



Engineering Geology
The University of Toledo
Department of Environmental Sciences
EEES-3250, (43488)

Instructor:	James Martin-Hayden	Term:	Fall 2015
Email:	James.Martin-Hayden@UToledo.edu	Class Location:	BO-1006
Office Hours:	M-Th, 11:30am-12:45pm	Class Day/Time:	TR 3:45-5:25pm
Office Location:	BO-3051A (in back of lab BO-3051)	Credit Hours:	3
Office Phone:	419-530-2634 (use email if no answer)		

COURSE/CATALOG DESCRIPTION

Application of geologic principles to engineering practices (dams, tunnels, drainage, foundations and water supply). Labs stress rock and mineral identification, quality control tests in engineering design and construction using rock.

COURSE OVERVIEW

This class introduces the application of geologic principles to engineering practices through a series of readings, laboratory exercises and practical problems. The first portion of the class covers the fundamentals of geology including: plate tectonics and the resulting distributions of geologic materials and phenomena; mineral, rock and soil characterization; geologic structures; and construction and use of geologic maps. The remainder of the course investigates specific geologic processes and applications to engineering practices.

STUDENT LEARNING OUTCOMES

Upon completing this course, the student will be able to:

1. Assess plate tectonic settings for geologic hazards and rock types expected,
2. Identify common rock-forming minerals as hand specimens and in rock samples,
3. Classify three types of rocks based on texture and composition,
4. Decipher geologic setting of sediment and rock formation,
5. Perform rock mechanic analyses including stress-strain relationships and rock mass classification,
6. Use strike/dip data to analyze and map dipping, folded, and faulted strata,
7. Deciphering geologic maps to determine geometry and orientation of beds, folds and faults.

Engineering Geology students must demonstrate the capacity to apply geological reasoning and scientific inquiry to geological problems (i.e., demonstrate scientific and quantitative reasoning.)

TEACHING STRATEGIES

Engineering Geology is presented face-to-face with time allotted for students to work on problems and ask questions. As an applied science geology is best learned with hands-on exercises. As such, laboratory exercises for the first portion of the class focus on identifying geologic materials and deciphering the processes that formed them. The labs in the last portion of the class focus on rock-mass classification, geologic map reading and hydrogeologic analysis.



PREREQUISITES AND COREQUISITES

Math 1750 or 1850

REQUIRED TEXTS AND ANCILLARY MATERIALS

Geology for Engineers and Environmental Scientists. A.E. Kehew, Prentice-Hall, 3rd ed. 2006.
ISBN 0131457306

GRADING

Two in-class exams are each worth 20% of the final grade and the final exam is worth 30%.
Labs/Homeworks will constitute 30% of your final grade.

Exams: The course will be presented in two units: 1) Earth materials and processes; 2) rock mechanics and earth structures and mapping. Each of these units will be followed by an exam. Because application of principles is cumulative, the final exam will be comprehensive.

Homework: Generally readings and laboratory/homeworks are assigned weekly and due the following week.

Midterm Grading: Lab/Homeworks completed by midterm and Exam 1 constitute the midterm grade.

Final Grading: Conventional letter+/- scale, i.e., A >95%, A- 90-94%, B+ 87-89%, B 84-86%, ..., F <60%

COURSE SCHEDULE

	Week	Unit 1: Earth Materials and Processes, Reading (Kehew),	Laboratory Exercise
8/24	1	Introduction to Geology	Ch. 1
8/31	2	Plate Tectonics	Ch. 2 Plate Tectonics
9/7	3	Minerals	Ch. 3 Mineral ID
9/14	4	Igneous Processes and Rocks	Ch. 4
9/21	5	Igneous Rocks	Igneous Rock ID
9/28	6	Sedimentary Processes	Ch. 5
10/5	7	Fall break (Mon. and Tues.), Sedimentary Rocks	Sedimentary Rock ID
10/12	8	Exam 1 on Unit 1, Thurs., Oct. 15 th Earth Materials and Processes	
10/19	9	Metamorphic Processes	Ch. 6
10/26	10	Metamorphic Rocks	Metamorphic Rock ID
11/2	11	Rock Mechanics	Ch. 7 Rock Mechanics Prob.
11/9	12	Rock Mass Classification	
11/16	13	Exam 2 Thurs., Nov. 19 th Rock Mechanics and Rock Mass Classification	
11/23	14	Geologic Structures	Ch. 8 Geologic Map Reading
11/30	15	Geologic Maps	
12/7	16	Tie up and review	
12/14	Finals Week, Final Exam: Mon., December 14 th , 2:45-4:45pm		

TECHNOLOGY REQUIREMENTS

Engineering Geology requires access to a personal computer to complete assignments. The software used includes Microsoft Excel or any suitable spreadsheet program that allows the analysis and graphing of tabulated data. Access to Blackboard is required to obtain homework assignments, lecture outlines, data set and maps.



UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the basis of Disability (ADA.) The University is an equal opportunity educational institution. Please read [The University's Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance](#).

Academic Accommodations

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the [Student Disability Services Office](#).