RIVER ENVIRONMENTS OF ORGEON (ES458/558)
POLICIES AND PROCEDURES

Summer 2006 Term - Western Oregon University
3 cr August 5 – August 10 Natural Sciences Bldg, Rm 218 / Central Oregon

INSTRUCTOR: Dr. S. Taylor
OFFICE HOURS: By Appointment

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COURSE DESCRIPTION:

This field course focuses on the geomorphology of select fluvial environments in western and central Oregon (Santiam River, Newberry Volcano, Deschutes River, Columbia River, and Willamette River). The emphasis is on observation and analysis of fluvial processes, deposits, and landforms associated with active tectonics, mass wasting, glaciation, volcanism, and flooding. Additional topics include regional bedrock geology, fluvial hydrology, river classification, surficial mapping, and paleohydrology.

THE PROFESSOR'S PHILOSOPHY ON UPPER DIVISION EARTH SCIENCE / GEOLOGY COURSES:

The upper division Earth Science / Geology course sequence is designed for mature, serious students who are willing to work hard, play hard, have fun, and learn in-depth skills / concepts in a professional academic setting. By default, our student population is very diverse with a wide array of skills, interests, and career goals. The student population ranges from serious Earth Science majors with focused career objectives, to Geology / Earth Science minors to Science Education majors. As such, the professor is charged with serving a diverse array of student interests and career goals in the most professional manner possible. The problem-solving and technical skills acquired via training in the Earth Sciences are highly valuable (and marketable), regardless of career track. Students are expected to actively participate in the learning process and make a significant contribution to the academic integrity of the Earth Science program at Western Oregon University. The ultimate goal of the program is to provide graduates with the academic skills that will enable them to be highly competitive in graduate school or the career marketplace. *GO TEAM!*

REQUIRED READING:

Journal articles, text readings, and field guide, to be provided by the instructor.

CLASS NOTES:

A comprehensive set of instructor class notes are available for download via the internet. The class web site is at URL http://www.wou.edu/taylor and follow the links to the "ES458/558 River Environments" home page.

The class notes are available as Adobe Acrobat Reader files (*.pdf file). Acrobat Reader is free and is installed on many campus PC's. For home installation, Acrobat Reader is also available for download at the class web site, but you will be responsible for properly installing the software (and will do so at your own risk!).

Based on prior student suggestions, I have assembled my class notes and made them available. These notes may be freely printed at any campus internet station (e.g. ITC Bldg - Student Lab, Library, local department computer labs). The notes are in outline form and are very comprehensive.

PHILOSOPHY ON FIELD-BASED EDUCATION

This course is field-based and takes place outside of the "normal" context of a college classroom. The class will involve a number of field trip stops that focus on identifying geologic features and landscape elements, making observations, collecting field data, and conducting "on-the-fly" analysis and interpretation. Students are expected to keep detailed field notes and to mark positions of field stops on topographic maps. In addition,

students will work in teams to take photographs (digital or analog) to document the features associated with each stop. A typical class day will begin with breakfast and a morning meeting, followed by field stops, with a typical "class time" ranging from 9:00 AM to 6:00 PM. The morning meeting will involve working on lab exercises and problem sets. Evening activities will include camping, meal preparation, and completion of "homework" exercises. NOTE: you will be collecting data on some of the days and be expected to work up analyses and interpretations during some of the evening hours. The field notes, maps, photos, and field/lab exercises will be compiled into a final report chronicling results and interpretations compiled during the field trip (see "Final Report" section below for details).

EVALUATIONS AND EXPECTATIONS:

Student performance will be evaluated on the basis of field trip participation, field exercises, and a final report. The following is a breakdown of evaluation points and letter grades:

Participation	75 pts
Field Exercises	100 pts
Final Report	100 pts
TOTAL:	275 pts

Final Grading Scale

Percent Range of Total Points	Letter Grade	Percent Range of Total Points	Letter Grade
94-100%	A	77-79%	C+
90-94%	A-	73-76%	C
87-89%	B+	70-72%	C-
83-86%	B	67-69%	D+
80-82%	B-	63-66%	D
		60-62%	D-
		<60%	F

Participation: Students are expected to be engaged during the field stops, ask questions, interact with their peers, and generally be supportive of outdoor experiential education. This portion of your grade will be subjectively evaluated by the instructor. As long as you are playing along, being a good sport, not complaining too much, and engaged in the science adventure, you will do well in this part of the course.

