G473/573 ENVIRONMENTAL GEOLOGY
POLICIES AND PROCEDURES
Spring Term 2000 - Western Oregon University
3 CR TR  4:00-5:30 PM Rooms 218/103 Natural Sciences Bldg.

INSTRUCTOR: Dr. S. Taylor
OFFICE: RM 210 Natural Sciences Bldg
OFFICE HOURS:  M W 1-3 P.M.;  PHONE: (w) 838-8398 (h) 606-3541
WEB SITE: www.wou.edu/taylor  E-MAIL: taylors@wou.edu

This course serves as an upper division introduction to environmental geology. The emphasis is placed on the technical aspects of human interaction with near-surface environments of the Earth. Topics include an overview of environmental and land-use regulations, geomorphic hazards (soil erosion, flooding, mass wasting, landslide, debris flow, coastal erosion), tectonic hazards (earthquakes, tsunamis, ground disturbance, volcanic eruptions), water resource issues (source, supply and quality), mining impacts, and waste management.

REQUIRED LAB MANUAL:

ADDITIONAL READING MATERIALS:
Journal articles and text readings, to be provided by the instructor.

CLASS WEB SITE:
A comprehensive set of instructor class notes will be available for download via the internet. The class web site is at URL http://www.wou.edu/taylor ... and follow the links to the "G473" 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!). 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. "Exam Study Guides" will also be posted on the class web site as the term progresses.

FIELD TRIP(S):
A field trip is planned to the Coffin Butte Landfill near Corvallis on Thursday April 27, 2000. The class will depart from WOU at 3:00 PM and should return by 5:30. Please plan accordingly. An additional field trip may be scheduled and organized as the term progresses. The University policy on field trips is that attendees must pay out-of-pocket for vehicle rental and mileage costs. Please be aware that additional class expenses will be required for field trips, these are typically charged administratively to student accounts (~ $5-10 range max.)
ENVIRONMENTAL GEOLOGY SPEAKER SERIES:

A series of outside speakers from industry and government have been scheduled as part of the class. The speaker series is designed to both enhance the public visibility of the geology program at Western Oregon University, and to encourage student interaction with working professionals in the environmental industry. A majority of outside speakers will present during class time, in Room 103 of the Natural Sciences Building. The presentations will begin at 4:30 PM with Dr. Taylor providing a "warm-up act" from 4:00-4:20. Please note that several of the speakers will present as part of the Division of Natural Sciences Seminar Series at 12:00 PM on select Wednesdays during the term. Class participants are required to attend the Wednesday-noon seminar dates. If students have a scheduling conflict with the Wednesday time slot, please see the instructor for make-up assignments.

EVALUATIONS AND EXPECTATIONS:

Student performance will be evaluated on the basis of oral presentations, lab exercises, writing assignments, and two (2) exams. The following is a breakdown of evaluation points and letter grades:

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Points</th>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>Mid-Term Exam</td>
<td>125</td>
<td>29%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>125</td>
<td>29%</td>
</tr>
<tr>
<td>Writing Assignments (10 x 5 pts)</td>
<td>50</td>
<td>12%</td>
</tr>
<tr>
<td>Oral Presentation</td>
<td>50</td>
<td>12%</td>
</tr>
<tr>
<td>Lab Exercises</td>
<td>75</td>
<td>18%</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>425</strong></td>
<td><strong>100%</strong></td>
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</tbody>
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Final Grading Scale

<table>
<thead>
<tr>
<th>Percent Range of Total Points</th>
<th>Letter Grade</th>
<th>Percent Range of Total Points</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>94-100%</td>
<td>A</td>
<td>77-79%</td>
<td>C+</td>
</tr>
<tr>
<td>90-94%</td>
<td>A-</td>
<td>73-76%</td>
<td>C</td>
</tr>
<tr>
<td>87-89%</td>
<td>B+</td>
<td>70-72%</td>
<td>C-</td>
</tr>
<tr>
<td>83-86%</td>
<td>B</td>
<td>67-69%</td>
<td>D+</td>
</tr>
<tr>
<td>80-82%</td>
<td>B-</td>
<td>63-66%</td>
<td>D</td>
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<td></td>
<td>60-62%</td>
<td>D-</td>
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<tr>
<td></td>
<td></td>
<td>&lt;60%</td>
<td>F</td>
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</tbody>
</table>

Writing Assignments

Students are required to write a 300-500 word (1-2 typed pages) summary for each of the presentations by outside speakers and for the field trip to Coffin Butte Landfill. The presentations and field trip address important aspects of the regional environmental geology in Oregon. This exercise is designed to enhance the writing skills of students and is an excellent method of exam preparation.
The summaries should be neatly word-processed, double spaced, with 1 inch margins, and checked for spelling errors with a "spell checker" tool. Miss-spelled words will not be tolerated. Save your word-processing files as you may be required to modify and edit the summaries. Use the following format:

**Speaker Summary**
**Title of Presentation**
**Speaker / Organization**

**Student Name / Date**

**Paragraph 1:** Statement(s) of the environmental problem(s) / issue(s).

The first sentence of paragraph 1 should be a succinct topic sentence that provides a good overview of "who, what, where, when" as related to the main points of the speaker presentation.

