

Geog / Geol 642.
Fall 2011. TuTh 12:35-2:15 pm.

Watershed Assessment and Restoration.
Web page: http://bss.sfsu.edu/jdavis/geo_642

Instructor: Jerry Davis. Office: HSS 273. Hours: M-Th 2:15-3:30.
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Course Description, Objectives, Learning Outcomes

This course explores watersheds and appropriate integrative methods of assessment and restoration of hillslopes and stream systems. The course begins with an exploration of the properties and processes of watersheds, their slope materials, soils and land-use characteristics, and the forms and processes of the stream network that drains them. Students will also learn assessment methods employing geographic information systems (GIS) technology to problems of hillslope hydrological runoff modeling and soil erosion prediction, interpretation of historical and current runoff-discharge relationships, and modeling the effects of changing land use. Hillslope and stream restoration field methods will include physical and biotechnical methods, with examples drawn from throughout the Bay Area and California. Prerequisite: Geog 101 or Geol 120, plus Geog 603 or equivalent knowledge of GIS.

Instructional Methods: Lecture/Discussion with Exams; Computer Labs; Field Studies. Students with disabilities who need reasonable accommodations are encouraged to contact the instructor. The Disability Programs and Resource Center (DPRC) is available to facilitate the reasonable accommodations process. The DPRC is located in the Student Service Building and can be reached by telephone (voice/TTY 415-338-2472) or by email (dprc@sfsu.edu).

Grading System: two exams per term (2 x 25%), Lab exercises (10%) (see iLearn for assignments and due dates), Field Trips and Review of Field Notebook (10%), Term Projects and Presentations (30%). Note: Term project study area should be determined by the fourth week of class. *Note: you need to submit an early watershed choice proposal, then a project proposal, then the final project, on iLearn. See iLearn for dates and assignment details.*

Reading List/Textbooks: There are many resources on this subject, and no single document that works for all we need. I've provided most on the website. The bookstore has ordered two books, Riley and a field notebook.

Harrelson, Cheryl, C. L. Rawlins, and John C. Potyondy (1994). *Stream channel reference sites: an illustrated guide to field technique*. USDA Forest Service General Technical Report RM-245. (online)

Gordon, Nancy D., Thomas A. McMahon, Brian L. Finlayson, Christopher J. Gippel, Rory J. Nathan, *Stream Hydrology: An Introduction for Ecologists*, 2nd Edition (2004). ISBN: 978-0-470-84358-1 (out of print, but useful)

Field Notebook

Field notes are a critical part of field work, providing a record of information often not recorded anywhere else – original sketches, observations and other notes. Field notebooks will be used both on field trips and on the group term project. *Rite-in-the-Rain* notebooks are recommended; a selection is available upstairs in the bookstore. Students will turn in field notebooks from field trips, at an assigned date, for instructor review. Field notebook pages from term projects should be scanned and the digital files included with the term project.

Leopold, Luna B., M. Gordon Wolman, and John P. Miller (1964, 1992). *Fluvial Processes in Geomorphology*. New York: Dover. 522 p. ... great classic fluvial geomorphology text.

Riley, Ann (1998). *Restoring Streams in Cities*. Island Press. ... good for those interested in the entire complex process of urban stream restoration. (in the bookstore)

Rosgen, David (1998). *Applied River Morphology*. Pagosa Springs: Wildland Hydrology. <http://www.wildlandhydrology.com>

Flosi, G., et al. (1998). California Salmonid Stream Habitat Restoration Manual. California Dept. of Fish and Game. <http://www.dfg.ca.gov/fish/resources/habitatmanual.asp>

FISRWG (10/1998). Stream Corridor Restoration: Principles, Processes, and Practices. By the Federal Interagency Stream Restoration Working Group (FISRWG).

Schedule TuTh 12:35-2:15 pm. + field trips

Readings: chapters assigned in (G) Gordon *et al.*, (if you can find this book – it’s out of print) (H) Harrelson *et al.*, (L) Leopold *et al.*, (R) Riley, and other assigned readings.

Dates	Topic	Readings
Tue, 08/23	Introduction to the Course and to Watersheds 0: Spatial Analyst	GIS (G)1 (L)1,2
Thu, 08/25 to Tue, 08/30	Hydrogeomorphic Watershed Parameters; Runoff and Stream Channel Initiation	(G)2,4 (L)3,5,10
Thu, 09/01 to Tue, 09/13	Field 1. Upland Morphometric Survey	(G) 5.1-5.3.
Thu, 09/15 to Thu, 09/22	Fluvial & Riparian Systems	(G)6,7 (L)6,7 (R)1,4
Tue, 09/27 to Tue, 10/04	Field 2. Stream Measurements for Hydrologic & Geomorphic Assessment; Reference Reach	(G)5,8 (H)All (L)3 (R)8/300-307
Thu, 10/06 to Tue, 10/11	GIS 1. Data, Air Photos, Field Map	(G)3
Thu, 10/13	Exam 1	
Tue, 10/18 to Tue, 10/25	Stream Classification	(G)9/262-286 Rosgen, Montgomery-Buffington
Thu, 10/27 to Tue, 11/01	Water Quality Parameters & Assessment GIS 2: Sediment Modeling	(G)2,5,9/233-242 (R)8/308- 319
Thu, 11/03	Habitat/Bioassessment	(G)9/242-319 Flosi <i>et al.</i>
Tue, 11/08 to Tue, 11/15	GIS 3: Hydro modeling	
Thu, 11/17	Disturbances	(R)2,3
Tue, 11/29 to Thu, 12/01	Restoration	(G)9/319-358 (R)6,7,8,9
Tue, 12/06	Exam 2	
Thu, 12/08 to Tue, 12/13	Watershed Analysis Project Presentations	

Field Trips, etc.

Saturday 9/10 Morphometric hillslope measurements. San Pedro Watershed.

Sunday 10/2 Stream morphometric and sediment measurements. San Pedro Creek.