EES 221 Environmental Geology Laboratory (1 cr.)

Instructor: Catherine A. Carlson, Ph.D. **Semester:** Spring 2009
Office: Rm. 261, Science Bldg **Phone:** (860)465-5218
Office hours: MF 12-1 pm, MWF 2-3 pm **Fax**: (860)465-5213
E-mail: Use Blackboard Mail (if not working: carlsonc@easternct.edu)

Course Description: Environmental geology is the application of geologic information to the entire spectrum of interactions between people and the physical environment. In this laboratory course we will explore geology's role in solving major environmental problems facing people and society while covering the basic principles of earth science.

Pre- or Co-requisite: EES 220.

Course Objective: We live in a complex world that is both heavily dependent on natural earth resources for our standard of living and threatened by environmental hazards, natural and anthropogenic. It is more important than ever before that every citizen be informed about the role of earth resources and hazard mitigation for maintaining our society. An informed citizen is well prepared to make decisions at the personal level (e.g., deciding where you will live), local level (e.g., voicing concerns about zoning regulations), national level (e.g., contacting Congressional leaders about the opening of public lands to mining), and global level (e.g., contacting Congressional and United Nations leaders regarding global warming and the global water crisis). Consequently, the objective of this course is to help you apply the basic concepts, principles, and tools of environmental geology to practical situations.

Liberal Arts Core Curriculum: This course fulfills the Tier II laboratory requirement for the Natural Sciences category. As such the course will help you to

- evaluate the quality of scientific data and its interpretation in published studies,
- acquire and synthesize data needed to apply science to the needs of society
- apply scientific methods and knowledge in making and evaluating decisions in human affairs,
- recognize the limitations of science in addressing certain societal problems
- apply ethical principles to practical problems of life and work,
- effectively communicate ideas orally, visually, and in writing,
- develop the ability to think critically, and
- effectively seek and employ information to achieve academic goals.

Course Format: This is an on-line course. Consequently, we will not meet in a traditional classroom. Instead, you will use the required texts and the Internet, and you will interact with the instructor and your classmates through Blackboard Vista.

The course consists of a sequence of 14 laboratories. The first lab will introduce you to principal environmental problem—increasing population. The remaining labs will cover specific topics in environmental geology, such as water resources, mineral resources, earthquake hazards, and coastal hazards. Each laboratory will consist of an assignment and a discussion posting of a current geologic issue/event (GeoNews). You will report your work using various modes of communication, including e-mail, discussion groups, and uploading assignments.

Laboratory Assignments: Worksheets are provided for most assignments. Download the worksheet and answer questions as you work through each lab. The worksheets are Microsoft Office Excel documents and must be completed in Microsoft Excel (or a compatible spreadsheet program). Note that Microsoft Office is available free to Eastern students through the Center for Instructional Technology. Answers to some worksheet questions require you to use the drawing tools in Excel. If you do not know how to draw lines and add text boxes, be sure to get assistance early in the semester. Save your completed worksheets using the format, your_last_name-worksheet_name.xls, and upload under Assignments. A few assignments will utilize online resources, such as EarthInquiry. All work in these cases will be done online. All the laboratories are learning experiences; consequently, you are not expected to know the answer to every question—if you did, you wouldn't need to take this course! IF YOU FIND A QUESTION THAT YOU DON'T KNOW HOW TO ANSWER AFTER SPENDING 10 MINUTES TRYING TO FIGURE IT OUT, ASK FOR HELP on the general discussion board or contact a classmate or the me via Mail. I also have office hours during which we could meet either online (e.g., chat), on the phone, or in my office.