Field Exercises: Field and lab exercises will be worked BOTH during "class time" (9 AM – 6 PM) and during evening hours throughout the week. You will be expected to complete post-trip lab, reading, and homework assignments following the field week. Due dates for field exercises will be prescribed by the instructor (some will be due during the field week, others will be due after the field week), and based on consultation with the students.

Final Report Due Dates: The project is due by September 1, 2006; late projects will be accepted with a 10% grade penalty. You will receive an “incomplete” grade until the final project is submitted. Any students who do not submit a completed final project by October 1, 2006 will receive a final grade of “F” for the class.

FINAL REPORT

Final Report: Field notes, observations, exercises, results, interpretations, maps, and photo logs will be compiled into a final field trip report. The final report should be compiled as a portfolio, presented in the neat, professional-looking three ring binder, with cover and tab-separators. The field trip report will be organized according to the following outline format, and presented in the following order:

I. Introduction
   a. General overview of course and field trip
      i. Figure: Road Map with Trip Stops
   b. Goals and Objectives of Course and Field Trip
II. Regional Geologic Setting of High Lava Plains – Deschutes/Columbia Plateau
   a. Written summary and annotated outlines of pre-trip readings, as assigned in the introductory class letter: (pre-trip readings include: Orr and Orr, 1999 - Overview of High Lava Plains; Orr and Orr, 1999 - Overview of Deschutes-Columbia Plateau; O'Connor et al., 2003a - Overview of Deschutes Geology, Hydrology, Geomorphology)

III. Field Stop Description (repeat this section for each stop, sequentially on the trip)

   A. Location Map / Stop Identification / Physiographic Description
   B. Geologic Overview
      i. Bedrock Geology
         a. rock types
         b. chronology / rock age
         c. geomorphic setting
   C. Geomorphic Field Observations (for each stop)
      i. Landforms
      ii. Processes
      iii. Materials (types of deposits, texture, grainsize, description)
   D. Photo Gallery (from field photos)
   E. Stop Interpretation and Summary

III. Course Synthesis and Summary (Answer the Questions in Narrative Format)

   A. Landforms and Processes Associated with western and central Oregon Rivers

      What are the dominant processes that influence western and central Oregon Rivers? In your narrative include both a discussion of both geologic and tectonic processes.

      What are the landforms associated with lower hillslope and valley environments along western and central Oregon Rivers?

   B. Meteorologic and Climate Controls on Fluvial Processes in western and central Oregon

      Compare and contrast precipitation patterns west of the Cascades vs. east of the Cascades. What are the dominant controls on these precipitation patterns?

      What types of meteorologic conditions cause flooding west of the Cascades? What meteorologic condition causes the highest magnitude floods?

      What types of meteorologic conditions cause flooding east of the Cascades?

   C. Geologic Controls on Fluvial Processes in western and central Oregon

What types of climatically-driven and tectonically driven geologic processes result in large magnitude flooding in western and central Oregon?

Compare and contrast the magnitude of floods associated with meteorological vs. geological processes in western and central Oregon.

D. Overview of Hydrologic and Paleohydrologic Techniques (from field exercises)

Why is it important to assess the magnitude and frequency of flood discharges along rivers?

List and discuss the types of techniques that can be used to reconstruct ancient paleofloods, particularly as applied to rivers in western and central Oregon.

E. Overview of River Classification Systems (from field exercises)

List and discuss the types of criteria that are used to classify rivers. Why is river classification important for understanding fluvial processes?

IV. Results from Lab/Field Exercises (answer all questions / type written; present in the following order:)
- A. Answers to Field Trip Reading Questions (p. 191-193 of field guide)
- B. Surficial Mapping Data Log Summary (p. 195-196 of field guide)
- C. Stream Ordering Exercise (p. 197-199 of field guide)
- D. Answers to Fluvial Hydrology Problem Set (p. 201 of field guide)
- E. Review of Day 1 / Preview of Day 2 Concepts (p. 203-204 of field guide)
- F. Field Hydrology at Lower Paulina Creek (Day 2) (p. 205-207 of field guide)
- G. Whiskey Dick Exercise (p. 209 of field guide)
- H. Buckskin Mary Exercise (Flood Recurrence Intervals) (p. 211 of field guide)
- I. Soil-Geomorphic Associations of the Columbia Plateau (p. 213-215 of field guide)
- J. Geologic Timeline Exercise (p. 223-230C of field guide)
- K. Deschutes River – Applied Field Problems Exercise (p. 217-222 of field guide)
- L. Trout Creek Road Cut – Stratigraphic Cross-Section and Interpretation
- M. Warm Springs River Junction-Railroad Cut – Stratigraphic Cross-Section and Interpretation

V. Acknowledgements
VI. References Cited
VII. Appendix I – Copies of Field Notes

PRE-TRIP ORGANIZATIONAL MEETING
A pre-trip organizational meeting will be held on Thursday August 3 at 6:00 PM in Rm 218 of the Natural Sciences Building. The purpose of this class meeting is to provide an introduction to the course, organize cooking teams, review course policies, and general team building.

