BIOL 0016Z - ECOLOGY OF THE AMERICAN RIVER

Catalog Description

Hours: 13 (7 lecture, 6 laboratory)
Description: Field study of the aquatic, riparian, and associated ecosystems of Sierra Nevada river systems with specific attention on the American River system. This class may require the ability to hike moderate distances on uneven ground. (CSU)

Course Student Learning Outcomes

- CSLO #1: Describe and evaluate the impacts of humans on the environments of the American River watershed and other watersheds of the Sierra Nevada.
- CSLO #2: Describe the ecological and geological principles that affect the natural ecosystems of the American River watershed and other watersheds of the Sierra Nevada.
- CSLO #3: Explain the factors that have shaped the evolutionary adaptations of organisms in the American River watershed and other watersheds of the Sierra Nevada.
- CSLO #4: Accurately document and interpret ecological observations made on a field trip in a watershed of the Sierra Nevada.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

13

Outside of Class Hours

14

Total Student Learning Hours

27

Course Objectives

Course objectives are linked to items listed in the course content outline (in parentheses)
Lecture Objectives:
1. Evaluate the factors that have affected the formation of the American River watershed and other watersheds of the Sierra Nevada. (Lecture Outline #1, #2, #3)
2. Apply ecological terminology to the description of the ecosystems of the American River watershed and other watersheds of the Sierra Nevada. (Lecture Outline #1, #2, #3, #4, #5)
3. Describe the interactions that local organisms have with the biotic and abiotic factors of their ecosystems. (Lecture Outline #3, #4, #5, #6).
4. Explain the role that geology plays in the formation and delineation of the American River watershed and other watersheds of the Sierra Nevada. (Lecture Outline #2, #3)
5. Analyze the past and present effects that humans, including water policies, have on the ecosystems of the American River watershed and other watersheds of the Sierra Nevada. (Lecture Outline #3, #7)
Laboratory/Field Objectives:
1. Demonstrate the use of a dichotomous key or field guide to identify species. (Laboratory/Field Outline #1)
2. Identify geological features that impact the formation and function of ecosystems in the American River watershed and other watersheds of the Sierra Nevada. (Laboratory/Field Outline #2)
3. Construct a cross-sectional drawing of a typical Sierra Nevada river system and label major terrestrial and aquatic plant communities/ecosystems. (Laboratory/Field Outline #1, #2, #3)
4. Identify and observe the interactions that local organisms have with the biotic and abiotic factors of their ecosystems. (Laboratory/Field Outline #1, #2, #3, #4).
5. Identify examples of human impacts to ecosystems in the American River watershed and other watersheds of the Sierra Nevada and evaluate the extent of those impacts. (Laboratory/Field Outline #4)
6. Create a detailed field journal or summary report documenting the field experience. (Laboratory/Field Outline #5)

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Projects
  - Example: To address Course Lecture Objective #3, "Describe the interactions that local organisms have with the biotic and abiotic factors of their ecosystems," students might be asked, either individually or in groups, to prepare a short oral presentation or written report or participate in a class discussion about the major characteristics of a species of plant or animal occurring in a Sierra Nevada watershed and its role in the ecosystem. Students could be evaluated on accuracy of information, attention to detail, and completeness. Students could be evaluated on participation, accuracy of information, attention to details, and completeness.
- Reports
  - Example: To address Course Lab Objective #6, "Create a detailed field journal or summary report documenting the field experience," students might be asked to write a report summarizing the ecosystem(s) visited, geological features observed, and species encountered. Students could be evaluated based on accuracy of information, attention to detail, and completeness of summary.
- Skill Demonstrations
  - Example: To address Course Lab Objective #1, "Demonstrate the use of a dichotomous key or field guide to identify species," students might be asked to use a taxonomic key to correctly identify an organism. Students could be evaluated on the correctness of answer, technique, and application of terminology in the key.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion
- Distance Learning

Lab:

1. To address Course Lab Objective #1, "Demonstrate the use of a dichotomous key or field guide to identify species", the instructor might lead the class in a demonstration of the use of a dichotomous key for a known specimen, and then guide students as they attempt the identification of unknown specimens.
2. To address Course Lab Objective #2, "Identify geological features that impact the formation and function of ecosystems in the American River watershed and other watersheds of the Sierra Nevada," the instructor might point out such key features in the field, making comparisons to other such geological features observed in the field or described in the classroom, and then students will make and record their own observations and comparisons.

