judge the effects of geology, climate, weather and ecological interactions on the natural history of organisms and environments.
- CSLO #4: Justify the role that evolution plays in the natural history and conservation of organisms.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

108

Outside of Class Hours

108

Total Student Learning Hours

216

Course Objectives

Lecture Objectives:

1. Compare the definitions of natural history and conservation and evaluate the use of each in biology and environmental studies. (Outline Ia, Ib)
2. Explain the importance of biodiversity to ecosystems and humans. (Outline Ia, Ib, Ic, Id)
3. Evaluate the anthropomorphic threats to biodiversity and propose ways to combat those threats. (Outline Ia, Ib, Ic, Id)
4. Use the major lines of evidence for evolution to defend the theory. (Outline Ie)
5. Draw correlations to illustrate the relationships between evolutionary history, natural history, and ecology. (Outline Ie)

6. Evaluate the contributions of the people who shaped early view points regarding the environment, the land ethic, forestry practices, conservation and preservationist movements. (Outline If)
7. Compare the processes used to do conservation of land and species and discuss the efficacy of each. (Outline Ig)
8. Explain the role that geological processes play in the building of ecosystems and in defining the boundaries of the same. (Outline IIa, IIb)
9. Judge the geological factors, limiting factors, major ecological services provided, threats to, indicator species of and geographical regions where found in the major ecological regions of California: coastal environments, coastal forests, Central Valley, Sierra Nevada, aquatic systems, and deserts. (Outline IIc, IIIa, IIIb, IIIc, IIId, IIIE, IIIf, IIIG, IIH)
10. Evaluate the impacts of the Gold Rush on California. (Outline IIId)
11. Evaluate the politics of water reclamation and utilization efforts by humans in the west. (Outline IIIE)
12. Diagnose the effects of urbanization and how this process has changed over the last 50 years. (Outline IVa, IVb, IVc)
13. Evaluate the global and regional processes that affect the climate and how those processes are affected by climate change. (Outline IIb)
14. Evaluate the effects of climate change on the natural and human built world and living things. (Outline Ic, IIb)
15. Identify on a map the major geographical features of California. (Outline IIc)

Laboratory Objectives:

1. Identify groups (family, genera, species) using taxonomic keys and field guides. (Lab Outline III)
2. Develop, implement and test a scientific hypothesis. (Lab Outline I)
3. Apply the major ecological principles and the biotic and abiotic factors that regulate natural ecosystems. (Lab Outline II)
4. Analyze the macroinvertebrate fauna of a freshwater ecosystem and use those data to determine the relative health of the system. (Lab Outline XIII)
5. Utilize specimens in the museum to demonstrate evidence of evolution. (Lab Outline IV)
6. Evaluate the adaptations of plants, birds and mammals that enable them to fulfill their niche and the evolutionary processes that led to those adaptations. (Lab Outline X, XI, XII)
7. Design a preserve for the conservation of a species. (Lab Outline VI, IX, XIV)
8. Develop a conservation area considering the interests of all stakeholders involved. (Lab Outline XVII)
9. Demonstrate the role that geological processes play in the building of ecosystems and in defining the boundaries of the same. (Lab Outline VII)

General Education Information

- Approved College Associate Degree GE Applicability
 - AA/AS - Life Sciences
 - AS - Life Science Lab
- CSU GE Applicability (Recommended-requires CSU approval)
 - CSUGE - B2 Life Science
 - CSUGE - B3 Lab Activity
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)
 - IGETC - 5B Biological Science
 - IGETC - 5C Laboratory Science

