

# CEG 4012 – Geotechnical Engineering

3 Credits – \*Required Course\* – Spring 2020

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**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:** Students will be able to determine subsurface stresses due to surface loading; to apply stress increases and insitu measurements to analyze foundation settlements; to design shallow foundations (footings) and deep foundations (piles); to analyze the stability of slopes; to determine stresses against retaining walls; to design retaining walls for various subsurface conditions.

**Lectures:** M, W, F | Period 7 (1:55 PM - 2:45 PM) – FLG 260

**Instructor:** Dr. Khiem Tran

Office: 580 B Weil Hall

Phone: (352) 294-3369

E-mail: [tk@ufl.edu](mailto:tk@ufl.edu)

Office Hours: M, W – 3 to 4 PM

**Teaching Assistant:**

Angelina Liu

Office: 265 O Weil Hall

Email: [liu343@ufl.edu](mailto:liu343@ufl.edu)

Office Hours: M: 11:45 to 12:45 (Period 5)

W: 11:45 to 1:45 (Period 5 & 6)

**Textbook and Notes:**

- Geotechnical Engineering: Principles & Practices (Second Edition) by Coduto, Yeung, and Kitch.

Notes for each lecture will be provided in PPT 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.

Additional reading and examples can be found in:

- Principles of Geotechnical Engineering by Braja M. Das, any edition
- Fundamentals of Geotechnical Engineering by Braja M. Das, any edition

**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 1:55 PM. **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:** Each exam will concentrate on the material most **recently covered, and they will be in-class exams for 50 minutes.** One page (front and back) will be allowed as a formula reference. Formulas, general procedures, and other GENERAL information may be included. Solved examples are **NOT** allowed. Tables and graphs will be provided. Reference sheets will be checked prior to the exam and can be confiscated for inappropriate material.

**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 TA's office but will not be returned to keep. To receive any points back you must talk with the TA within the first week after grades are published. **The instructor and assistants will discuss any exam, homework 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. Submit your homework with all sheets stapled. Your name (with your sorting number), homework number and date should be on the first sheet – clearly written. If there are multiple pages include pages numbers. If there are multiple pages include pages numbers.

CEG 4012	HW #1	1-10-2020	Doe, John – #8	1/3
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1. 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.
2. 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.
3. Enough space should be provided between problems to clearly identify each one.
4. Numerical answers should be given with an appropriate number of significant digits.
5. Illegible homework is subject to being rejected by the T.A.'s for grading purposes.

<b>Grading:</b>	Exam No. 1	25%
	Exam No. 2	25%
	Final Exam	30%
	Homework	20%

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

More information on UF grading policy may be found at:

<http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades>

### ***Students Requiring Accommodations***

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, <https://www.dso.ufl.edu/drc>) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

### ***Course Evaluation***

Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at <https://gatorevals.a.ufl.edu/students/>. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via <https://ufl.bluera.com/ufl/>. Summaries of course evaluation results are available to students at <https://gatorevals.a.ufl.edu/public-results/>.

### ***University Honesty Policy***

UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (<https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/>) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

### ***Commitment to a Safe and Inclusive Learning Environment***

The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, [rbielling@eng.ufl.edu](mailto:rbielling@eng.ufl.edu)
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, [taylor@eng.ufl.edu](mailto:taylor@eng.ufl.edu)
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, [nishida@eng.ufl.edu](mailto:nishida@eng.ufl.edu)

### ***Software Use***

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

### ***Student Privacy***

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: <https://registrar.ufl.edu/ferpa.html>

### ***Campus Resources:***

#### ***Health and Wellness***

#### **U Matter, We Care:**

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact [umatter@ufl.edu](mailto:umatter@ufl.edu) so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

**Counseling and Wellness Center:** <http://www.counseling.ufl.edu/cwc>, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

**Sexual Discrimination, Harassment, Assault, or Violence**

If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the [Office of Title IX Compliance](#), located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, [title-ix@ufl.edu](mailto:title-ix@ufl.edu)

**Sexual Assault Recovery Services (SARS)**

Student Health Care Center, 392-1161.