Lecture:

1. To satisfy Course Lecture Objective #4, "Explain the role that geology plays in the formation and delineation of the American River watershed and other watersheds of the Sierra Nevada," the instructor might present a lecture (supplemented by images and/or video) that explains the geological history of the American River, including what rock formations make up the area and how those have influenced the hydrology of the river, the species assemblages, and human uses, and then students will make and record their own observations of geological features.
2. To satisfy Course Lecture Objective #5, "Analyze the past and present effects that humans, including water policies, have on the ecosystems of the American River watershed and other watersheds of the Sierra Nevada," the instructor might lead an in-class discussion about the historical impacts of humans on the ecosystems of Sierra Nevada watersheds (e.g. agricultural impacts, mining impacts, logging, etc.).

Distance Learning

1. To address Course Lecture Objective #1, "Evaluate the factors that have affected the formation of the American River watershed and other watersheds of the Sierra Nevada," the instructor might prepare a lecture to post online that explains the factors (e.g. geological history, climate, glaciation, etc.) that have impacted the formation of the American River watershed. This online lecture might include text, audio (with transcript), and/or captioned video presentation of information. The students will be listening and/or watching this lecture, taking notes, asking clarifying questions (via chat, video conferencing, email, etc.), making connections to material learned in previous classes and/or previous observations they have made in the American River watershed (or other Sierra Nevada watershed), and then applying this information as they complete and document their own environmental observations for this class. A student can demonstrate mastery of this objective in multiple ways. One example is to correctly identify (with sketches and/or narrative) in the course field journal the observation of evidence of past glaciation in an American River or Sierra Nevada watershed (e.g. glacial erratics, glacial striations, moraines, etc.). Images and/or text from these field observations could be shared via a class discussion board or submitted digitally as part of an assignment via the course LMS. Another example is to participate in a class discussion via the LMS discussion boards and correctly describing the impact of soil qualities on vegetation that was observed during the field portion of this course.
2. To address Course Lab Objective #5, "Identify examples of human impacts to ecosystems in the American River watershed and other watersheds of the Sierra Nevada and evaluate the extent of those impacts," the instructor might guide the students in the online presentation and discussion (via an online discussion board, collaborative project, video conference, etc.) of collected observations of human impacts on Sierra Nevada ecosystems.

Typical Out of Class Assignments
Reading Assignments

1. To address Course Lecture Objective #2, students might be asked to read a handout that describes basic ecological terminology related to the American River watershed and then apply this knowledge to descriptions of observations made in the field. 2. To address Course Lecture Objective #3 and Course Lab Objective #4, students might be asked to review the life history information from a handout or the Species Profile on the US Fish & Wildlife Service website for a threatened or endangered species that occurs in the American River watershed or another watershed of the Sierra Nevada and be prepared to discuss this in class.

Writing, Problem Solving or Performance

1. To address Course Lecture Objective #4 and Course Lab Objective #2, students might be asked to write and/or prepare a short oral presentation about a geological feature occurring in the American River watershed or another watershed of the Sierra Nevada. 2. To address Course Lab Objective #6, students might be asked to document their observations in the field in a journal, using any combination of text, sketches, photos, and/or other media.

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

- Introduction to Water in California
  - Author: Carle, David
  - Publisher: University of California Press
  - Publication Date: 2015
  - Text Edition: 2nd
  - Classic Textbook?:
  - OER Link:
  - OER:
- Field Guide to the Sierra Nevada
  - Author: Laws, John Muir
  - Publisher: California Academy of Sciences
  - Publication Date: 2007
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:

- Pacific Coast Tree Finder
  - Author: Watts, Tom
  - Publisher: Nature Study Guild Publishers
  - Publication Date: 2004
  - Text Edition: 2nd
  - Classic Textbook?:
  - OER Link:
  - OER:
- The Laws Guide to Nature Drawing and Journaling
  - Author: Laws, John Muir
  - Publisher: Heyday Books
  - Publication Date: 2016
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:

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