

Meetings: GLY 457: TR, 9:30-10:45am (lecture/discussion), Science (S) 165
GLY: 480L: R, 1:00-3:00pm (lab), S165/S170

Text: Course pack, available at www.uiversityreaders.com
Includes parts of three texts:

- 1) *Principles of Engineering Geology*, 1988, by Robert B. Johnson & Jerome V. DeGraff, published by John Wiley & Sons;
- 2) *Engineering Geology; An Environmental Approach*, 1996, 2nd ed., by Perry Rahn, published by Prentice-Hall;
- 3) *Engineering Geology*, 2007, 2nd ed., by F.G. Bell, published by Butterworth-Heinemann (imprint of Elsevier).

Instructor: Bill Niemann, Ph.D., P.G., E.I.T.
Office: 171 Science Building
Office Hours for GLY 457 Students:

- MW: 9:00-11:00am,
- TR: 11:00am-12:00pm
- By chance or by appointment

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Course Description

Engineering geology is the oldest branch of geology. It can be defined as the application of geologic information to the design of engineered structures. This course will provide basic technical background knowledge for typical engineering geology applications in addition to practice in the art of communication of geologic information for engineering purposes.

Relationship of Course to Departmental Goals

This course addresses the major goals of the geology department at Marshall University: getting students to:

- think logically, critically and creatively,
- communicate ideas clearly and effectively in speaking and writing, and
- recognize, analyze, and solve problems utilizing the most appropriate research methods available.

Foundational Knowledge

Foundational knowledge provides a starting vocabulary and base-level understanding of concepts and phenomena in the study of engineering geology. Foundational knowledge students should already have before beginning this course (prerequisites):

1. Basic understanding of plate tectonics, minerals, rocks, surface processes and earth history. (Successful completion of an introductory geology survey course--GLY 110 or 200 or equivalent--should suffice). If you need to review, consult the instructor for appropriate resources.

2. Basic understanding of topographic maps and ability to recognize properties of and identify basic rocks, minerals and fossils. (Successful completion or current enrollment in, an introductory earth materials lab--GLY 210L or equivalent--should suffice). If you need to review, consult the instructor for appropriate resources.
3. Math skills commensurate with completion of course(s) in college algebra and trigonometry.
4. Writing skills appropriate for college sophomores. For special help, go to <http://www.marshall.edu/cos/studentresources.asp> and click on *Writing Center*.

Foundational knowledge you are not expected to have before beginning this course:

1. Understanding of advanced concepts and terminology from upper-level geology classes in geomorphology, stratigraphy, structural geology and mineralogy/petrology.

Course Learning Objectives

1. Articulate the typical role and duties of an engineering geologist. Demonstrate an appreciation for the type of interaction required with engineers who use geologic information in the design of engineered structures.
2. Become familiar with geologic characteristics of rock and soil that influence engineering properties. Describe and identify relevant characteristics from grain-size to field scale.
3. Describe how weathering processes influence the engineering behavior of rock and soil including development and/or weakening of discontinuities. Use this knowledge to predict the types of engineering issues that might exist in areas characterized by given geologic materials or history.
4. Demonstrate a familiarity with basic mechanics as they apply to intact rock, rock masses and soils. Be able to solve quantitative problems involving stress and strain of rock and soil and make qualified judgments in the application of this information.
5. Demonstrate a familiarity with evaluation of slope stability in both natural and engineered slopes underlain by soil and rock.
6. Describe how subsurface water influences the engineering behavior of rock and soil.
7. Demonstrate how geologic materials are placed in engineered structures as fill, support, ballast, etc.
8. *Application* of all of the above to specific problems, sites, or scenarios through assignments given in this course.

Assessment of Learning

The following measures will be used to assess student attainment of the learning objectives listed above:

- Exams (quantitative problem solving, written answers, fill-in-the blank, lists, etc.),
- Lab exercises and reports,
- Oral presentation,
- Attendance,
- Homework assignments and/or quizzes (written and problem-based).

These methods are consistent with what students will likely be required to do in the future (grad school, professional life) with knowledge and skills gained from this course.

Grading

- Grade components—GLY 457

Lab exercises/reports	30%
Exams (3)	40%
Homework/Quizzes	25%
Attendance.....	5%

Total.....	100%

- Grade components—GLY 480L

Lab exercises/reports	100%
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- Grading scale

A = 90-100% of total points			
B = 80-89%	“	“	“
C = 70-79%	“	“	“
D = 60-69%	“	“	“
F < 60%	“	“	“

Academic Dishonesty

Neither Marshall University nor this instructor tolerates academic dishonesty including cheating, falsification, plagiarism, bribes, favors and complicity. Students who choose to violate MU's policies on academic dishonesty risk dismissal from the University. Pages 106-109 of the 2010-2011 MU Undergraduate Catalog address the definitions and procedures specified in cases where academic dishonesty is in question.

