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| Discipline: Agriculture | Sub-discipline: Forestry/Natural Resources |
| General Course Title: Watershed Ecology and Restoration | Min. Units: 3 Semester |
| Proposed Suffix: L | |
| <p>Course Description: An introduction to the methods, techniques, and tools used to restore and enhance watershed health. Laboratory required.</p> | |
| Required Prerequisites or Co-Requisites ¹ | |
| Advisories/Recommended Preparation ² | |
| <p>Course Objectives: <i>At the conclusion of this course, the student should be able to:</i></p> <ul style="list-style-type: none"> • Define the hydrologic cycle and explain the various processes of the cycle. • Define and describe the physical and biological processes that affect watershed health and function • Identify the biologic and economic need for restoring and maintaining watershed health in California. • Identify topographical maps, assessments and hand tools and equipment used by watershed restorationists. • State criteria for choosing "hard" versus "soft" streambank repair techniques and identify instream structure suitability relative to stream channel type and function. • Demonstrate techniques for reducing sediment from roads and making other upslope repairs and improvements as a field trip activity. • Compare and contrast local watersheds, and discuss land use impacts (both perceived and real) relative to cause and effect. • Evaluate local restoration projects, both completed and planned, and develop and demonstrate prescriptions for repair as a field trip activity. • Analyze and discuss important water issues in California. • Demonstrate a working knowledge of watershed restoration techniques and the ability to communicate with other resource professionals. • Use quantitative techniques for riparian habitat assessment including various accepted sampling protocols | |
| <p>Course Content:</p> <ol style="list-style-type: none"> 1. The California Hydrologic Cycle and Water Resource Issues <ol style="list-style-type: none"> a. The Hydrologic Cycle in California: climate, topography, geographic location b. Overview of water development in California: modifications to natural hydrologic regime, supply and demand, conflicting uses. 2. Upslope Processes/ Routing <ol style="list-style-type: none"> 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, successes, and failures <p>Watershed Ecology and Restoration (Contents Continued)</p> | |

¹ Prerequisite or co-requisite course need to be validated at the CCC level in accordance with Title 5 regulations; co-requisites for CCCs are the linked courses that must be taken at the same time as the primary or target course.

² Advisories or recommended preparation will not require validation but are recommendations to be considered by the student prior to enrolling.

3. 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 process - biological processes

4. 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

5. 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

6. 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. Pierces Disease and riparian corridors and stream/agricultural interface.

Laboratory Activities: Individual Laboratory Activities are designed to support course objectives.

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| Methods of Evaluation: Lecture Comprehensive Quizzes and Exams Written Critical Thinking Scenarios Problem Analysis and Solution Research and Term Papers | Methods of Evaluation: Laboratory Laboratory Skill Validation by Observation Laboratory Reports Laboratory Research Projects and Reports Laboratory Skill Practicum Exams |
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Typical Textbooks, Manuals, or Other Support Materials
Stream Corridor Restoration: Principles, Processes and Practices Federal Stream Interagency Work Group. 1997.
California Salinod Stream Restoration Manual. Flosi, G., S. Downie, J. Hopelain, M. Bird, R. Coey and B. Collins. 1998.
 California Department of Fish and Game, Third Edition.

Statewide Articulation: CPSLO-FNR 320, articulated to other universities as specific equivalent by individual community colleges, additional statewide course equivalency articulation currently underway, also currently transfers as lower division elective

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| FDRG Lead Signature: | Date: |
| Mark E. Bender, PhD CSU Stanislaus | |

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