

CEG 4011 – Soil Mechanics

4 Credits – *Required Course* – Spring 2015

Description: Physical properties of soils, compaction, flow of water through soil, distribution of stress within soil and consolidation. Laboratory required.

Prerequisites: EGM 3520

Goals: This course, the first of two required courses in the area, introduces the civil engineering student to the fundamentals of Soil Mechanics – essentially, what soil is, its origin and how it behaves under various conditions (i.e., water, load, etc.).

Outcomes: This course requires the student to apply basic math, science and engineering principles to solve engineering problems. The weekly laboratory sections require the ability to conduct experiments and analyze and interpret data. Working in groups fosters the ability to function efficiently as a team. The written laboratory reports represent forms of technical communication. Homework and the five exams require the ability to identify, formulate and solve engineering problems.

Objectives: The student is expected to learn:

- The basics of physical geology – the rock cycle, plate tectonics, origin, transportation and deposition of soils, etc.
- The definitions of Soil Mechanics and the use of phase diagrams
- To classify soils by the USCS and AASHTO systems
- To calculate geostatic stresses
- To make calculations on the 1-D and 2-D flow of water through soils
- To calculate the settlement of structures on clay and sand
- The fundamentals of soil shear strength
- The procedures for performing standard soil laboratory tests

Lectures: MWF – 4th Period – FLG 220

Laboratory: MTW – 8-9th Period – Weil 170

- Lab day depends on Section #

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Text and Notes: There is not a required textbook for this course. Handouts for some lectures will be provided in PDF format and posted on Sakai. Be sure to look over these and bring them to class so you can follow along. Lecture notes are the student's responsibility.

Additional reading and examples can be found in *Introduction to Geotechnical Engineering*, Holtz, Kovacs, & Sheahan, Second Edition and *Principles of Geotechnical Engineering*, Braja M. Das, Eighth Edition. These books can be used as a reference. If you need more examples or problems to work on your own; there are also several other soil mechanics and geotechnical engineering books at the library.

Laboratory: Each student must attend lab and purchase a lab manual from the ASCE office. Lab reports are due at the beginning of the next lab meeting, unless otherwise instructed. Pre-labs are due at the beginning of the lab to be conducted. **Lab reports and pre-labs will be considered late 10 minutes after the start of lab (3:10 PM).** Late pre-labs will automatically receive a zero. Late lab reports can be turned in for a 50% deduction by 3:00 PM the following day (labs will still be graded, but the maximum attainable grade will be 50%). **After this time, late lab reports will receive a zero; however a complete lab report must still be submitted to receive credit for the course.** Students have a week to turn in late lab reports to receive credit for the course. Pants and closed-toed shoes are required for the lab. Safety glasses are also required, but will be provided in lab. **If a student is more than 20 minutes late (after 3:20 PM), does not have proper attire, or does not follow the safety rules then the student will receive a 10% deduction on their lab report and will have to leave and make-up the lab during a different section.** There are NO exceptions to this policy. It is the student's responsibility to come to lab prepared (i.e. wear proper lab attire, read the lab manual, submit assignments in time) and complete the lab in the time allotted. If a student has a valid excuse for missing a lab then prior notice and approval must be granted. The student will have to make-up the lab during one of the other lab sections. **ALL lab reports must be submitted to receive credit for the course.**

Assignments: Homework will be assigned approximately weekly and it is due at the start of the class period on the day specified; no later than 10:50 AM. **Late homework will NOT be accepted and will receive a zero.** These rules apply unless advance written notice has been submitted to the instructor for a valid excuse. All homework must follow the format below. Illegible homework is subject to being rejected by the T.A.'s for grading purposes.

Exams: Exams will be given in-class on a one hour period. Each exam will concentrate on the material most recently covered. No open notes during exam. You will receive a formula sheet (same used for the FE exam – see copy on Sakai) as well as any charts/tables required during the exam.

Make-up Exam/Late Assignment Policy: Do not miss an exam unless you have a valid excuse. Make-up exams will only be rescheduled if prior approval is granted and the student must make a reasonable attempt to take the exam prior to the scheduled exam date. Exams can be reviewed at any time in the T.A.'s office but will not be returned to keep. To receive any points back you must talk with the T.A. within the first week after grades are published. **The instructor and assistants will discuss any exam, homework, or lab report within 1 week (excluding holidays) after return. After this time discussion is closed and grades are final.**

Calculator Policy for Exams: The only calculators that are allowed for use during the exams are the ones that are permitted for the Fundamentals of Engineering Exam, which all civil engineering students are required to take prior to graduation. **There are NO exceptions to this policy.**

Homework Submission Instructions:

1. Homework needs to be **stapled or will receive a zero.** Your name (**with your sorting number**), class course, homework number and date should be on the first sheet – clearly written. If there are multiple pages include pages numbers.

