NRM 88 Course Outline as of Fall 2019

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	8	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 watershed restoration ecology 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 watershed restoration ecology 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:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 2003	Inactive:	
UC Transfer:		Effective:		Inactive:	

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. Analyze and explain physical and biological processes of watershed health.
2. Determine the economic need for restoring and maintaining watershed health.
3. Evaluate completed and planned restoration projects and apply prescriptions for repair and reducing sediment.
4. Identify impacts and recommend preventative measures, restoration treatments and Best Management Practices (BMP).

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Objectives:
Upon completion of this course, students will be able to:
1. Define how ecoysystems function over space and time, including ecosystem processes and how they vary within a natural window of variability.
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.

12. Familiarity with broard areas of ecological theory that are foundational to the science of restoration ecology.
13. Define the difference between ecological theory, restoration ecology and ecological restoration.
14. Knowledge of the benefits of linkages between ecological theory, restoration ecology and ecological restoration.
15. Compare and contrast how restoration success has been evaluated (i.e. various projects)
16. Identify the socio-economic impacts of watershed and community restoration.

Topics and Scope:

I. Watershed Restoration Ecology
- A. Conceptual framework of healthy and impaired watershed processes
- B. watershed impacts and function relative to local and regional and use practices
- C. restoration tool box
- D. Sale, timing and cost/benefit
- E. BMPs
  1. Low impact development
  2. Slow it, spread it, sink it
  3. Rainwater harvesting
  4. Water conservation

II. Ecological Restoration - Project Planning
- A. 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 maintenance of restoration projects

III. Restoration of aquatic habitats
- 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. Survey of local restoration techniques, including successes and failures, relative to stream channel function

VI. Riparian Restoration
- A. Successful native plant revegetation
- B. Methods for controlling invasive species
- C. 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 land use issues in California to total 500 words during the semester.
4. Skill demonstration and written exams for impact 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 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.)