

**Meetings:** TR: 9:30-10:45am (lecture/discussion), Science (S) 165/167

R: 1:00-2:50pm (lab), S165/S166/S170/field trips

**Text:** *Geological Engineering* (1<sup>st</sup> ed.) by Luis de Vallejo Gonzalez & Michael de Freitas  
CRC Press (2011)  
ISBN-13: 978-0415413527  
ISBN-10: 0415413524

**Instructor:** Bill Niemann, Ph.D., P.G., E.I.

Office: 171 Science Building

Office Hours for Students:

- M: 2:00-4:00pm
- TR: 11:00-11:30pm (after class)
- TR: 4:30-4:50am
- F: 9:30-11:30am
- By chance (open door policy)
- By appointment
- Not a good time: before class

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E-mail: [niemann@marshall.edu](mailto:niemann@marshall.edu)

Blackboard through MUOnline

### **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 and solutions. 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.

**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 minerals, rocks, and surface processes. (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 and minerals. (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 1) MTH 132 (Precalculus), or 2) MTH 122 (Trigonometry) and 127/130 (College Algebra).
4. Writing skills appropriate for college sophomores. For special help, go to <http://www.marshall.edu/cos/studentresources.asp> and click on *Writing Center*.

**Course Learning Outcomes\***

<b>Category</b>	<b>Practice</b>	<b>Assessment</b>
Part I: Fundamentals	In-class exercises and concept checks, lab activities	Homework, quizzes, exams, lab assignments
Part II: Methods		
Part III: Applications		
Part IV: Geologic Hazards		

\*Detailed learning outcomes for each category and sub-category will be provided separately via Blackboard.

## **Assessment of Learning**

### ➤ **Grading scale**

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

### ➤ **Grade components**

Lab exercises (~15) = 25%  
Exams (3) = 50% (15% + 15% + 20%)  
Quizzes (~4) = 10%  
Homework (~8-10) = 15%

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**Total = 100%**

Extra Credit  
Attendance = -2% to +2%  
(29 lectures, 15 labs)

No. of Unexcused Absences*	Extra Credit (%)
0	+2
1	+1.5
2	0
3	-1.5
4	-2
4+	-3

Unexcused from lecture counts as 1 absence  
Unexcused from lab counts as 2 absences  
\*See attendance policy below

### **Assessment of Learning (cont.)**

- **Grading of Labs and Homework.** Selected labs and homework may be scored by use of a  $\checkmark+$ ,  $\checkmark$ , or  $\checkmark-$ , indicating above satisfactory (125%), satisfactory (100%) and less than satisfactory (75%), respectively. Significantly incomplete or sloppy work will receive a grade of  $\checkmark--$  (50%). A detailed matrix describing this grading method is shown below.

<b>Grade →</b>	$\checkmark--$ (50%)	$\checkmark-$ (75%)	$\checkmark$ (100%)	$\checkmark+$ (125%)
<b>Criterion ↓</b>				
<b>Timeliness</b>	Submitted 48 hours or more after due date/time	Submitted late but within 24 hours of due date/time	Submitted by due date/time	Submitted by due date/time
<b>Completeness</b>	Repeated missing answers/elements (includes not showing supporting calculations for numerical answers)	Missing answers/elements (includes not showing supporting calculations for numerical answers)	Complete answers/elements	Work product beyond assignment
<b>Neatness</b>	Illegible and/or sloppy	Difficult to read	Easy to Read	Easy to Read
<b>Care</b>	Obvious lack of care	Lack of care	Obvious care	Extraordinary care
<b>Achievement</b>	Multiple missing / incorrect answers	Incorrect answers	Reasonable answers	Correct and thorough answers
<b>Evidence of Learning</b>	No evidence	Lack of evidence	All objectives met	Exceeds objectives

