

## **GEOL 456 Engineering Geology Syllabus**

### **Instructor**

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### **Office hours**

Upon appointment.

**The best way to contact me** is by email ([wzhu@geol.umd.edu](mailto:wzhu@geol.umd.edu)). I will response ASAP.

### **Lectures**

PLS 1111  
Tuesday, 2:00 – 3:15 PM  
Thursday, 2:00 – 3:15 PM

### **Class Description and Outline**

An overview of engineering geology with an emphasis on physical understanding of natural hazards and natural resources. General theories of stress and strain, failure criteria, frictional stability, fluid flow in porous media and poroelasticity are introduced. Quantitative approaches on earthquakes, landslides, land subsidence, and geotechnical aspects of oil/gas exploration are discussed.

### **Text book**

Textbook: Engineering Geology, Perry H. Rahn  
Prerequisites: MATH 141, PHY 141, GEOL 100 or GEOL120 or permission of instructor

### **Expectation of students**

Prerequisites: MATH 141, PHY 141, GEOL 100 or GEOL120 or permission of instructor.  
For physics, math, engineering students who do not have any geological background, special permission can be granted on individual basis.

### **Academic integrity**

The University of Maryland, College Park has a nationally recognized Code of Academic Integrity, administered by the Student Honor Council. This Code sets standards for academic integrity at Maryland for all undergraduate and graduate students. As a student you are responsible for upholding these standards for this course. It is very important for you to be aware of the consequences of cheating, fabrication, facilitation, and plagiarism.

For more information on the Code of Academic Integrity or the Student Honor Council, please visit <http://www.shc.umd.edu>.

To further exhibit your commitment to academic integrity, remember to sign the Honor Pledge on all examinations and assignments: "*I pledge on my honor that I have not given or received any unauthorized assistance on this examination (assignment).*"

## **Reading Assignments**

Readings from the textbook or scientific journals will be assigned after each class. Students are expected to follow the assignments to familiarize the material to ensure better class discussions.

## **Attendance**

Participation in class sessions is essential for satisfactory completion of the course. Posted web notes are intended as a synopsis of lecture material only. If you miss a lecture you are advised to get full notes from a colleague. Only students with written, excused absences are entitled to a make-up exam, and that should be at a time convenient for the instructor and student. University Policy provides several cases for which student absence is excused ([www.testudo.umd.edu/soc/atedasse.html](http://www.testudo.umd.edu/soc/atedasse.html)). Note that the student must request to be excused in writing and supply appropriate documentation.

If the campus is closed for any reason during a scheduled lecture, the material of that day will either be incorporated with future lectures or left as reading in the textbook. If the campus is closed for any reason during the midterm exam, it will be rescheduled to a future lecture time.

## **Special Needs**

I will make every possible effort to accommodate your request for special accommodations, when justified. However, any requests must be submitted as soon as possible but no later than the end of the schedule adjustment period. *Do not wait!*

## **Students with Disabilities**

If you have a documented disability, you should contact Disability Support Services 0126 Shoemaker Hall. Each semester students with documented disabilities should apply to DSS for accommodation request forms, which you can provide to your professors as proof of your eligibility for accommodations. The rules for eligibility and the types of accommodations a student may request can be reviewed on the DSS web site.

## **Religious Observances**

The University System of Maryland policy provides that students should not be penalized because of observances of their religious beliefs, students shall be given an opportunity, whenever feasible, to make up within a reasonable time any academic assignment that is missed due to individual participation in religious observances. *It is the responsibility of the student to inform the instructor of any intended absences for religious observances in advance.*

## Grading

Homework assignments will be given out approximately every 2 weeks. Students will make a class presentation in lieu of a midterm exam---each student will present and lead discussion on an assigned topic. There will be a final research project in lieu of a final exam. Grades will be based 50% on the homework, 20% on the midterm and 30% on the final.

## Website

A website for the class is available through the University ELMS/blackboard system.

Follow the link to <https://elms.umd.edu/>, enter your directory ID and password.

If you are registered, you should be able to see GEOL 489Z/789Z in your list of classes.

## Course Evaluation

CourseEvalUM will be open for students to complete their evaluations for Fall 2009 courses between Tuesday, December 1, and Sunday, December 13. Students can go directly to the "<http://www.courseevalum.umd.edu/>" website to complete their evaluations, beginning December 1. You will be alerted about these dates and provided more information closer to that time, and students will be alerted via their official university e-mail account.

Students who complete evaluations for all of their courses in the previous semester (excluding summer), can access the posted results via Testudo's CourseEvalUM. Reporting link for any course on campus that has at least a 70% response rate. You can find more information, including periodic updates, at the "[https://www.irpa.umd.edu/Assessment/CourseEval/fac\\_faq.shtml](https://www.irpa.umd.edu/Assessment/CourseEval/fac_faq.shtml)" course evaluation website.

The expectation is that all students will complete these. This is YOUR chance to anonymously evaluate this class: please use this opportunity!

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## Schedule

*Note:* this schedule is subject to change. Depending on how each lecture goes, and on possible University closing, updates will be posted in the website.

### Date    Lectures

|          |                                                 |
|----------|-------------------------------------------------|
| 9/1/09   | 1. Overview                                     |
| 9/3/09   | 2. Stress            (Homework #1)              |
| 9/8/09   | 3. Principal Stress                             |
| 9/10/09  | 4. Mohr's Circle                                |
| 9/15/09  | 5. Strain                                       |
| 9/17/09  | 6. Elastic Modulus    (Homework #2)             |
| 9/22/09  | 7. Tensile Strength                             |
| 9/24/09  | 8. Compressive Strength                         |
| 9/29/09  | 9. Shear Strength                               |
| 10/1/09  | 10. Triaxial Tests    (Homework #3)             |
| 10/7/09  | 11. Mechanics of Faulting                       |
| 10/8/09  | 12. Pore Fluid                                  |
| 10/13/09 | 13. "Beer Can" Experiment                       |
| 10/15/09 | 14. Rock Friction    (Homework #4)              |
| 10/20/09 | 15. Frictional Instability                      |
| 10/22/09 | 16. Mechanics of Earthquakes                    |
| 10/27/09 | 17. Quantification of Earthquakes    (Readings) |
| 10/29/09 | 18. Midterm                                     |
| 11/3/09  | 19. Earthquake Cycle and Probability            |
| 11/5/09  | 20. Porous Media                                |
| 11/10/09 | 21. Soil Texture    (Homework #5)               |
| 11/12/09 | 22. Soil Consolidation                          |
| 11/17/09 | 23. Liquefaction                                |
| 11/19/09 | 24. Mass Wasting Processes                      |
| 11/24/09 | 25. Land Subsidence    (Homework #6)            |
| 11/26/09 | Thanksgiving Holiday, No Class                  |
| 12/1/09  | 26. Engineering Seismology                      |
| 12/3/09  | 27. Electrical Resistivity and Gravity          |
| 12/8/09  | 28. Geophysical Logging                         |
| 12/10/09 | 29. Energy Resources                            |
| 12/17/09 | 30. Final Project Due                           |