**Paragraph 2:** Social costs / human significance of the described environmental problem.

**Paragraph 3:** Methods, techniques, or regulations employed to mitigate the environmental problem (methods / techniques include those recommended or those actively in place).

**Paragraph 4:** Concluding paragraph / student critique of the speaker and regional relevance of the described environmental problem.

*All Students must adhere to the prescribed organization of the summary. Deviation from the scheme will result in significant point loss.*

**Please Note:** Some speakers may directly address the content of these paragraphs, and some may not. If not, it will be your job as the audience to ask good questions and fill in the content you will need to put together your summaries. Don't be afraid to ask good questions and get the information you need to put together a well thought-out summary.

**Oral Presentations**

Students will present a summary of a relevant journal article in the form of an oral presentation. The journal articles and topics will be selected by the instructor. The summary will be presented in the style of a professional scientific meeting: a 15-minute oral presentation and 5 minutes for questions and discussion. Students will be required to use one or more multi-media devices such as a slide projector, overhead projector, or digital projector (e.g. Powerpoint presentation). All of the above technology is readily available on campus.

Transparencies for overheads can easily be created using a photo-copier. Powerpoint is a digital multi-media software that is part of the Microsoft Office package. Powerpoint incorporates digital images (scanned), graphics, and text that can be projected to a screen. It is also possible to output hardcopy photographic slides from Powerpoint and project them with a traditional slide projector.
In addition to the in-class presentation, students are required to provide the abstract for the selected paper and a set of key figures that emphasize the main points. The abstracts and key figures from each participant will be compiled by the instructor into an "abstract volume" that students will be able to study from for the exam. See the instructor as the term progresses for help in crafting and executing your presentation.

**Lab Exercises**

Relevant take-home and in-class exercises will be crafted and implemented as the term progresses. The exercises are designed as "hands-on" tools for discovery, supporting the concepts developed during lecture. Several of the exercises will be derived from the "Virtual Reality" lab manual. Others will be provided by the instructor on an as-needed basis.

**Exams**

The mid-term will cover material presented during the first-half of the class. The final will focus primarily on material from the second-half, however may include a review of important concepts from the first exam. **Note:** since there are only two exams, accounting for 58% of the grade, it is imperative that students actively study during the weeks leading up to the mid-term and final. **Warning:** given the volume and level of material, "cramming" at the last minute before the exam will greatly reduce the probability of achieving high scores. **Moral of the story:** factor in a weekly study routine for the class and you will greatly increase your performance level.

**Make-Up Exams and Incompletes**

Under NO circumstances will make-up exams be administered without prior arrangement (at least five days) and good reason, with a signed administrative excuse. Please show up on exam day! Under NO circumstances will a grade of "incomplete" be issued in the last week of class. If you find yourself in a situation where you can't complete the required course work, please make arrangements with the instructor prior to the last week of class. Contact the Office of the Dean of Students (838-8365) for assistance in arranging incompletes.

**Why are We Doing Writing Assignments and Oral Presentations in a Geology Class?**

The point of the exercise is that a we all need practice communicating. Every sector of the professional job market requires skills in written and oral communication, including business, science, and education. Communication skills are essential for survival in the "Information-Based Economy"... that's why we're doing writing assingments and oral presentations in a geology class!

**STUDENT HONOR POLICY:**

Plagiarism and cheating will not be tolerated. Cheating includes copying others work and using cheat sheets on exams. However, students are encouraged to interact in small groups during class assignments, i.e. you can freely discuss concepts in all portions of the class, except exams.

**OTHER REQUIRED MATERIALS:**

Students will also need access to a scientific calculator, ruler, protractor, and pentium-class desktop computer. You will be required to use these materials during lecture, lab, and exams. The Virtual Reality lab manual uses an interactive PC environment with CD-ROM video. The Natural Sciences
Computer Lab will be available for student use during class time and at other times during the day. Weekend use of the computer lab is possible, with prior arrangement.

**STUDENTS WITH DISABILITIES**

Any student who has a disability which requires accommodation, please make an appointment to see me.

**ABOUT THE LAB MANUAL**

VR Excursions uses advanced interactive technology to give students access to a variety of complex environmental problems (a nuclear waste disposal site, a coal-fired power plant, and a solid waste landfill). What is VR Excursions? VR Excursions is a text/disk package that contains a dual platform CD-ROM and a lab manual. The CD-ROM contains three field simulations and a virtual office. What are the three field simulations?

Simulation 1: The Yucca Mountain Project - Students use this simulation to explore issues related to the safety of the Yucca Mountain Project as a nuclear waste repository. Much of the module examines the physical nature of the surficial and bedrock deposits, potential pathways for movement of radioactive wastes, and the levels and sophistication of evaluation needed in order to effectively use scientific data to solve a risk-management problem.