- **Late Lab Assignments.** Lab exercises are due at the beginning of the subsequent week's lab period unless otherwise stated by the instructor. For lab assignments receiving a numerical grade, late submittals will be penalized an automatic 15%, and an additional 5% per subsequent calendar day (weekdays), with a maximum late penalty of 50%. Failure to submit a lab assignment within 7 days of the original due date means a grade of zero for that assignment. If submittal of a lab assignment is delayed for reasons relating to an excused absence, the adjusted due date then becomes the beginning of the next class or lab period.
- **Late Homework.** Late submittal of homework or other take-home assignments (including Blackboard assignments) will be penalized an automatic 15%, and an additional 5% per subsequent calendar day (weekdays). Failure to submit an assignment within 1 week of the original due date will result in a grade of zero for that assignment. If submittal of an assignment is delayed for reasons relating to an excused absence, the adjusted due date then becomes the beginning of the next class period.
- **A zero grade will be assigned for in-class quizzes or exam if an absence is unexcused.** In the case of an excused absence, a "no grade" (i.e., no credit or penalty) will be assigned or the quiz may be made up by a date mutually agreed upon by the student and instructor.

### **\*Attendance Policy**

A daily record of attendance will be kept by circulating a sign-in list at the beginning of each class. *It is the responsibility of each student to sign the list, and if late to sign the list or notify the instructor at the end of the lecture.* Failure to do so may result in an unexcused absence for that lecture. Arriving late or leaving lecture early may reduce or void credit for attendance for that day.

**The only absences considered excused for this class or those approved by the Dean of Student Affairs.** These include “University Excused Absences” such as serious medical or legal reasons, military obligation, or university activities excused by the academic deans. See Marshall’s policy on “excused Absences” at [www.marshall.edu/academic-affairs/policies/](http://www.marshall.edu/academic-affairs/policies/). **Note that a student who is briefly ill or injured for three or less consecutive hours of class is not excused from attending this class. *Notice of an excused absence must be received by the instructor directly from the office of the Dean of Student Affairs.*** Student Affairs is located on the second floor of the Memorial Student Center (2W38), 304-696-6423. Requests for excused absences can be submitted remotely using the form available at <http://www.marshall.edu/student-affairs/excused-absence-form/>

In the case of an excused absence, any material missed can be completed, without penalty, by a later date assigned by the instructor. Failure by the student to complete the material by the assigned date will result in a zero for the assignment in question. The instructor may instead opt to assign a “no-grade,” without penalty to the student, for missed material as a result of the absence.

There will be no makeup exams without an official excused absence from the Dean of Student Affairs.

Note that extreme weather could result in closure of the university and cancellation of class or a delay in the start of class. Marshall’s “clock” starts at 8 am. A two-hour delay means that TR classes starting at 9:30 would instead begin at 10:00 am and continue to 10:45am. (If the weather looks bad, check your e-mail and listen for announcements on local radio and TV. See Marshall’s policy on “Inclement Weather” at [www.marshall.edu/academic-affairs/policies/](http://www.marshall.edu/academic-affairs/policies/).)

### **Weekend Field Trip**

- This 3-day trip exposes students to field areas, concepts, skills and group work that cannot be duplicated elsewhere. Therefore, this trip is mandatory for all students in the class. In fairness to all students who do attend the trip, those who fail to participate will receive an incomplete grade for the course.

### **University-wide policies**

- Additional university policies relating to academic dishonesty, etc. also apply to this class and can be viewed at <http://www.marshall.edu/academic-affairs/policies/>

**GLY 457: Engineering Geology -- Schedule -- Fall 2018**

<b>Week</b>	<b>Date</b>	<b>Day</b>	<b>Format</b>	<b>Topic</b>	<b>Reading</b>	<b>Assignment</b>
1	21-Aug	T	Lec	Introduction	Chapter 1	
	23-Aug	R	Lec	Introduction	Chapter 1	
	23-Aug	R	Lab	Lab: Introductory Field Trip	Handout	
2	28-Aug	T	Lec	Rock Mechanics	Chapter 3	
	30-Aug	R	Lec	Rock Mechanics	Chapter 3	
	30-Aug	R	Lab	Lab: Engineering Properties of Intact Rock	Handout	
	31-Aug	F				Homework 1 due @ 11:59pm
3	4-Sep	T	Lec	Rock Mechanics	Chapter 3	
	6-Sep	R	Lec	Rock Masses	Chapter 3	
	6-Sep	R	Lab	Lab: Unconfined Compression Tests (@Triad Eng. )	Handout	
4	11-Sep	T	Lec	Rock Masses	Chapter 3 / 6?	
	13-Sep	R	Lec	Rock Masses / <b>Quiz 1</b>	Chapter 2	
	13-Sep	R	Lab	Lab: Slake Durability Test (MU Engineering Lab building)	Handout	
	14-Sep	F				Homework 2 due @ 11:59pm