HW #1	CEG 4011	1-6-14	Doe, John – #8	1/3
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2. Students will receive their sorting number after drop/add ends. This number is assigned based on alphabetical order of last names and is used by the T.A.'s for grading purposes only. Points will be deducted for NOT including your number next to your name.
3. All homework must be submitted on **engineering computation paper** using only one side of the page. Homework not submitted on engineering paper will receive a zero, unless otherwise instructed.
4. Work should be organized and neat. Assumptions should be clearly stated, appropriate units should be noted on answers and answers should be boxed, underlined or otherwise appropriately labeled. **If your answer is not clear you will not receive credit.**
5. Enough space should be provided between problems to clearly identify each one.
6. Numerical answers should be given with an **appropriate number of significant digits.**
7. **Illegible homework is subject to being rejected by the T.A.'s for grading purposes.**

Honesty Policy: All students admitted to the University of Florida have signed a statement of academic honesty, committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and others. This will be strictly enforced.

Accommodations for Students with Disabilities: Students requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the instructor when requesting accommodation. UF Counseling Services provides resources on-campus for students having personal problems or lacking clear career and academic goals. The Career Resource Center is also available to help with proof-reading assignments and career/job search services.

- UF Counseling & Wellness Center, 3190 Radio Rd., (352) 392-1575
- Career Resource Center, Reitz Union, (352) 392-1601

Grading:

Exams – 5	= 75%
Lab Reports – 10	= 20%
Homework – 10	= 5%

Final letter grades will be assigned based on the following scale:

A	94
A-	90
B+	87
B	83
B-	80
C+	77
C	73
C-	70
D+	67
D	63
D-	60
E	0

Tentative Course Outline:

Lecture #	Week day	Month	Day	Description	HW	Lab #
1	W	Jan	7	Introduction		No Lab
2	F	Jan	9	Geology of Soils, Grain size, Shape, Angularity	HW-1	
3	M	Jan	12	Phase Diagrams	HW-2	No Lab
4	W	Jan	14	Phase Diagrams		
5	F	Jan	16	Atterberg Limits, Soils Structure	HW-1 due date	
-	M	Jan	19	--Martin Luther King Day-- --No class--		No Lab
6	W	Jan	21	Soil Classification	HW-2 due date / HW-3	
7	F	Jan	23	Soil Classification *END OF TEST 1 TOPICS*		
8	M	Jan	26	Compaction		1 Specific Gravity
-	W	Jan	28	Review Test 1	HW-3 due date	
-	F	Jan	30	Test 1		
9	M	Feb	2	Soil Exploration		2 Sieve Analysis
10	W	Feb	4	Soil Exploration		
11	F	Feb	6	Geostatic Stresses	HW-4	
12	M	Feb	9	Geostatic Stresses		3 Atterberg Limits
13	W	Feb	11	Stresses Due Surface Loads (Pyramid method, Point and Circular Load)	HW-5	
14	F	Feb	13	Stresses Due Surface Loads (Boussinesq, "mn" Method, Embankment)	HW-4 due date	
15	M	Feb	16	Stress Due Surface Loads Examples *END OF TEST 2 TOPICS*		4 Compaction
-	W	Feb	18	Review Test 2	HW-5 due date	
-	F	Feb	20	Test 2		
16	M	Feb	23	Permeability		5 Relative Density
17	W	Feb	25	1-D Flow	HW-6	
18	F	Feb	27	1-D Flow		

-	M	March	2	--Spring Break-- --No class--		No Lab
-	W	March	4	--Spring Break-- --No class--		
-	F	March	6	--Spring Break-- --No class--		
19	M	March	9	2D-Flow		6 Permeability
20	W	March	11	2D-Flow *END OF TEST 3 TOPICS*		
-	F	March	13	Review Test 3	HW-6 due date	
-	M	March	16	Test 3		7 Consolidation Introduction
21	W	March	18	Consolidation Test		
22	F	March	20	Normally Consolidated Clays	HW-7	
23	M	March	23	NC & OC Clays		8 & 9 Consolidation Readings & Direct Shear
24	W	March	25	Over Consolidated Clays		
25	F	March	27	Time Rate Consolidation	HW-7 due date /HW-8	
26	M	March	30	Time Rate Consolidation		10 Unconfined Compression
27	W	April	1	Cases of Settlement *END OF TEST 4 TOPICS*		
-	F	April	3	Review Test 4	HW-8 due date	
-	M	April	6	Test 4		No Lab
28	W	April	8	Mohr Circle	HW-9	
29	F	April	10	Mohr Circle		
30	M	April	13	Shear Strength	HW-10	No Lab
31	W	April	15	Shear Strength	HW-9 due date	
32	F	April	17	Guest Speaker *END OF TEST 5 TOPICS*		
-	M	April	20	Review Test 5 (Including lab overview)	HW-10 due date	No Lab
-	W	April	22	Test 5		