GLY 457/557 ENGINEERING GEOLOGY FALL 2012

Meetings: GLY 457/557: TR, 9:30-10:45am (lecture/discussion), Science (S) 165
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:

- M: 9:00-11:00am, 2:00-4:00pm
- T: 4:30-5:30pm
- W: 2:00-4:00pm
- 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 *Witing Center.*

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

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

Course Learning Outcomes

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:

- Lab exercises and reports,
- Quizzes,
- Oral presentation (group),
- Homework related to assigned readings.

Grading

- Grade components

  Lab exercises/reports ……... 50%
  Quizzes …….. 30%
  Homework …….. 15%
  Presentation…….. 5%

  Total……..100%

- Grading scale

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

- Categorical Grading—a shorthand grading system will be used for some assignments in this class. The criteria are as follows:

Grade → / Criterion ↓	√ - - (50%)	√ - (75%)	√ (90%)	√ + (105%)
Timeliness	Submitted significantly after due date/time	Submitted after due date/time	Submitted by due date/time	Submitted by due date/time
Completeness	Repeated missing answers/elements	Missing answers/elements	Complete answers/elements	Work product beyond assignment
Neatness	Illegible and/or sloppy	Difficult to read	Easy to Read	Easy to Read
Care	Obvious lack of care	Lack of care	Obvious care	Extraordinary care
Achievement	Multiple missing / incorrect answers	Incorrect answers	Reasonable answers	Correct and thorough answers
Evidence of Learning	No evidence	Lack of evidence	All objectives met	Exceeds objectives

Policy Statement on Examinations and Assignments including Submittal of Late Work

- Lab exercises/reports are due at the beginning of the class or lab period on the due date; after the beginning of the period work is considered late. 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%. Exceptions will be made in the case of excused absences (see attendance policy below).

- Credit for in-class activities, including quizzes, will not be given for unexcused absences (see attendance policy below).

Attendance

- *Excused absences* are limited to those excused by the Dean of Students see pages 81-83 of the 2011-2012 MU Undergraduate Catalog.

University Policies

By enrolling in this course, you agree to the University Policies listed below. The full text of each policy can be viewed by going to www.marshall.edu/academic-affairs and clicking on "Marshall University Policies." Or, you can access the policies directly by going to http://www.marshall.edu/academic-affairs/?page_id=802

Academic Dishonesty/ Excused Absence Policy for Undergraduates/ Computing Services Acceptable Use/ Inclement Weather/ Dead Week/ Students with Disabilities/ Academic Forgiveness/ Academic Probation and Suspension/ Academic Rights and Responsibilities of Students/ Affirmative Action/ Sexual Harassment

GLY 457/557: ENGINEERING GEOLOGY
FALL 2012 SCHEDULE, WEEKS 1-8

Week	Day	Dates	Topic	Assignments	Lab / Location
1	T	28-Aug	Introduction		
	R	30-Aug	Introduction	CP: 1-23	Intro -- Field Trip
2	T	4-Sep	Stress -- Intro	CP: 55-69 Practice Quiz	
	R	6-Sep	Stress -- Intro	CP: 69-75 **Quiz**	Rock: Compression Tests --Triad Eng.
3	T	11-Sep	Stress – Mohrs Circles	CP: 75-85	
	R	13-Sep	Stress – Mohrs Circles	CP: 87-105	Rock Masses I: Discontinuities
4	T	18-Sep	Rock Masses – Intro	CP: 165-190 Practice Quiz	
	R	20-Sep	Rock Masses – Rock Quality	CP: 56, 190-192, **Quiz**	Rock Masses II: RQD
5	T	25-Sep	RQD	CP: 195-210	
	R	27-Sep	No meeting		**Sept: 28-30: Weekend Field Trip**
6	T	2-Oct	Engineering Props of Rocks	Practice Quiz CP: 135-154	
	R	4-Oct	Strain	CP: 57-62, 143-154 **Quiz**	Digital Photogrammetry (Field Trip?)
7	T	9-Oct	Weathering	CP: 25-31, 155-156, 162-163	
	R	11-Oct	Soil / Bedrock Contacts	CP: 33-53	Rock: Slake Durability – MU Eng. Lab
8	T	16-Oct	Rock Scour	Handout	
	R	18-Oct	Rock Scour	Handout **Quiz**	Rock Scour (Field Trip)

GLY 457/557: ENGINEERING GEOLOGY
FALL 2012 SCHEDULE, WEEKS 9-15

Week	Day	Dates	Topic	Assignments	Lab / Location
9	T	23-Oct	Catch up		
	R	25-Oct	Soil: Volume & weight	CP: 237-250	Soils: Atterberg Limits S170
10	T	30-Oct	Soil: description & classification	251-258 **Quiz**	
	R	1-Nov	Soil description & classification	CP: 218-228	Soils: Compaction Test S170
11	T	6-Nov	Soil: mechanics	CP: 211-227	
	R	8-Nov	Soil: mechanics	CP: 229-236	Groundwater: Beech Fork Dam (field trip)
12	T	13-Nov	Subsurface water: significance	CP: 293-296	
	R	15-Nov	Subsurface water: principles	CP: 287-291, 297-303 **Quiz**	G. Water: Permeameter Test S170
19-Nov 23-Nov			**Thanksgiving Break**		
13	T	27-Nov	Subsurface water: pressure & flow	CP: 304-307	
	R	29-Nov	Subsurface water: control	CP: 309-320	Dead Week: No lab
14	T	4-Dec	Group meetings		
	R	6-Dec	Catch up	**Quiz**	
15	T	11-Dec	**Group Presentations**		
FINALS	**R 13-Dec through T 18-Dec**				