NR12 – Watershed Ecology
Course Syllabus for Spring 2010
Tuesday 0800-1150 (FEM 8)

Instructor: Kent Kinney
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Course Objectives:

Students will be introduced to the study of watersheds, lakes and riparian zones. They will investigate fresh water fisheries, storage facility issues, and water utilization issues. Students will use technological instruments to monitor water quality at numerous field sites including the upper and lower Kings River, reservoirs and rangeland.

Textbook:

Stream Ecology, 2nd ed., J. Allan, 2007, Springer., Recommended

California Salimod 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., Recommended

Stream Corridor Restoration: Principles, Processes and Practices Federal Stream Interagency Work Group. 1997.

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

- 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 up-slope 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

Course Content:

1. The California Hydrologic Cycle and Water Resource Issues
   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
   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

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. Riparian corridors and stream/agricultural interface.

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

Tentative Schedule

		Lab Topic
Week 1	January 12	Watershed delineation
Week 2	January 19	Watershed delineation
Week 3	January 26	Stream channel measurements
Week 4	February 2	Stream channel measurements
Week 5	February 10	Soil erosion and runoff
Week 6	February 16	Water release and flow/Culverts
Week 7	February 23	Dissolved oxygen/turbidity
Week 8	March 2	Water quality measurements
Week 9	March 9	**Midterm Exam** Fish
Week 10	March 16	(FCD) **Alternate Meeting**
Week 11	March 23	Aquatic Macroinvertebrates
Spring Break	Spring Break	Spring Break Spring Break
Week 12	April 6	Aquatic plants species
Week 13	April 13	Erosion Protection
Week 14	April 20	Erosion Protection
Week 15	April 27	Limnology
Week 16	May 4	Managing Land Use
Week 17	May 11	Utilization of water in CA
Week 18	**Final Exam**	Thursday May 20, 0800 - 0950

Attendance and Grading Policy:

If you miss a lecture or lab, you are responsible for obtaining notes from a classmate or from the web site. The success of any class depends on the presence and active participation of each student; therefore, you are expected to attend every class. Your attendance record will be considered when assigning your final grade. **If you miss class >6 times during the semester (without a valid reason) you will be dropped from the course**. Individual exam grades may be curved and final grades will be assigned based on a straight percentage system according to the following scale:

Course Grade	**Cumulative Percent**
A	90-100
B	80-89
C	70-79
D	60-69
F	< 59

Breakdown of Grades	**Points**
Midterm Exam	25%
Lab Assignments	20%
Macroinvertebrate	
Stream Cross Section	
Map Assignments	20%
Watershed Perimeter	
California Watersheds	
Field Trip Participation	10%
Final Exam	25%
Extra Credit (10%)	
	Total 100 %

Field Trips:

There may be project trips taken during the semester. These trips will generally be taken during scheduled lab times but we **may** leave before and return after normal class hours. Field trips and labs will happen **rain or shine** so come prepared for the worst possible weather situations.

Always come prepared to go outside during lab. My definition of "Being Prepared" means to wear hiking boots or work boots, wear long pants, and to bring other items such as water, bug repellent, rain gear (even if there is a slight chance of rain), and plenty of warm cloths.

LAST DAY TO DROP IS 12th March

Accommodation

If you have a need for an academic accommodation or materials in alternate media (i.e., Braille, large print, electronic text, etc.) per the Americans with Disabilities Act(ADA) or Section 504 of the Rehabilitation Act, please contact me as soon as possible.