

GEOL 0086 – Environmental Geology

Instructor: Dr. Carrie Davis Todd

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Office hours: Monday 3 – 4 pm; Tuesday 1 – 2 pm; Wednesday 9 – 10 am; or by appointment

Textbook: *Geology and the Environment, 5th Edition* by Pipkin, Trent, Hazlett, and Bierman

Introduction

As an introductory geoscience course, there are no pre-requisites and no assumption of an existing knowledge of geology, although you are expected to be able to perform basic mathematical calculations. This course presents environmental topics in geology that have an impact on humans, such as natural hazards (earthquakes, volcanoes, floods), resource extraction (mining, fossil fuels, groundwater pumping), and pollution (climate change, water quality).

Geographically, we are situated in a great place to study environmental geology, from slope stability issues on hillsides to water quality degradation to the rich mineral deposits under our feet. It is hoped that by the end of this course, you will be a more informed citizen with the ability to make educated decisions regarding your interaction with the environment and a deeper appreciation of the landscape around you.

Outcomes

By the end of this course, students will be able to:

- read and interpret topographic maps (identify landscape features and explain the processes responsible for these features, as well as the hazards they may present)
- explain how a knowledge of geology can help people solve environmental problems
- understand the concept of recurrence interval as it relates to natural hazards, such as flooding
- differentiate between natural and human-induced environmental disruptions
- recognize and analyze current global events related to course topics

Academic Integrity

Although there will be opportunities for group work in this course, all students are responsible for understanding the material and should indicate with whom they collaborated on any assignment. Group work does not mean that one person does all the work and everyone else puts their name on it...this is considered cheating. Students **should not:** claim other's ideas as their own, turn in other's work as their own, copy sources without proper citation (plagiarism), or allow others to take their work or ideas. If you have questions about academic honesty, see

the instructor or refer to the document “Academic Integrity at the University of Pittsburgh at Johnstown.” (<http://www.upj.pitt.edu/3386/>) Anyone found to be in violation of the UPJ standards for academic integrity will be dropped from the course.

Students with Disabilities

It is the responsibility of the student to discuss any classroom or exam accommodations with the instructor as soon as possible. Accommodations can be made for all aspects of the course (lectures, activities, exams); however, all requests must be verified with the UPJ Disability Services office prior to implementation.

Expectations and Rules

- It is your responsibility to be prepared for class. While every attempt will be made to follow the syllabus, changes may occur and will be announced in class. If you miss a class, it is your responsibility to obtain the information presented in class.
- Quizzes and exams start at the beginning of the class period. Be on time! No additional time will be given for late arrivals.
- Do not ask “Are we covering any important in class today?” All topics presented in this course are important! Environmental Geology is a subject with a great deal of relevance to our everyday lives. A little knowledge goes a long way and has the potential to save your life some day.
- Turn off all devices that ring, buzz, beep, play music, etc. Repeat offenders will be asked to leave the class.
- Bring a calculator and pen/pencil to every class. A cell phone does not count as a calculator!

Late Work

It is your responsibility to turn in any assignments by the deadline. Late work will be penalized 10% each day it is late. Work turned in more than one week past the deadline will result in an automatic zero on the assignment.

Exams

There will be three exams given (two during the semester and one during the final exam period). Your lowest exam score will be dropped. There will be **no make-up exams** under any circumstances.

Quizzes

There will be periodic quizzes during the course of the semester and the lowest quiz score will be dropped. The dates of these quizzes will only be announced in lecture. There will be **no make-up quizzes**.

Final Project

Toward the end of the semester, you will have the opportunity to examine one aspect of environmental geology in greater detail. This project will largely be researched and conducted outside of class time and will culminate in an oral presentation to the class during the last week of the semester. Additional details regarding the project will be provided later in the semester. You can work in pairs or individually on this final project. Absolutely no more than two people can work together. If you choose to work in a pair, keep in mind that you will be graded as a pair (e.g. you will both receive the same grade, regardless if the work was split evenly or one-sided), so pick your partner carefully.

Attendance and Participation

Attendance is showing up for class, while participation is showing interest in the class. It is possible to receive full credit for attendance and receive a zero for participation (sleeping through class, being disruptive, not paying attention, etc.).

Extra Credit

There will be opportunities for additional points throughout the semester, such as bonus questions on exams, optional field trips, and short reports on current events.

Grading

Homework/Activities	30%
Quizzes	10%
Exams	30% (15% each)
Final Project	20%
Attendance	5%
Participation	5%

Course Schedule

Day	Topic	Reading: pages (Chapter)
M Aug 25	Course introduction	pp. 1 – 8 (Chapter 1)
W Aug 27	The Scientific Method	8 – 9 (1)
F Aug 29	Maps and map scale	9 – 10 (1); handout
M Sept 1	NO CLASS – Labor Day	
W Sept 3	Earth Materials: Minerals	15 – 23 (2)
F Sept 5	Mineral identification	15 – 23 (2)
M Sept 8	Earth Materials: Rocks	23 – 29 (2)
W Sept 10	Rock Identification	23 – 29 (2)
F Sept 12	Plate Tectonics	45 – 63 (3)
M Sept 15	Plate Tectonics	45 – 63 (3)
W Sept 17	Earthquakes	70 – 84 (4)
F Sept 19	Earthquakes: Case studies and mitigation	84 – 100 (4)
M Sept 22	Volcanoes: Types of volcanoes	109 – 122 (5)
W Sept 24	Volcanoes: Prediction and mitigation	123 – 134 (5)
F Sept 26	Exam I	
M Sept 29	Weathering	148 – 155 (6)
W Oct 1	Soils	155 – 160 (6)
F Oct 3	Soil erosion and other problems	161 – 174 (6)
M Oct 6	Mass wasting	178 – 190 (7)
W Oct 8	Mass movements: Prevention and prediction	190 – 200 (7)
F Oct 10	Water resources: Hydrologic cycle, groundwater	213 – 224 (8)
M Oct 13	Water resources: Pollution and water quality	224 – 234 (8)
W Oct 15	Flooding, hydrographs, and prediction	246 – 261 (9)
F Oct 17	Humans vs. Floods	261 – 273 (9)
M Oct 20	The Johnstown Floods	Handout
W Oct 22	Tsunamis	281 – 286 (10)
F Oct 24	Hurricanes	293 – 299 (10)
M Oct 27	Exam II	
W Oct 29	Mineral resources: Location and formation	370 – 385 (13)
F Oct 31	Mineral resources: Mining	386 – 400 (13)
M Nov 3	Mineral resources: Local impacts of coal mining	Handout
W Nov 5	Energy: Fossil fuels	412 – 427 (14)
F Nov 7	Energy: Fossil fuels	412 – 427 (14)
M Nov 10	Problems and alternatives to fossil fuels	427 – 437 (14)

W Nov 12	Climate change	323 – 330 (11)
F Nov 14	Climate change	330 – 341 (11)
M Nov 17	Work day for final project	
W Nov 19	Landfills and municipal waste disposal	447 – 459 (15)
F Nov 21	Hazardous and nuclear waste disposal	459 – 470 (15)
M Nov 24	Work day for final project	
W Nov 26	NO CLASS – Thanksgiving Break	
F Nov 28	NO CLASS – Thanksgiving Break	
M Dec 1	Presentations	
W Dec 3	Presentations	
F Dec 5	Presentations	
? Dec x	Exam III	