**GLY 457: Engineering Geology -- Schedule -- Fall 2018 (cont.)**

<u>Week</u>	<u>Date</u>	<u>Day</u>	<u>Format</u>	<u>Topic</u>	<u>Reading</u>	<u>Assignment</u>
5	18-Sep	T	Lec	In-class Lab: Measuring Friction Angles	Handout	
	20-Sep	R	Lec	<b>EXAM 1</b>	Chapters 1, 3, 6	
	20-Sep	R	Lab	Lab: Rock Masses II: Rock Quality Designation (RQD)	Handout	
6	25-Sep	T	Lec	Field Trip Preview	Handout	
	27-Sep	R	Lec	No Class?		
	27-30 Sep	R - SUN	Lab	Lab: Weekend Field Trip: Rock masses, slope stability, dams, sinkholes, etc.		
7	2-Oct	T	Lec	Soil Mechanics	Chapter 2	
	4-Oct	R	Lec	Soil Mechanics	Chapter 2	
	4-Oct	R	Lab	Lab: Rock Masses I: Discontinuities (field trip data)	Handout	
8	9-Oct	T	Lec	Soil Mechanics	Chapter 2	
	11-Oct	R	Lec	Soil Mechanics	Chapter 2	
	11-Oct	R	Lab	Lab: Soils: Particle-size analysis	Handout	
	12-Oct	F				Homework 3 due @ 11:59pm

**GLY 457: Engineering Geology -- Schedule -- Fall 2018 (Cont.)**

<u>Week</u>	<u>Date</u>	<u>Day</u>	<u>Format</u>	<u>Topic</u>	<u>Reading</u>	<u>Assignment</u>
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9	16-Oct	T	Lec	Site Investigations	Chapter 5	
	18-Oct	R	Lec	Engineering Geologic Mapping	Chapter 7	
	18-Oct	R	Lab	Lab: Soils: Atterberg Limits	Handout	

10	23-Oct	T	Lec	Slopes	Chapter 9	
	25-Oct	R	Lec	Slopes / <b>Quiz 2</b>	Chapter 9	
	25-Oct	R	Lab	Slopes: CRSP (field trip data)	Handout	
	26-Oct	F				Homework 4 due @ 11:59pm

11	30-Oct	T	Lec	Dams & Reservoirs	Chapter 11	
	1-Nov	R	Lec	<b>EXAM 2</b>	Chapters 2, 5, 7	
	1-Nov	R	Lab	Lab: Beech Fork Reservoir -- Field Trip?	Handout	

12	6-Nov	T	Lec	Dams / Slopes	Chapter 11	
	8-Nov	R	Lec	Bridges	Handout	
	8-Nov	R	Lab	Lab: Bridges: Rock scour	Handout	



**GLY 457: Engineering Geology -- Schedule -- Fall 2018 (Cont.)**

<u>Week</u>	<u>Date</u>	<u>Day</u>	<u>Format</u>	<u>Topic</u>	<u>Reading</u>	<u>Assignment</u>
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13	13-Nov	T	Lec	Tunnels	Chapter 10	
	15-Nov	R	Lec	Pipelines	Handout	
	15-Nov	R	Lab	Lab: Engineering Geologic Mapping	Handout	
	16-Nov	F				Homework 5 due @ 11:59pm

	20-Nov	T				
	22-Nov	R				
	22-Nov	R				

14	27-Nov	T	Lec	Foundations	Chapter 8	
	29-Nov	R	Lec	Foundations	Chapters 8	
	29-Nov	R	Lab	Lab: Foundations: Soil Compaction Test	Handout	

15	4-Dec	T	Lec	Geohazards	Chapter 13	Homework 6 due @ 11:59pm
	6-Dec	R	Lec	Geohazards	Chapters 14	
	6-Dec	R	Lab	Dead Week -- No lab		

**FINALS**

FINAL EXAM: 8-10am, TUESDAY, 11 DECEMBER 2018