

CATALOG INFORMATION

Dept and Nbr: NRM 88

Title: WATRSHD ECOL/RESTORATION

Full Title: Watershed Ecology and Restoration

Last Reviewed: 1/25/2021

| Units   |      | Course Hours per Week |      | Nbr of Weeks | Course Hours Total |       |
|---------|------|-----------------------|------|--------------|--------------------|-------|
| Maximum | 3.00 | Lecture Scheduled     | 2.00 | 17.5         | Lecture Scheduled  | 35.00 |
| Minimum | 3.00 | Lab Scheduled         | 3.00 | 17.5         | Lab Scheduled      | 52.50 |
|         |      | Contact DHR           | 0    |              | Contact DHR        | 0     |
|         |      | Contact Total         | 5.00 |              | Contact Total      | 87.50 |
|         |      | Non-contact DHR       | 0    |              | Non-contact DHR    | 0     |

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade or P/NP

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly: NRM 280.25

Catalog Description:

An introduction to the methods, techniques, and tools used to restore and enhance watershed health.

Prerequisites/Corequisites:

Recommended Preparation:

Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:

Description: An introduction to the methods, techniques, and tools used to restore and enhance watershed health. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

|                      |                      |                      |           |
|----------------------|----------------------|----------------------|-----------|
| <b>AS Degree:</b>    | <b>Area</b>          | Effective:           | Inactive: |
| <b>CSU GE:</b>       | <b>Transfer Area</b> | Effective:           | Inactive: |
| <b>IGETC:</b>        | <b>Transfer Area</b> | Effective:           | Inactive: |
| <b>CSU Transfer:</b> | Transferable         | Effective: Fall 2003 | Inactive: |
| <b>UC Transfer:</b>  |                      | Effective:           | Inactive: |

**CID:**

### **Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Outcomes and Objectives:**

Upon completion of this course, students will be able to:

1. Define the hydrologic cycle and explain the various processes of the cycle.
2. Define and describe physical and biological processes that affect watershed health and function.
3. Identify the biologic and economic need for restoring and maintaining watershed health in California.
4. Identify topographical maps, assessments and hand tools and equipment used by watershed restorationists.
5. State criteria for choosing "hard" versus "soft" streambank repair techniques and identify instream structure suitability relative to stream channel type and function.
6. Demonstrate techniques for reducing sediment from roads and making other up-slope repairs and improvements as a field trip activity.
7. Compare and contrast local watersheds, and discuss land use impacts (both perceived and real) relative to cause and effect.
8. Evaluate local restoration projects, both completed and planned, and develop and demonstrate prescriptions for repair.
9. Analyze and discuss important water issues in California.
10. Demonstrate a working knowledge of watershed restoration techniques and the ability to communicate with other resource professionals.
11. Use quantitative techniques for riparian habitat assessment including various accepted sampling protocols.

### **Topics and Scope:**

- I. The California Hydrologic Cycle and Water Resource Issues
  - a. The Hydrologic Cycle in California: climate, topography, geographic location
  - b. Overview of water usage development in California: modifications to natural hydrologic regime, supply and demand, and conflicting uses
- II. Upslope Processes/Routing
  - a. Sediment delivery, storage and yield
  - b. Hillslope processes

- c. Surface erosion from hillslopes
  - d. Restoration techniques for erosion from human activities
  - e. Survey of local watershed restoration efforts and projects, including successes and failures
- III. Hydrology/Ecology
- a. Conceptual framework of healthy and impaired watershed processes and function relative to local and regional land use practices
  - b. Stream processes as a river continuum concept
  - c. Stream channel morphology and function
  - d. Physical and biological processes
- IV. Ecological Restoration - Project Planning
- a. Overview of watershed and fishery restoration techniques, methods, and tools.
  - b. Riparian corridor restoration: planning, appropriate species, location, scheduling
  - c. Upslope restoration: grasslands, woodlands, wetlands, intermittent streams, erosion control
  - d. Invasive species: issues and problems related to restoration projects
- V. Restoration of In-stream Habitat Conditions
- a. Identification of land use impacts and innovative solutions for restoring functional processes
  - b. Recreating riffle-pool-flatwaters, increasing pool volume, spawning and rearing habitat
  - c. Bio-engineering techniques for erosion control and restoring channel process
- VI. Riparian Restoration - Implementation Techniques
- a. Survey of appropriate restoration techniques relative to stream channel function
  - b. Successful native plant revegetation
  - c. Methods for controlling invasive species
  - d. Pierce's Disease and riparian corridors and stream/agricultural interface.

### **Assignment:**

The student may be required to complete:

1. Reading assignments that will average 20 pages per week.
2. Group projects in hands-on use of topo maps, demonstration techniques for sediment measuring and oral discussion/research of land use and impacts on watersheds.
3. Writing assignments, reading reports, and term papers that deal with the biological and economic restoration needs, watershed restoration techniques, and water issues in California to total 500 words during the semester.
4. Skill demonstration and written exams for riparian habitat assessment using sampling protocols, developing and demonstrating prescriptions for riparian repairs and in making upslope repair.

### **Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

|  |                     |
|--|---------------------|
| Written homework, reading reports, term papers | Writing<br>10 - 45% |
|--|---------------------|

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Group projects; critical thinking focus on watershed health in California.

Problem solving  
10 - 20%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Class performances, technical measures and reports

Skill Demonstrations  
10 - 40%

**Exams:** All forms of formal testing, other than skill performance exams.

Multiple choice, true/false, matching items, completion

Exams  
20 - 30%

**Other:** Includes any assessment tools that do not logically fit into the above categories.

Attendance and class participation

Other Category  
15 - 35%

### **Representative Textbooks and Materials:**

California Salmonid Stream Restoration Manual (3rd), by Flosi, et.al., California Department of Fish and Game, 1998 (Classic).

Stream Corridor Restoration: Principles, Processes & Practices, Federal Stream Interagency Work Group, 1997 (Classic).

(Government documents updated as available.)