GeoNews: Weekly discussion posting on a current geologic issue/event (GeoNews) will help you to apply what you are learning to current events. To receive credit for a GeoNews discussion posting, you must post each week by the laboratory assignment deadline. Include in your report a short introduction to the situation/event/issue, a short explanation of the geology involved, and the human impact. As you will be learning geology in this course, I will expect to see the explanations of the geology to improve each week. You may give updates on previously posted events/issues as long as your contribution is substantive. Provide your GeoNews in your own words—plagiarism will not be tolerated—and identify the source(s) you used. Include a descriptive subject line to clue us into your topic. Review your classmates' postings and add your comments as appropriate—for example, you may have personal experience with this particular event or issue, or a similar event or issue. Thoughtful additions may earn you extra credit. Revisit the postings often to see updates. If I ask you to add to or correct your posting, you must do so within a week to receive credit.

The course assumes concurrent or prior enrollment in EES 220 Environmental Geology. Consequently, it is assumed that all students are competent users of computers, computer software (e.g., Microsoft Excel), Blackboard Vista, e-mail, and the Internet. High-speed Internet access is required to access some course materials. Libraries often provide this service to the public on a limited basis. If you do not have access to high-speed Internet service, you should not take this course.

Responsibilities of On-line Learners: As an on-line learner, you will be responsible for determining the pace and schedule of your work. You may complete the readings and assignments at any times that are convenient to you as long as your work is submitted before the assignment deadline (Late work is not accepted without prior approval by the instructor and only for extreme situations).

Although you may be located many miles from Eastern Connecticut State University, you are expected to have frequent contact with your instructor and classmates via e-mail and the on-line discussion board. You may also use the on-line discussion board to ask questions, offer comments, and obtain advice/assistance from your instructor and classmates.

If you are coming into this course thinking that on-line study is an easy way to earn to science

laboratory credit, think again. On-line study requires more initiative and self-discipline than an on-campus course. Be prepared to spend a significant amount of time completing this course. When you take an on-campus laboratory course, you spend 3 hours in lab each week. In addition, you would spend a t least an equal amount of time outside of the traditional class time reading and completing assignments. An on-line course requires the same time commitment.

The key to success is self-motivation and perseverance. **Set work hours each day and stick to them—put them into your appointment book.** Learning at home requires much more dedication than learning on-campus, where you count on the instructor to keep you on track. This course allows you great flexibility as long as you meet the inflexible deadlines. The amount of time needed to complete a laboratory assignment will vary from lab to lab. In general, you will be given a week for each laboratory. Deadlines are posted on Blackboard Vista Calendar.

Required Texts/Materials:

Environmental Geology Laboratory (ISBN 0-471-47198-4)
EarthInquiry (ISBN: 1-4292-3098-3)
Mineral and Rock kits (available through ECSU bookstore)
Custom Course Packet (provided on loan from the EES department)
Ruler, calculator

The Custom Course Packet is provided on loan from the Environmental Earth Science (EES) Department and may be obtained from the EES departmental secretary. You may keep the Resource CD, but all other materials must be returned or you will receive an Incomplete for your semester grade.

Grading: I do not grade on a curve. Therefore, it is theoretically possible for the whole class to get an A or an F.

Lab assignments	85%
GeoNews	15%
Total	100%

A	90%	B-	77%	D+	64%
A-	87%	C+	74%	D	60%
B+	84%	C	70%	F	<60%
B	80%	C-	67%		

Academic Services Center (ACS): Students are encouraged to use the support offered by the **ACS** located on the ground floor of the Library. Tutoring, Math, Writing, and supplemental Advising Services are available for students in the Center at the following times: Sun. 2-9; M.-Th. 9-9, Fri. 9-5. (Closed Sat.) For further information call 465-4272 or check the ASC website at http://academicaffairs.easternct.edu/ASC-FAQs.html . These services are only available on ground.

Cheating and Plagiarism Policy: Refer to the ECSU Academic Integrity policy. Cheating and plagiarism are serious offenses, and **IGNORANCE OF WHAT CONSTITUTES CHEATING AND PLAGIARISM IS NOT AN ACCEPTABLE EXCUSE.** It may be tempting to copy and paste from the Internet, but doing so will not be tolerated.

