

NRM 104 Course Outline as of Fall 2023**CATALOG INFORMATION**

Dept and Nbr: NRM 104 Title: ECOLOGICAL RESTORATION
 Full Title: Ecological Restoration
 Last Reviewed: 2/27/2023

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	6	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:

Catalog Description:

In this course students will learn hands-on techniques for planning, planting, monitoring, and maintaining local restoration projects. Students will explore native plant communities as models for restoration. Students will apply various restoration techniques by conducting field work at Shone Farm and other Sonoma County locations.

Prerequisites/Corequisites:**Recommended Preparation:**

Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:**Schedule of Classes Information:**

Description: In this course students will learn hands-on techniques for planning, planting, monitoring, and maintaining local restoration projects. Students will explore native plant communities as models for restoration. Students will apply various restoration techniques by conducting field work at Shone Farm and other Sonoma County locations. (Grade or P/NP)

Prerequisites/Corequisites:

Recommended: Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Transfer Credit:

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

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	Area	Effective:	Inactive:
CSU GE:	Transfer Area	Effective:	Inactive:

IGETC:	Transfer Area	Effective:	Inactive:
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CSU Transfer:	Effective:	Inactive:
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UC Transfer:	Effective:	Inactive:
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CID:

Certificate/Major Applicable:

Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:

At the conclusion of this course, the student should be able to:

1. Demonstrate skills in planning and planting techniques for restoration projects.
2. Demonstrate skills for restoring, monitoring, and maintaining a restoration project.
3. Identify native species for restoration projects in northern California.
4. Discuss management practices for invasive species for restoration of native plant communities.
5. Conduct a site analysis to plan and implement a restoration project.
6. Discuss the management and maintenance of restoration projects.

Objectives:

At the conclusion of this course, the student should be able to:

1. Perform a restoration site analysis.
2. Describe procedures used in restoration site preparation.
3. Demonstrate knowledge of maintenance requirements for re-vegetation projects.
4. Identify exotic and invasive plants and insects in northern California.
5. Implement strategies to control invasive plant and insect species.
6. Discuss the importance of native plant habitat for wildlife.
7. Preserve and maintain a native habitat.
8. Demonstrate skill at various restoration planting techniques.
9. Select appropriate species of and sources for plants to use in restoration.
10. Set short-term and long-term goals for restoration projects.
11. Discuss ecological restoration practices relevant to California.
12. Discuss practices for maintaining healthy soils.
13. Discuss relevant policies and governmental agencies for restoration projects.
14. Plan and implement a restoration project.
15. Discuss how to monitor and maintain restoration projects in the short-term and long-term.
16. Discuss coordinating restoration projects with multiple stakeholders (landowners and land

managers).

Topics and Scope:

I. Overview

- A. Defining landscape restoration
- B. Geographic profile of a watershed
- C. Local plant communities and associations*

II. Site analysis

- A. Physical factors*
 - 1. Soils
 - 2. Exposure
 - 3. Climate
- B. Desired vegetation type*
 - 1. Historical and current analysis
 - 2. Native species selection
 - 3. Nursery and greenhouse propagation options
- C. Invasive and exotic species
 - 1. Common invasive plant and insect species
 - 2. Competition with native species
 - 3. Strategies for managing invasive species

III. Project Planning and Goals

- A. Natural versus restoration landscaping
 - 1. Human needs
 - a. Recreation
 - b. Flood control areas
 - c. Agricultural pollinators (hedgerows)
 - 2. Ecological needs
 - a. Importance of native plant habitat for wildlife
 - b. Importance of native plants for pollinators
 - c. Requirements for encouraging wildlife
- B. Plant materials
 - 1. Selecting appropriate species
 - 2. Sources for plants, including greenhouse propagation and nurseries
 - 3. Sudden Oak Death safety for plant materials

IV. Restoring healthy soils

- A. Mycorrhizae
- B. Weeds
- C. Mulches
- D. Compost
- E. Biochar

V. Invasive species*

- A. Identification techniques
- B. Plant monitoring techniques
- C. Management strategies
- D. Mechanical removal – tools and equipment
- E. Chemical removal - Pesticides

VI. Out-planting requirements and techniques*

- A. Site preparation for planting
- B. On site layout techniques for materials
- C. Plant protection strategies
- D. Efficient labor techniques

- E. Tools and equipment used in restoration
 - F. Field monitoring practices
 - G. Record keeping
 - VII. Maintenance of revegetation projects*
 - A. Irrigation
 - B. Weed control
 - C. Grazing – goats, sheep, cattle
 - D. Prescribed Fire
 - E. Pest control
 - F. Thinning and replanting
 - VIII. Student-conducted Restoration Project
 - A. Site analysis at Shone Farm
 - B. Setting project goals
 - C. Project planning and timeline
 - D. Acquire appropriate plant materials
 - E. Site preparation for planting
 - 1. Irrigation
 - 2. Invasive species management
 - F. Monitoring restoration project
 - G. Maintaining restoration project
 - IX. Ecological restoration resources
 - A. Books
 - B. Online resources
 - C. Government agencies
 - D. Community based projects
 - 1. Environmental groups
 - 2. Landowners
 - 3. Coordination across multiple stakeholders
 - 4. Maintaining restoration projects across jurisdictions.
- * This part of the course will also be covered during lab time.

Assignment:

Lecture-Related Assignments:

1. Weekly reading assignment (5-10 pages)
2. Final project: group restoration project (planning, implementation, and monitoring of a restoration project at Shone Farm or another site in Sonoma County)

Lab-Related Assignments:

3. Field work, field reports, site assessment report, restoration planning at Shone Farm and other sites in Sonoma County
4. Field trip reports (4-6, 2-3 pages each)
5. Weekly lab activities
 - A. Native plant ecology
 - Importance of native plant species in restoration
 - B. Plant identification techniques
 - C. Planting techniques
 - D. Irrigation techniques
 - E. Invasive species removal and management
 - Mechanical treatments
 - Tools and equipment
 - Chemical treatments

- Pesticides
- F. Plant monitoring protocols
G. Maintaining restoration projects

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.

Field reports	Writing 10 - 20%
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Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Field work, field reports, site assessment report, restoration planning	Problem solving 20 - 40%
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Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Weekly lab activities	Skill Demonstrations 35 - 55%
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Exams: All forms of formal testing, other than skill performance exams.

Final project	Exams 15 - 20%
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Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%
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Representative Textbooks and Materials:

A Guide to Restoring Native Riparian Habitat in the Russian River Watershed. Gaffeny, Karen. Sonoma County Water Agency and Circuit Rider Productions. 1998 (classic).

Know Your Natives. Wrynski, Jeanette. Yolo County Resource Conservation District. 2000 (classic).

Introduction to Restoration Ecology. 1st ed. Howell, Evelyn A. and Harrington, John A. and Glass, Stephen B. Island Press. 2011 (classic).

Foundations of Restoration Ecology. 2nd ed. Palmer, Margaret A. and Zedler, Joy B. and Falk, Donald A. Island Press. 2016 (classic).

Required reading for introducing the student to professional societies and international context of restoration:

Primer on Ecological Restoration, Society for Ecological Restoration International Science and Policy Working Group, Version 2. 2004 (classic).

Instructor prepared materials

