CEG 4012 – Geotechnical Engineering

3 Credits – *Required Course* – Spring 2015

Description: Subsurface stresses, Settlement Analysis, Site Investigation and Insitu Methods, Shallow and Deep Foundations, Slope Stability, and Lateral Earth Pressures/Retaining Wall Design.

Prerequisites: CEG 4011

Objectives: Assure students are able to determine the stress increase due to a surface load; to apply stress increase and insitu measurements to analyze foundation settlements; to design shallow foundations (footings) and deep foundations (piles); to analyze the stability of slopes; to determine the stresses against retaining walls; to design retaining walls for various subsurface conditions.

Lectures: MWF – 3rd Period – FLG 220

Final Exam: Scheduled for 30E

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Office Hours: W (10:30 – 11:30 AM) & R (1:00 – 3:00 PM)

Text and Notes: Notes for each lecture will be provided in PDF format and posted on Canvas. The notes are partially blank and can be completed by following the lecture. At the completion of the course, the notes will serve as a good reference, so make sure to attend lectures and bring the notes. Lecture notes are the student's responsibility.

Reference textbooks are *Principles of Geotechnical Engineering*, Das, 8th Ed. and *An Introduction to Geotechnical Engineering*, Holtz, Kovacs and Sheahan, 2nd Ed.

Assignments: Homework will be assigned approximately weekly and it is due at the start of the class period on the day specified. **Late homework will receive a 25% penalty per day it is late.** These rules apply unless advance written request has been submitted to the instructor and approved. Illegible homework is subject to being rejected by the T.A.

In-Class exercises will consist of small groups of students applying the concepts from lectures to practical problems. Each problem will be provided by the instructor in a clearly defined problem statement, will require your knowledge of geotechnical engineering and will cover (at least) one class period. **Only students attending class on the day the in-class exercise is assigned will receive a grade for it.** Grading will be based on the completeness of the solution, so show your work. Engineering judgment is required, so include statements

explaining the group decisions and ALL assumptions made. Each student in the group will receive the same grade, but it is expected that each contributes!

Exams: Exams will be given in-class during one lecture period. Each exam will concentrate on the material most recently covered. One page (front and back) will be allowed as a formula reference. Formulas, general procedures, tables, and other GENERAL information may be included. Only calculators are allowed for use during the exams, nothing else!

Make-up Exam/Late Assignment Policy: Do not miss an exam. Make-up exams will only be given if prior approval is granted by the instructor 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. **The instructor and assistants will discuss any exam, homework, or in-class exercise within 1 week (excluding holidays) after return. After this time, grades are final.**

Homework & In-Class Exercise Submission Instructions:

1. Submit your HW and In-class exercises with all sheets stapled. Your name, course, homework number and date should atop the first page – clearly written. If there are multiple pages include pages numbers. For in-class exercises, make sure to appropriately label the results printed from the program used.
2. Submit homework on **engineering computation paper,** using only one side of the page.
3. Work should be organized and neat with assumptions clearly stated. Show units throughout the work and clearly identify the answers (e.g., boxed, underlined, etc.).
4. Numerical answers should be given with an appropriate number of significant digits.

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.

Grading:	Exams – 4	= 80%
	In-Class Exercises – 2	= 10%
	Homework – 10	= 10%

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

A	100-94%	C	76-73%
A-	93-90%	C-	72-70%
B+	89-87%	D+	69-67%
B	86-83%	D	66-63%
B-	82-80%	D-	62-60%
C+	79-77%	E	59-0%

Tentative Course Outline:

Lecture #	Week day	Month	Day	Description	HW
1	W	Jan	7	Introduction	
2	F	Jan	9	Review of Stresses	
3	M	Jan	12	Review of Consolidation	HW-1 assigned
4	W	Jan	14	Elastic Settlement	
5	F	Jan	16	Secondary Compression, Time Rate Consolidation	
-	M	Jan	19	No Class--Holiday	
6	W	Jan	21	Time Rate Consolidation	HW-1 due HW-2 assigned
7	F	Jan	23	Site Investigation	
8	M	Jan	26	Settlements of Footings on Sands	
9	W	Jan	28	Settlements of Footings on Sands	HW-2 due
10	F	Jan	30	Allowable Foundation Settlements *END OF TEST 1 TOPICS*	HW-3 assigned
11	M	Feb	2	Bearing Capacity – Terzaghi	
12	W	Feb	4	Bearing Capacity – Meyerhof	
13	F	Feb	6	Bearing Capacity – Meyerhof Exercises	HW-3 due HW-4 assigned
-	M	Feb	9	**Test 1 – Stresses / Settlement**	
14	W	Feb	11	Bearing Capacity – Eccentric Loaded Footings	
15	F	Feb	13	Deep Foundations – Piles	HW-4 due HW-5 assigned
16	M	Feb	16	Deep Foundations – Piles Exercises	
17	W	Feb	18	Deep Foundations – Drilled Shaft	
18	F	Feb	20	Deep Foundations – Drilled Shaft Exercises	HW-5 due HW-6 assigned
19	M	Feb	23	Pile Groups	
20	W	Feb	25	FB-Deep *END OF TEST 2 TOPICS*	

21	F	Feb	27	**In-class exercise 1: FB Deep**	HW-6 due
Feb 28 – Mar 8 **Spring Break**					
22	M	Mar	9	Stability of Earth Embankments	In-class 1 due
23	W	Mar	11	Infinite Slopes & Finite Slopes	HW-7 assigned
-	F	Mar	13	**Test 2 - Site Investigation / Bearing Capacity / Deep Foundations**	
24	M	Mar	16	Taylor Charts	
25	W	Mar	18	Rapid Drawdown	
26	F	Mar	20	Rapid Drawdown / Summary	HW-7 due
27	M	Mar	23	Method of Slices	HW-8 assigned
28	W	Mar	25	Method of Slices	
29	F	Mar	27	Total vs. Effective Stresses	
30	M	Mar	30	Slope/W *END OF TEST 3 TOPICS*	HW-8 due
31	W	Apr	1	**In-class exercise 2: Slope/W**	
32	F	Apr	3	Earth Pressures – Rankine Sand/Clay	HW-9 assigned
-	M	Apr	6	**Test 3 - Slope Stability**	
33	W	Apr	8	Earth Pressures – Rankine inclined / Coulomb	HW-9 due; In-class 2 due
34	F	Apr	10	Earth Pressures – Surcharge	HW-10 assigned
35	M	Apr	13	Retaining Walls and Modes of Stability	
36	W	Apr	15	Retaining Wall-Cantilever Design	
37	F	Apr	17	Retaining Wall-MSEW Design	
38	M	Apr	20	Retaining Wall-LRFD	HW-10 due
-	W	Apr	22	**Test 4 – Earth Pressures**	