Disability Notice: If you are a student with a disability and believe you will need accommodations for this class, it is your responsibility to contact the Office of AccessAbility Services at 465-0189. To avoid any delay in the receipt of accommodations, you should contact the Office of AccessAbility Services as soon as possible. Please understand that I cannot provide accommodations based upon disability until I have received an accommodation letter from the

Office of AccessAbility Services. Your cooperation is appreciated.

Course Topics: The laboratories are described below.

Laboratory (tentative due date)	Topic	Brief Description
1 (Feb. 2)	Population dynamics—the threat of exponential growth	We will explore the realities of exponential growth in global population and resource consumption.
2 (Feb. 9)	Maps—history, applications, and technology	We will investigate the importance of maps with examples such as John Snow's cholera map (1854 epidemic). We will explore geological applications of topographic maps and GPS.
3 (Feb. 17)	Streams and rivers—storm waters and floods	We will investigate the dynamics of stream flow and the erosion cycle. We will explore issues related to dams, floodplains, and urban development with examples from the Great Flood of 1993 and development in Cody, WY.
4 (Feb. 23)	Groundwater—a resource, but hazard	We will explore the dynamics of groundwater systems with attention to water-level maps and Darcy's Law. We will look into basement flooding and the Erin Brockovich case. We will also investigate the relationship between groundwater withdrawal and land subsidence.
5 (Mar. 2)	Weathering—soils and human geography	We will investigate physical and chemical weathering with an eye toward environmental problems such as acid mine drainage. We will explore soil development, soil fertility, and human geography with examples such as the soils of France's champagne country and settlement patterns in Fayette, Texas.
6 (Mar. 9)	Minerals (uses and consumption) & Selenium contamination	We will review mineral characteristics before investigating important mineral commodities. We will consider the economic, social, and environmental factors that contribute to mineral commodity availability. We also will explore selenium toxicity and important predictors of selenium contamination.
7 (Mar. 16)	Rocks—igneous, sedimentary, and metamorphic	We will explore the three rock types: igneous, sedimentary, and metamorphic. We will consider rock processes, rock textures and compositions, and environments of formation.

8 (Mar. 30)	Plate tectonics & Geologic maps	We will investigate the development of plate tectonic theory and the ways that rocks are folded and faulted. We will explore how to use geologic maps with examples from the Grand Canyon, south-central Texas, and the Southern Appalachian Mtns.
9 (Apr. 6)	Landscape geology—glacial and desert features	We will investigate glaciers and glacial landscapes. We also will investigate hazards and landscape features of deserts. Both environments are sensitive to global climate change, the topic of the next laboratory.
10 (Apr. 13)	Global climate change—what does the future hold?	We will investigate the complexities of climate change. We will explore the energy budget model and apply it to Mono Lake, CA. We will investigate the factors that influence climate change and why. We then will use our newly acquired knowledge to investigate potential future climate changes and their consequences.
11 (Apr. 20)	Slopes & Monitoring and mitigating volcanic hazards	We will investigate slope failure, both classification and causes. We will examine incidences of slope failure to better understand the factors that contribute to them. We will investigate different types of volcanism and the impact of volcanic eruptions on communities, ecosystems, and climate. We will evaluate data from field instruments to predict volcanic activity.
12 (Apr. 27)	Earthquakes—seismic gaps and risk analysis	We will investigate the principles of wave transmission, strain energy, seismic gaps, and risk analysis. We will use seismic data from a global network of states to interpret the distribution of earthquakes and make assessments of seismic hazards along an active fault zone.
13 (May 4)	Coastal hazards—hurricanes and rising sea levels	We will investigate significant threats to coastal areas—severe storms and rising sea level. We will explore beach vulnerability using data from Hurricanes Dennis and Lili.
14 (May 13)	Waste and water & Hazardous waste (out of sight, out of mind)	We will investigate the problem of water in waste management. We will explore home septic systems, municipal sewage systems, and sanitary landfills. We also will investigate disposal practices for hazardous waste. We will consider case studies, including Love Canal and Yucca Mountain.