

BUTTE COLLEGE

COURSE OUTLINE

I. CATALOG DESCRIPTION

NR 40 - Watershed Ecology and Habitat Restoration

3 Unit(s)

Prerequisite(s): NONE

Recommended Prep: Reading Level IV; English Level III; Math Level IV

Transfer Status: CSU

34 hours Lecture

51 hours Lab

This course is an introduction to the methods, techniques, and tools used to restore and enhance watershed health. Topics will include reforestation techniques, hydrologic cycle, disturbance mitigation, and use of native plants for biofiltration. The course emphasizes local water issues and restoration efforts.

II. OBJECTIVES

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

- A. Define the hydrologic cycle and explain the various processes of the cycle.
- B. Identify the biologic and economic need for restoring and maintaining watershed health in California.
- C. Identify the tools and techniques of watershed restoration.
- D. Demonstrate techniques for reducing erosion.
- E. Compare and contrast local watersheds, and discuss land use impacts (both perceived and real) relative to cause and effect.
- F. Evaluate local restoration projects, both completed and planned, and develop and demonstrate prescriptions for repair as a field trip activity.
- G. Analyze and discuss important water issues in California.
- H. List and discuss wetland and upland habitat restoration techniques using native plants and various irrigation methods.

III. COURSE CONTENT

A. Unit Titles/Suggested Time Schedule

Lecture

<u>Topics</u>	<u>Hours</u>
1. Introduction to Water Resources in California	6.00
2. Hydrology/Ecology	5.00
3. Ecological Restoration - Project Planning	6.00
4. Restoration of In-Stream Habitat Conditions	5.00
5. Riparian Restoration - Implementation Techniques	6.00
6. Upslope Processes/Routing	6.00
Total Hours	34.00

Lab

<u>Topics</u>	<u>Hours</u>
1. State water projects	3.00
2. Federal water projects	3.00
3. Local water projects	3.00

4.	Stream Channels	3.00
5.	Impaired Watersheds	3.00
6.	Healthy Watersheds	3.00
7.	Mitigation Sites	3.00
8.	Restoration Plans	3.00
9.	Invasive Species	3.00
10.	Land-Use Impacts and Innovative Solutions	3.00
11.	Re-creating Aquatic Habitat	3.00
12.	Bioengineering Techniques	3.00
13.	Native Plant Revegetation	3.00
14.	Diseases and Restoration Efforts	3.00
15.	Sediment Delivery, Storage and Yield	3.00
16.	Hillslope Processes	3.00
17.	Erosion Restoration Techniques	3.00
	Total Hours	51.00

IV. **METHODS OF INSTRUCTION**

- A. Lecture
- B. Guest Speakers
- C. Class Activities
- D. Field Trips
- E. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
- F. Reading Assignments
- G. Multimedia Presentations

V. **METHODS OF EVALUATION**

- A. Exams/Tests
- B. Quizzes
- C. Papers
- D. Lab Projects
- E. Class Discussion

VI. **EXAMPLES OF ASSIGNMENTS**

- A. Reading Assignments
 - 1. Read the chapter on ecological attributes of restored ecosystems and prepare a detailed list of those attributes to share in class.
 - 2. Read the article (handed out in class) on the necessity of erosion control prior to re-vegetation of a restoration site. Be prepared to discuss the difficulties of controlling erosion on sites after re-vegetation has begun.
- B. Writing Assignments
 - 1. Write a 5 page research paper on guidelines for restoration on different habitat types. In your paper, explain how soil type and climate influence the species that may be present.
 - 2. Write a short essay (500 words) on the ability of a given species to increase its population density on restored habitat sites. Be sure to include peer-reviewed materials as references.
- C. Out-of-Class Assignments
 - 1. Attend our field trip to a logged site on the Big Chico Creek Watershed. Describe in your notes ways that logging companies minimize soil loss through erosion and be prepared to

- discuss your findings in class.
2. Attend our field trip to the Sul Norte habitat restoration site on the Sacramento River National Wildlife Refuge. Be prepared to take notes on the irrigation system and arrangement of the restored vegetation. Pick a particular restored plant species and be prepared to discuss its water needs.

VII. **RECOMMENDED MATERIALS OF INSTRUCTION**

Textbooks:

- A. Clewell, A. F., & Aronson, J. Ecological Restoration: Principles, Values, and Structure of an Emerging Profession. 2nd Edition. Island Press, 2013.

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