BIOL 0016O - ECOLOGY OF THE HIGH SIERRA AND WHITE MOUNTAIN

Catalog Description

Hours: 54 (27 lecture, 27 laboratory)
Description: Field study which examines high-elevation mountain ecosystems using the high Sierra Nevada and White-Inyo Mountain Range of California as specific study sites. Observation and study of sub-alpine and alpine ecosystems like forests, montane chaparral, meadows, aquatic habitats, alpine tundra, and fell-fields. This class requires the ability to hike moderate to long distances on uneven ground at high elevations. This class will involve camping in either developed campsites or in undeveloped wilderness areas. (CSU)

Course Student Learning Outcomes

- CSLO #1: Describe and evaluate the impacts of humans on the environments of the high Sierra Nevada and White-Inyo Mountains.
- CSLO #2: Describe the ecological and geological principles that affect the natural ecosystems of the high Sierra Nevada and White-Inyo Mountains.
- CSLO #3: Explain the factors that have shaped the evolutionary adaptations of the organisms of the high Sierra Nevada and White-Inyo Mountains.
- CSLO #4: Accurately document and interpret ecological observations made on a field trip to the high Sierra Nevada and White-Inyo Mountains.

Effective Term

Fall 2022

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

54

Total Student Learning Hours

108

Course Objectives

Course objectives are linked to items in the course content outline (parentheses)
Lecture Objectives:
1. Evaluate the factors that have affected the formation of the ecosystems of the high Sierra Nevada and White-Inyo Mountains. (Lecture Outline #1, #2, #5)
2. Apply ecological terminology to the description of the ecosystems of the high Sierra Nevada and White-Inyo Mountains. (Lecture Outline #1, #2, #4, #5)
3. Investigate the interactions that local organisms have with the biotic and abiotic factors of their ecosystems. (Lecture Outline #1, #2, #3, #4, #5)
4. Explain the role that geology plays in the formation and delineation of communities of the high Sierra Nevada and White-Inyo Mountains. (Lecture Outline #3)
5. Analyze the past and present effects that humans have on ecosystems of the high Sierra Nevada and White-Inyo Mountains. (Lecture Outline #6)
Laboratory Objectives:
1. Demonstrate the use of a taxonomic key or field guide to identify species. (Laboratory/Field Outline #1, #4)
2. Identify geological and hydrological features that impact the formation and function of communities in the high Sierra Nevada and White-Inyo Mountains. (Laboratory/Field Outline #2, #3)
3. Investigate the interactions that local organisms have with the biotic and abiotic factors of their ecosystems. (Laboratory/Field Outline #1, #2, #3, #4)
4. Identify examples of human impacts on communities of the high Sierra Nevada and White-Inyo Mountains. (Laboratory/Field Outline #4, #5)
5. Create a detailed field journal or summary report documenting the field experience. (Laboratory/Field Outline #6)

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

- Classroom Discussions
  - Example: To address Course Lecture Objective #3, "Investigate the interactions that local organisms have with the biotic and abiotic factors of their ecosystems", students might take part in a classroom discussion about the major characteristics of representative species of plants and animals occurring in the high Sierra Nevada or White-Inyo Mountains and their role in the ecosystem. Students could be evaluated based on participation, accuracy of information, and completeness of information.
- Projects
  - Example: To address Course Lecture Objective #3, "Investigate the interactions that local organisms have with the biotic and abiotic factors of their ecosystems", students might complete a project, either individually or in groups, that includes researching the major characteristics of a species of plant or animal occurring in the high Sierra Nevada or White-Inyo Mountains and its role in the ecosystem, compiling this information in written or graphical form, and sharing this information in an oral classroom presentation. Students could be evaluated based on the completeness of the project, participation in all aspects of the project, accuracy of information presented, and overall quality of the project.
- Reports
  - Example: To address Course Lab Objective #5, "Create a detailed field journal or summary report documenting the field experience", students might be asked to write a report summarizing the ecosystems visited, geological and hydrological 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 taxonomic 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 the answer, technique, and understanding of terminology in the key.

Repeatable

No

Methods of Instruction

- Laboratory
- Lecture/Discussion

Lab:

1. To address Course Lab Objective #1, "Demonstrate the use of a taxonomic 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 an unknown specimen.
2. To address Course Lab Objective "2, "Identify geological and hydrological features that impact the formation and function of communities in the high Sierra Nevada and White-Inyo Mountains", the instructor might point out such key features in the field, making comparisons to other such features observed in the field or described in the classroom. Students will then 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 communities of the high Sierra Nevada and White-Inyo Mountains", the instructor might present a lecture (supplemented by images and/or video) that explains the geological history of the Sierra Nevada (e.g. tectonic plate movements, geologic uplift, and glaciation) and how it has influenced the development of soils and species assemblages. Students will then make and record their own observations of geological features.
2. To satisfy Course Lecture Objective #5, "Analyze the past and present effects that humans have on ecosystems of the high Sierra Nevada and White-Inyo Mountains", the instructor might lead an in-class discussion about the historical impacts of humans on the region (e.g. logging, mining, fire suppression, recreation, conservation, etc.).

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 or to read the Ecology unit from the OpenStax Biology online textbook and then apply this knowledge to descriptions of observations in the field. 2. To address Course Lecture Objective #3 and Course Lab Objective #3, students might be asked to review life history information for a high Sierra Nevada or White-Inyo Mountains species that is available in a field guide, handout, or a natural resource agency website 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 geologic or hydrologic feature occurring in the high Sierra Nevada or White-Inyo Mountains. 2. To address Course Lab Objective #5, 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

- Timberline: Mountain and Arctic Forest Frontiers
  - Author: Stephen Arno
  - Publisher: Mountaineers Books
  - Publication Date: 2014
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:
- Sierra Nevada Natural History
  - Author: Storer, Usinger, Lukas
  - Publisher: UC Press
  - Publication Date: 2004
  - Text Edition: 1st
  - 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:
- Natural History of the White-Inyo Range, Eastern California
  - Author: Clarence Hall, Ed.
  - Publisher: UC Press
  - Publication Date: 1991
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:

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