Articulation Information

- CSU Transferable
- UC Transferable

Methods of Evaluation

- Classroom Discussions
 - Example: Find an example of a well-known conservationist. That person can be someone you are already familiar with or it can be someone you found through an internet search. What did that person do to become so well known? When you thought of your conservationist, were they white or were they a person of color? If you did a search for conservationists, were the people you read about mostly white? Why do you suppose that is? If conservation work is being done by western agencies in other countries, how important is it to have conservationists from that country working on or leading the project? How common is it to actually have local people's heading up projects in other countries? For your original post, select one of the topics above. Do some research on that topic. Post what you learned. Please include the links to any of the sites that you used. Your post should be written in a way as to educate the other people in this class about your selected topic. For your reply, select a post by another student who selected a topic different than your own. Review their post and any associated links. Construct a reply based upon what you learned from that post. Your reply should add substance to the conversation or your reply can be a question based upon what you learned but if you post a question, you will need to spend a little bit of time researching the answer. Please provide the answer in your post. Either way, your post should work to move the conversation forward.
- Essay Examinations
 - Example: Why do floods typically follow fires in the redwood forest? How do these trees cope with the floods?
- Objective Examinations
 - Example: Sandy soils, out of reach of sea spray, in areas which are prone to fire and flood, which receive large amounts of precipitation, would be perfect for which type of community? A. closed-cone forest B. redwood forest C. grasslands D. chaparral
- Projects
 - Example: Students will visit a local, natural environment and record, with a photograph or a drawing, 5 plants and 5 animals of the region. The students will provide both the scientific and common names for each species identified. Students will need to annotate each image, providing information on what characteristics that they used to help in their identification of that species. Additionally, students will need to record basic behavioral information for animals and basic location information for plants.
- Reports
 - Example: For a taxonomy lab students will need to go outside and identify 5 organisms. They can all be plants or they can all be animals. Where they locate these organisms is totally up to them and they do not need to all be from the same location. Students will need to submit the images they took of the organisms they find or draw out pictures of what they saw. Those images will need to be annotated. Each image needs to also be accompanied by the common and scientific name for each species.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. To address lab objective #6, "Utilize specimens in the museum to demonstrate evidence of evolution", the instructor might show students (either in person or via video) specimens that demonstrate changes in a lineage over time, such as the evolution of modern cetaceans from four-legged terrestrial ancestors, the change in body size and number of digits seen in the horse family, etc. Alternatively, the instructor could develop an assignment that asks students to find such evidence in the Museum, and then guide students in this activity.

Lecture:

1. To address lecture objective #8, "Explain the role that geological processes play in the building of ecosystems and in defining the boundaries of the same", the instructor might provide background information on basic geological processes in a lecture setting, and then facilitate a discussion that applies those basic principles to a particular location (such as the Sierra Nevada or Point Reyes).

Distance Learning

1. To address lecture objective #1, "Compare the definitions of natural history and conservation and evaluate the use of each in biology and environmental studies", the instructor might prepare an online lecture providing an overview of the fields of natural history and conservation, providing pertinent examples illustrating the connection of these fields to basic concepts covered in biology and environmental studies courses. This lecture could involve a slide presentation and pertinent video or audio material. Students will evaluate and then discuss (in an online discussion board) the principles that effect the ecosystem and environment where they live.

Typical Out of Class Assignments Reading Assignments

1. Read the provided State Park proposal for the development of a new state park and be prepared to debate the merits of the proposal.
2. Read "Thinking Like a Mountain" by Aldo Leopold. Evaluate how Leopold's own feelings about the environment were shaped by his experiences.

Writing, Problem Solving or Performance

1. Visit the CIA Factbook website and collect the data found there on the 20 countries provided in lab. Use these data to determine if a relationship exists between education level, GDP, and age at reproduction and overall population size.
2. Evaluate how necessary it is to have a connection to nature in order to take part in conservation. If a connection is needed, how can conservation happen without the buy in of all parties? Write an argumentative essay discussing how to get buy in from those connected to nature and those who do not feel a connection to nature in order to do conservation.

Other (Term projects, research papers, portfolios, etc.)

Term project: Visit at least 2 ecosystems. Evaluate and compare each based upon the biodiversity of the area, the abiotic factors and management of each in a field notebook.

Required Materials

- A Primer of Conservation Biology
 - Author: Primack
 - Publisher: Sinauer and Associates
 - Publication Date: 2012
 - Text Edition: 5th
 - Classic Textbook?:
 - OER Link:
 - OER:
- A Natural History of California
 - Author: Schoenherr
 - Publisher: University of California Press
 - Publication Date: 2017
 - Text Edition: 3rd
 - Classic Textbook?:
 - OER Link:
 - OER:
- A Field Guide to Sierra Nevada
 - Author: Laws
 - Publisher: California Academy of Sciences
 - Publication Date: 2012
 - Text Edition: 3rd
 - Classic Textbook?:
 - OER Link:
 - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.