

EARS 18 Environmental Geology

Fall 2010

Instructor: Erich Osterberg, 205 Fairchild Hall, 646-1096, erich.c.osterberg@dartmouth.edu

Teaching Assistant: Tom Baker, 218 Fairchild, Thomas.c.baker@dartmouth.edu

Class Meeting Time: Tue Thu 10-11:50 AM. Laboratory: Wed. 2-5 PM

Office Hours: Tue 2:30-3:30, or by appointment.

Class Web Site: <http://blackboard.dartmouth.edu>

Course objectives:

This course takes an interdisciplinary approach toward understanding Earth's terrestrial, marine, atmospheric, and biological environments. We will learn about the dynamic natural processes that are important in each complex environment, as well as the impact of past and present human activities. In the process of developing this understanding, we will gain skills in collecting, interpreting, and reporting scientific data through field trips and laboratory sessions. Environmental issues such as ozone depletion, acid rain, climate change, and air and water pollution are key topics of focus. This course does not emphasize environmental policy, but rather the scientific knowledge and arguments behind environmental policy. However, selected case studies will allow students to gain appreciation of the complexity of scientific, social, cultural and political interactions that surround many environmental issues.

Prerequisites:

There are no prerequisites for this course.

Text:

- 1) *Environmental Geology – An Earth System Science Approach*, by Merritts, De Wet and Menking, W.H. Freeman and Company, New York, 1998. **Required.**
- 2) Lecture Notes, Environmental Geology, Chapters Available through Blackboard.

Course Requirements and Grading:

Quizzes (10% of grade): There will be 3 announced quizzes during the term on the reading, lectures and labs. This is to help you prepare for the exams by testing your knowledge.

Laboratory Projects and Reports (20% of grade): There will be 4 lab reports due based on field trips we will take (Labs 1-4). These labs all take place out doors, involving a field trip with sample collection/analysis.

Class participation (10% of grade): This will include attending lectures and labs, participating in class discussions, asking questions, promoting class interaction, and participating in laboratory work. In addition, you must email me 1 question each week on Tuesday.

First Exam (20% of grade): October 26 (subject to change)

Second Exam (20% of grade): November 23 (subject to change)

Final Project (20% of grade): In the second half of the course, you will complete a proposal for a scientific project on an environmental geology topic of your choice. You will choose your topic through consultation with me, and Tom and I will help you develop your science plan, methods and budget. More information about this project will be provided later in the course.

Late Assignments: 10% will be deducted after 5 pm on the assignment due date, and cumulatively for each additional day that an assignment is late, unless you discuss the situation with me **prior** to the original due date. For example, an assignment due on Wednesday would be deducted 10% if turned in between 5 pm Wednesday and 5 pm Thursday, and 20% if turned in between 5 pm Thursday and 5 pm Friday, etc. If you are unable to complete an assignment on time due to illness or other personal reasons, you may be eligible to have this penalty waived. You are encouraged to talk to me as soon as possible, and if necessary, meet with your Dean to discuss your situation.

Disability-Related Accommodations: Students requiring disability-related accommodations must register with the Student Accessibility Service (SAS) office. Once SAS has authorized accommodations, students must show the originally signed SAS Accommodations/Consent Form and/or a letter on SAS letterhead to their professors. As a first step, if you have questions about whether you qualify to receive accommodations, you should contact the SAS office. All inquiries and discussions about accommodations will remain confidential.

Religious Observances: If you have a religious observance that conflicts with your participation in this course, please meet with me to discuss accommodations.

Academic Honor Principle: You should be aware of and conform to the Dartmouth Honor Code as expressed in the ORC. For this course, this means:

Labs: You may discuss the lab assignments with each other and work together towards solutions, but you must write up your solutions in your own words showing your thinking and work where appropriate. If you are working in groups then you may share data with group members, but write-ups should still be in your own words.

Exams: All work on exams is your own.

If you are unsure, please ask how the Honor Principle applies to this course.

Course Outline and Reading Assignments

The following reading refers to chapters and pages in the textbook by Merritts, De Wet and Menking. The lectures may not strictly follow the order of the outline below due to the lab schedule, which is constrained by the weather. Some sections may be moved forward to prepare you for outdoor labs.

Tentative Schedule (Updated 9/18/10)

Date	Lecture/Lab Topic	Reading	Assignment
9/23 (Th)	Overview of the course	Ch 1 & 2	
9/27 (T)	Earth's lithosphere	Ch 3 & 4	
9/28 (W)	Lab 1: Smarts mountain stream pH		
9/29 (Th)	Earth's pedosphere (soils and weathering)	Ch 6	
10/5 (T)	Earth's hydrosphere	Ch 7, 10	QOTW
10/6 (W)	Lab 2: Elizabeth Mine acid drainage		
10/7 (Th)	Earth's biosphere; Quiz #1	TBD	Lab 1 due
10/12 (T)	Earth's atmosphere	Ch 9	QOTW
10/13 (W)	Lab 3: Balch Hill soil CO ₂		
10/14 (Th)	Earth's Climate	Ch 12, 13	Lab 2 due
10/19 (T)	Climate change and impacts, Quiz #2	IPCC	QOTW
10/20 (W)	Fieldtrip 1: Dartmouth power plant		
10/21 (Th)	Mitigation of climate change	IPCC	Lab 3 due
10/26 (T)	EXAM #1		

10/27 (W)	Lab 4: Hanover wastewater treatment plant		
10/28 (Th)	Water resources and pollution	220-257, 316-321	
11/2 (T)	Energy Resources and Use	Ch 11	QOTW
11/3 (W)	Fieldtrip 2: Hanover water reservoir		
11/4 (Th)	Focus: Oil in the Environment (Tom Baker)	TBD	Lab 4 due
11/9 (T)	Waste management/land management, Quiz #3	TBD	QOTW
11/10 (W)	Fieldtrip 3: Claremont incinerator		
11/11 (Th)	Air pollution	pp. 280-286	
11/16 (T)	Mineral resources and use	Ch 5 to p.138	QOTW
11/17 (W)	Fieldtrip 4: West Lebanon Stone Quarry		
11/18 (Th)	TBD		
11/23 (T)	EXAM #2		
11/24-11/28	THANKSGIVING BREAK		
11/30 (T)	Class proposal presentations		