# BUTTE COLLEGE
## COURSE OUTLINE

I. **CATALOG DESCRIPTION**

**BIOL 5 - Ecology and Field Biology** **4 Unit(s)**

**Prerequisite(s):** NONE
**Recommended Prep:** Reading Level IV; English Level IV; Math Level IV
**Transfer Status:** CSU/UC
51 hours Lecture
51 hours Lab

This course will examine animal and plant species and populations as well as their relationships within communities and ecosystems. Topics include population and community structure, relationships between species, biogeography, and biodiversity. Included is the study of the native plants and animals with an emphasis on Butte County from the valley floor into the adjoining landforms of Northern California. The course includes one field trip per week.

II. **OBJECTIVES**

Upon successful completion of this course, the student will be able to:

A. Apply solutions to ecological inquiry using the scientific method.
B. Evaluate the anatomical and physiological adaptations organisms have evolved to cope with environmental factors.
C. Describe the limiting factors which restrict species geographical distribution.
D. Describe ecosystem structure and function, as well as cycling of resources within an ecosystem.
E. Explain ecological principles including competition, diversity, species interactions, ecological succession, island biogeography, and their applications to current ecological issues.
F. Analyze population dynamics, including patterns of distribution, age structure, growth, and intraspecific and interspecific competition.
G. Explain current ecological issues and apply ecosystem studies to their solutions.
H. Identify the landforms, mesoclimate, associated vegetation and fauna of northern California.
I. Explain common ethnobotanical uses of native plants.
J. Describe indicator species of birds, mammals and plants of each of the community types tied to the major landforms.
K. Differentiate habitat types in the various landforms in northern California.
L. Assemble the various aspects of the course into a conceptual natural reserve design.

III. **COURSE CONTENT**

A. **Unit Titles/Suggested Time Schedule**

Lecture

| Topics | Hours |
|---|---|
| 1. Course Introduction, Regional Landforms, Climate, Geology, and vegetation | 5.00 |
| 2. Thinking like an Ecologist; the Scientific Method | 2.00 |
| 3. Foundation principles of Ecology | 4.00 |
| 4. Branches of Ecology | 1.00 |
| 5. Adaptations, ethnobotanica uses, and distribution of plants, as well as adaptations and distrubution of animals | 5.00 |
| 6. Energy, nutrient flow and Ecosystems | 5.00 |
| 7. Population structure and dynamics | 6.00 |
| 8. Species interactions | 6.00 |

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|---|---|
| 9. Community structure and biodiversity | 6.00 |
| 10. Island biogeography and reserve design | 4.00 |
| 11. Restoration Ecology, Sustainability in Landscapes | 2.00 |
| 12. Conservation Biology | 3.00 |
| 13. Fire Ecology | 2.00 |
| Total Hours | 51.00 |

Lab

| Topics | Hours |
|---|---|
| 1. Regional Landscape Features and Geology | 3.00 |
| 2. Plant Collection Methods, Tree Identification | 5.00 |
| 3. Altitudinal Survey of Plant Communities | 3.00 |
| 4. Mixed Confier Forest and Serpentine Barrens | 3.00 |
| 5. Blue Oak Woodland Demography Survey | 3.00 |
| 6. Ethnobotany | 3.00 |
| 7. Birding Field Survey Techniques | 5.00 |
| 8. Avian Adaptations and Morphology | 3.00 |
| 9. Salmon Management and Hatcheries, Riparian Bird Habitats | 3.00 |
| 10. Birding Techniques and Avian Habitats | 5.00 |
| 11. Bird Identification, Behavioral Biology Study | 4.00 |
| 12. Small Mammal Habitats, Field tracking Techniques | 5.00 |
| 13. Field Conservation, Restoration Ecology Project | 3.00 |
| 14. Fire Ecology Observations, Monitoring | 3.00 |
| Total Hours | 51.00 |

## IV. **METHODS OF INSTRUCTION**

A. Lecture
B. Collaborative Group Work
C. Field Trips
D. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
E. Discussion
F. Demonstrations
G. Reading Assignments
H. Multimedia Presentations

## V. **METHODS OF EVALUATION**

A. Exams/Tests
B. Quizzes
C. Research Projects
D. Homework
E. Lab Projects

## VI. **EXAMPLES OF ASSIGNMENTS**

A. Reading Assignments
    1. Read about keystone species in the textbook and the online link provided in class on the

same topic. Write a 300-word paragraph describing how wolves in Yellowstone National Park can be considered a Keystone species, providing support from both sources.

2. Read about invasive species in the textbook and the online link provided in class on the same topic. Write a paragraph describing the characteristics which successful invasive species possess.

B. Writing Assignments

1. Research the effects of fire on Chaparral plant communities. Write a 500-word paper summarizing your findings. Include effects of fire suppression, dependency on fire for reproduction, and other relevant information.
2. Research a bird that was viewed at our bird blind using a field guide and one other source. Write a 500-word paper describing the bird's life history. Include seasonal status, nesting requirements, breeding behavior and other relevant information.

C. Out-of-Class Assignments

1. Visit the bird blind a minimum of five times. Record your observations. Write a 500-word paper summarizing your bird observations. Include weather, bird species observed, types of interactions, and other relevant information.
2. Visit the Butte College ponds. Analyze the following characteristics: plant and animal diversity, resource partitioning, species interactions and other relevant information. Write a 1-page summary of your findings.

## VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

A. Krebs, Charles. The Ecological World View. 1st Edition. University of California Press, 2008.
B. Peterson, Roger Tory. Birds of Western North America. 4th Edition. Houghton Mifflin, 1990.
C. Miller G. & Spoolman S. Essentials of Ecology. 7th Edition. Cengage Learning, 2014.

Materials Other Than Textbooks:

A. 3-ring binder and 3x5 index cards to produce required plant card assignment.

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