**University Police Department** at 392-1111 (or 9-1-1 for emergencies), or <http://www.police.ufl.edu/>.

Academic Resources

**E-learning technical support**, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. <https://lss.at.ufl.edu/help.shtml>.

**Career Resource Center**, Reitz Union, 392-1601. Career assistance and counseling. <https://www.crc.ufl.edu/>.

**Library Support**, <http://cms.uflib.ufl.edu/ask>. Various ways to receive assistance with respect to using the libraries or finding resources.

**Teaching Center**, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. <https://teachingcenter.ufl.edu/>.

**Writing Studio**, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. <https://writing.ufl.edu/writing-studio/>.

**Student Complaints Campus:** <https://care.dso.ufl.edu>.

**On-Line Students Complaints:** <http://www.distance.ufl.edu/student-complaint-process>.

## Course Outline

Week day	Month	Day	Topics	Reading
M	Jan	6	Introduction	Note
W	Jan	8	Review of Geostatic Stresses	9.4, 9.5, 9.8
F	Jan	10	Stresses due to Surface Loads	9.6, 9.7
M	Jan	13	Elastic settlement	Notes
W	Jan	15	Consolidation Settlement – Normally Consolidated	10.6
F	Jan	17	Consolidation Settlement – Overconsolidated	10.6
M	Jan	20	<b>No class</b> -Martin Luther King Day-	
W	Jan	22	Time Rate of Consolidation	11.1 – 11.3
F	Jan	24	Site Exploration and Characterization	Notes
M	Jan	27	Settlements of Footings on Sands	15.3
W	Jan	29	Settlements of Footings on Sands	15.3
F	Jan	31	Review of Exam 1	
M	Feb	3	<b>Exam 1: Stresses / Settlements</b>	
W	Feb	5	Allowable Foundation Settlements	Notes
F	Feb	7	Bearing Capacity – Terzaghi	15.2
M	Feb	10	Bearing Capacity – Terzaghi	15.2
W	Feb	12	Bearing Capacity – Meyerhof	Notes
F	Feb	14	Bearing Capacity – Meyerhof	Notes
M	Feb	17	Bearing Capacity – Eccentric Loads	Notes
W	Feb	19	Deep Foundation – Piles	14.2
F	Feb	21	Deep Foundation – Piles	14.2
M	Feb	24	Deep Foundation – Drilled shafts	Notes
W	Feb	26	Deep Foundation – Drilled shafts	Notes
F	Feb	28	Pile Group	Notes
M	Mar	2	-- Spring Break -- No class--	
W	Mar	4	--Spring Break -- No class--	
F	Mar	6	--Spring Break -- No class--	
M	Mar	9	FB-Deep	Notes
W	Mar	11	FB-Deep Software Practice	
F	Mar	13	Review of Exam 2	
M	Mar	16	<b>Exam 2: Bearing Capacity/Deep Foundations</b>	
W	Mar	18	Stability of Earth Embankments	13.5
F	Mar	20	Infinite & Finite Slopes	13.5, 13.6

M	Mar	23	Infinite & Finite Slopes	13.5, 13.6
W	Mar	25	Method of Slices	13.9
F	Mar	27	Method of Slices	13.9
M	Mar	30	Slope/W software	Notes
W	Apr	1	Slope/W software	
F	Apr	3	Earth Pressures: At-Rest, Active, Passive	17.1, 17.2
M	Apr	6	Earth Pressures: At-Rest, Active, Passive	17.1, 17.2
W	Apr	8	Earth Pressures – Rankine inclined	Notes
F	Apr	10	Earth Pressures – Coulomb	17.1, 17.2
M	Apr	13	Retaining Wall: Gravity	16.3
W	Apr	15	Retaining Wall: Cantilever	16.3
F	Apr	17	Retaining Wall Modes of Stability	16.3
M	Apr	20	Exam review, course wrap up	
W	Apr	22	<b>Final Exam: Slope/Retaining wall</b>	