POST FIELD TRIP MEETING AND DEBRIEFING SESSION
A post trip class meeting will be held on Tuesday August 17th at 6:00 PM in Rm 218 of the Natural Sciences Building. The purpose of this class meeting is to provide a summary and review of the field trip, and to assist students in completing their field exercises and final report. This will also be an opportunity for class participants to share data, photos, and other materials in preparation for final project submittal. The instructor will be available to answer questions and provide additional resources and reference materials.

TENTATIVE COURSE SCHEDULE / TRIP ITINERARY
Special Note: This schedule is considered tentative at best. This is the first time the course is being offered, the instructor reserves the right to add and delete field stops whenever necessary, depending on time schedule and field conditions. Students are expected to maintain a flexible attitude and to continuously repeat

the following mantras: "no worries", "it's all good", and "we get there, when we get there"!

Thursday 8/3/06 Pre-Trip Organizational Meeting, 6:00 PM NS218 WOU campus.

Day 1 Sat. August 5 "The Adventure Begins"

Stop 1-1 Natural Science Building Roof
Stop 1-2 North Santiam State Park east of Salem
Stop 1-3 Bigl Cliff Dam / Detroit Lakes
Stop 1-4 Suttle Lake
Stop 1-5 Lava Butte / Benham Falls
Camp at La Pine State Park

Day 2 Sun August 6 "From Volcanoes to River Canyons"

Begin Day Campground Worksheets / Lab Exercises
Stop 2-1 Paulina Peak
Stop 2-2 Little Cone Campground / Paulina Lake
Stop 2-3 Paulina Lake (Paulina Creek Outlet)
Stop 2-4 Paulina Falls
Stop 2-5 Paulina Creek Field Exercise (Ogden Group Camp and McKay Crossing)
Stop 2-6 Hwy 197 – Overview of Columbia River Basalts and Loess Hills
Camp at Deschutes River Recreation Area

Day 3 Mon August 7 “Missoula Floods and the Columbia Gorge”

Begin Day Campground Worksheets / Lab Exercises
Stop 3-1 (O'Connor Stop 3.2) Hwy 197 Roadcut South of The Dalles
Stop 3-2 (O'Connor Stop 1.1) Petersburg Bar
Stop 3-3 (O’Connor Stop xx) Fairbanks Divide
Stop 3-4 (O'Connor Stop 1.2) Celilo Falls Overlook
Stop 3-5 (O'Connor Stop 1.4) Scabland
Drive to Maupin / Camp at Trout Creek

Day 4 Tue August 8 "Rafting, Rapids, and Rays"

Raft Preparation
Stop 4-1 Lower Trout Creek – Road Cut
Stop 4-2 (Bebee et al. Stop 3) Warms Springs Confluence / Railroad Cut
Stop 4-3 (Bebee et al. Stop 4) Axford Flood Deposits (cutbank river left)
Stop 4-4 (Bebee et al. Stop 5) River Mile 78.5 Whiskey Dick; Camp-site lecture on Deschutes River hydrology and geomorphology
Camp at Whiskey Dick

Day 5 Wed August 9 "Another Day Floating the River"

Begin Day Campground Worksheets / Lab Exercises
Stop 5-1 Morning Hike to “The Pot” Overlook (from Whiskey Dick)
River Mile 77 Whitehorse Rapids (Yee Haw!)
Stop 5-2 (Bebee et al., Stop 6) River Mile 76 – The Pot – lower end
Camp at Buckskin Mary

Day 6 Thurs. August 10 "Out of the 'Chutes and Into the Gorge"

Stop 6-1 (Bebee et al., Stop 8) River Mile 64 – Buckskin Mary / Dant DF Overlook
Stop 6-2 (Bebee et al., Stop 9) River Mile 62.5 – Outhouse Flood Bar
Stop 6-3 (O'Connor Stop 3.4) Cascade Locks Marine Park / Bridge of the Gods
Stop 6-4 Bonneville Dam
Return to Monmouth via Portland

Thursday 8/17/06 Post-Trip Review Session, 6:00 PM Rm 218 Natural Science Bldg.