Simulation 2: Coal Power - This simulation examines the chemistry of coal-fired power plants, with particular emphasis on three areas: (1) formation of coal and its naturally occurring pollutants, (2) power plant siting given a potentially suitable geologic deposit, and (3) chemical methods of scrubbing emissions, waste handling and reduction processes, as well as the regulatory issues related to waste and emissions production.

Simulation 3: Solid Waste Landfill - The solid waste landfill simulation centers around the processes involved in managing the environmental compliance program at a municipal landfill. Students investigate hydrogeologic characteristics of the materials underlying the facility, the factors shaping physiochemical regimes in the area, the volume and chemical characteristics of leachate, and landfill gas generated by the facility.

Other Tools - VIRTUAL OFFICE provides a resource library for the student. Students can use the resources in this library to help them do basic research and to help them with the field simulations. It features a multidimensional bookshelf with electronic mini-books that access information on the following topics: Research Design, Technical Writing, GAS Meter, Scintillometer, Portable Rock Element Analyzer, Geology, Groundwater, Toxicology, Nuclear Waste, Coal, Coal Power Plants, Statistics, pH-SC-Temperature Meters, Depth-to-Water Meters, Scrubber Sensors, Radioactivity, Hazardous Waste, Regulatory Frameworks, and Solid Waste.
CLASS SCHEDULE

Presentations by outside speakers begin at 4:30 P.M. in RM 103, Natural Sciences Building. The class will meet at 4:00 P.M. in RM103 on speaker days, with Taylor lecturing from 4:00-4:20 P.M. Note special times associated with the Division of Natural Sciences Wednesday-Noon Seminar Series.

Tuesday 3/28/00  Class Introduction
Thursday 3/30/00 Overview of Environmental Problems; Lab-Writing-Presentation Techniques
Tuesday 4/4/00  Fluvial Systems and Flood Hazards
Thursday 4/6/00 Ann Beier, State Floodplain Program Manager, Oregon Dept. of Land Conservation and Development: "Flood Hazards in Oregon"
Tuesday 4/11/00 Solid Waste Issues, Landfill Technology, Groundwater
Thursday 4/13/00 No Formal Class Meeting- Taylor at University of Oregon (self-paced student lab)
Tuesday 4/18/00 Groundwater (cont.), Mining Issues and Environmental Quality
Thursday 4/20/00 Peter Wampler, Geologist, DOGAMI Mine Lands Reclamation Office: "Floodplain Mining Issues in Oregon"
Tuesday 4/25/00 Jack Arnt, Senior Hydrogeologist, Water Quality Program - Oregon Dept. of Environmental Quality: "Groundwater-Surface Water Interaction in Gravel-Dominated Fluvial Systems"
Thursday 4/27/00 Field Trip to Coffin Butte Landfill, Corvallis. Topics will include Waste Water Treatment Technology, Methane Gas Management, Groundwater Monitoring, and Geosynthetic Liner Technology. Tour leader: Brian Stone, Operations Manager, Valley Landfill, Inc., Trip promptly departs at 3:00 P.M.

Tuesday 5/2/00  Mid-term Exam, Primer on Landslides and Debris Flows
Thursday 5/4/00 Keith Mills, Geotechnical Engineer, Oregon Dept. of Forestry: "Debris Flow Hazards in Western Oregon".

Last Day to Withdraw Friday May 5, 2000

Tuesday 5/9/00  Open Schedule / Lab Catch-up
Thursday 5/11/00 Fred Lissner, Manager, Groundwater and Hydrology, Oregon Water Resources Division: "Groundwater Resource Issues in Oregon".
Tuesday 5/16/00 Seismic Hazards
Wednesday 5/17/00  Yumei Wang, Geotechnical Engineer, Oregon Dept. of Geology and Mineral Resources, "Earthquake Hazards in Western Oregon - Is WOU Prepared?". **Note: this will be part of the Division of Natural Sciences Seminar Series (12:00 PM)**

Thursday 5/18/00  Mark Darienzo, Earthquake and Tsunami Program Coordinator, Oregon Emergency Management: "Paleoseismology and Seismic Risk in Western Oregon".

Tuesday 5/23/00  Coastal Hazards

Wednesday 5/24/00  Roger Hart, Assistant Professor - Senior Research, College of Oceanic and Atmospheric Sciences, Oregon State University - Hatfield Marine Science Center: "El Nino Climate Change - Erosion and Landslides on the Oregon Coast". **Note: this will be part of the Division of Natural Sciences Seminar Series (12:00 PM)**

Thursday 5/25/00  Student Presentations

Tuesday 5/30/00  Student Presentations

Wednesday 05/31/00  Langdon Marsh, Director - Oregon Dept. of Environmental Quality: "A Thoughtful Look at Environmental Issues in Oregon". **Note: this will be part of the Division of Natural Sciences Seminar Series (12:00 PM)**

Thursday 6/1/00  Student Presentations (if needed), Final Analysis and Conclusion of Term (whew... what an action-packed class!)

June 5 - 9, 2000  Finals Week (check schedule for time of Final Exam)