Policy Statement on Examinations and Assignments including Submittal of Late Work

- **Major Dates:** The attached schedule includes the dates for the three written examinations. In all likelihood these dates will not be changed and participation in these activities is required to receive a passing grade in the course. Missed exams and presentations may be made up only if the student gives notice and valid reason for his/her absence within 24 hours.
- **Lab exercises/reports and all homework assignments** are due at the beginning of the class or lab period on the due date. Late submittals will be penalized 10% the first day and an additional 10% per day (weekdays) for subsequent late days, with a maximum penalty of 50%.
- **Credit for in-class activities,** including quizzes, will not be given for unexcused absences (see attendance policy below).

Attendance

Attendance is 5% of the course grade and no credit will be given to students for days they are absent from class without a valid reason. In addition, quizzes and homework are 25% of the course grade; students will receive zeroes for any quizzes and will incur late penalties (see above) for homework due if they miss class without a valid excuse. Arriving late or leaving class early may reduce or void credit for that day. For students registered for lab, attendance at all lab meetings is mandatory; in general, lab activities cannot be made up.

In the case of an excused absence (see attendance policy below), a “no grade” (i.e., no credit or penalty) will be assigned for a missed quiz or lab, or, at the discretion of the instructor, the quiz or lab may be made up by a date mutually agreed upon by the student and instructor. Failure by the student to complete the material by the assigned date will result in a zero for the assignment in question. Homework assignments not submitted as a result of an excused absence must be handed in at the next class meeting.

- ***Excused absences*** are those necessitated for significant medical or legal reasons, military obligation, jury duty, religious holidays, and university activities excused by the academic deans (see pages 79-81 of the 2010-2011 MU Undergraduate Catalog), or other valid reasons to be determined by the instructor in consultation with the student. The student must consult with the instructor at the first opportunity following the missed class session to determine if the absence is excusable and to see what work should be made up.
- ***Unexcused absences*** are those caused by oversleeping or other invalid reasons as determined by the instructor in consultation with the student. The student must consult with the instructor at the first opportunity following the missed class session to determine what work should be made up.

Learning Disabled Students

Students who require an alternative learning environment (e.g., additional time for exams), and can document such need, will be accommodated. Such students should inform the instructor of their needs no later than the first week of the semester so that arrangements can be made in advance.

Technology Requirements

Students can access the instructor's web page at <http://www.science.marshall.edu/niemann/>. Important class information may also be communicated to students via their MU e-mail (i.e., userid@marshall.edu) accounts. Students should check their MU e-mail regularly for any class related messages. Basic-function calculators should be brought to class regularly and to all exams.

Electronic Devices

Use of cell phones, PDA's, CD/MP3 players, etc. in class is strictly prohibited. During class such devices must be kept out of sight in a pocket, backpack, etc. *Cell phones must be set to silent mode. With the exception of basic-function calculators, use of any electronic devices during an exam will be considered evidence of cheating.* Cell phones may not be used as calculators on exams.

**GLY 457 / 480L: ENGINEERING GEOLOGY
FALL 2010 SCHEDULE, WEEKS 1-8**

Week	Day	Dates	Topic	Assignments	Lab / Location
1	T	24-Aug	Introduction		
	R	26-Aug	Introduction	CP: 1-24	No meeting
2	T	31-Aug	Stress -- Intro	CP: 57-69 Practice Quiz	
	R	2-Sep	Stress -- Intro	CP: 87-91 Quiz	Intro -- Field Trip
3	T	7-Sep	No meeting		
	R	9-Sep	Stress -- Mohrs Circles	CP: 69-84 HW#1 Assigned	UCS -- MU Eng. Lab
4	T	14-Sep	Stress -- Mohrs Circles	CP: 91-100	
	R	16-Sep	Strain	CP: 57-62, 143-154	Triaxial Test--Triad Eng.
5	T	21-Sep	Engineering Props of Rocks	CP: 107-134 HW#1 Due	
	R	23-Sep	Weathering	CP: 25-33, 180-183	Digital Photogrammetry (Field Trip)
6	T	28-Sep	Soil / Bedrock Contacts	CP: 33-53 Practice Quiz	
	R	30-Sep	Catch up	Quiz	Slake Durability -- MU Eng. Lab
7	T	5-Oct	Review		
	R	7-Oct	EXAM 1		No meeting
8	T	12-Oct	Rock Masses -- Intro	CP: 165-180	
	R	14-Oct	Rock Masses -- Rock Quality	CP: 56, 190-192	Rock Masses: Discontinuities