Introduction to Geotechnical Engineering – 53836 – CEE 4405 - B

Schedule and Location:

Lecture: 9:30-10:20 am MW Mason 3133 May 15, 2023 – Aug 02, 2023
Lab: 12:30 – 4:45 pm M Mason 1132 May 15, 2023 – Aug 02, 2023
Final exam: 8:00 am – 10:50 am Mason 3133 Aug 2, 2023

Instructor

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Teaching Assistants:

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Office Hours

Yumeng Zhao: Tuesday 2:00 pm – 3:00 pm
Emre Duman: Friday 10:00 am – 11:00 pm
Open door policy: you are welcome to stop by my office and talk with me about any aspect of the course during regular working hours (*Note: however, setting up a meeting time via email with [CEE4405] in the subject line in advance will give the highest probability of success*).

Course Description and Objectives

This course covers the fundamentals of soil properties and geotechnical engineering practice. Specific topics includes soil characterization and classification; compaction and soil improvement; fluid flow through porous media; stresses and strains in soils; settlement and consolidation analyses; shear strength and earth retaining structures. The course includes 5 laboratory sessions.

By the end of the course, you will be able to:

1. Define basic geotechnical terms such as phase relationship, shear strength, consolidation etc.
2. Understand the properties and behavior of soils, including the pore water, the soil skeleton and their interactions.
3. Analyze the behavior of soils under various loading conditions such as compaction and consolidation.
4. Apply the principles of soil mechanics to evaluate and design simple geotechnical systems.

Course Textbook

Budhu, M. (2010). Soil Mechanics and Foundations, 3rd Edition. John Wiley & Sons, Inc., New York.

Grading

Homework due every Wednesday (25%)
Pop quizzes 5 times (5%)
Exam I: 06/26 (25%)
Final exam: date (30%)
Lab reports due throughout the semester (15%)

Honor code

This course will be conducted under the guidelines of the Georgia Tech Academic Honor Code. In particular, cheating of any kind is unethical and unacceptable; quote and attribute any words/ideas that are not your own; wireless communication system of all kinds must be turned off while in the classroom. Please refer to http://www.honor.gatech.edu for further questions involving the Academic Honor Code.

- *Attendance*
  Attendance at all lectures is mandatory. Missing 4/5 pop quizzes will cause a drop in letter grade. In accordance with the Institute requirement, verification of participation of the class will be reported to the Registrar's Office and the Office of Scholarships and Financial Aid.
- *Homework*
  In total 6 homework (HW) throughout the semester. HW is due at 4:00 pm on the due date.
  HW can be turned in during class or at the instructor's office (Mason 2140).
  Grades for HW turned in after that time will be reduced by 10 per day late, including weekends and holidays.
  HW must be submitted in hard copy. Do not submit HW by email. Do not submit pictures of HW assignments.
  You are allowed (and encouraged) to work in study groups on HW, but each completed assignment should be your own work. It is NEVER acceptable for different students to turn in copies of the same printout. Please list any people with whom you studied on your assignment.
  The following formats are REQUIRED for all homework assignments:
  1. Turned-in HW must be neat, legible, and organized.
  2. Be certain to place your name, the HW number, and the date.
  3. Graphs are encouraged to be computer generated. Hand drawn graphs, if used, must be neat and clear in delivering the message.
  4. Be certain to track units throughout the assignment and include them in the final answer.
  5. Clearly state any assumptions (such as an assumed unit weight or density) you have made in solving the problems.
- *Laboratory Periods*
  The laboratory schedule is attached at the end of this syllabus. We will have 5 lab meetings. The experimental tests will cover:
  (1) Grain size analysis (sieve analysis and hydrometer test);
  (2) Atterberg limits;
  (3) Compaction;
  (4) Hydraulic conductivity;
  (5) Consolidation.

The attendance for laboratory session is mandatory and people who do not attend the lab sessions will not be graded for the sessions they missed.
Experiment session will be done in group formats. While the members in a group share the experimental data, everyone is required to submit the lab report individually. List your group members in the reports.
Each lab report is due to your teaching assistant by 4:00 pm ONE WEEK after your lab session has met. Grades for lab reports turned in after that time will be reduced by 10% per day late, including weekends.
All lab reports must be submitted to canvas.

Office of Disability Services

The Georgia Institute of Technology has policies regarding disability accommodation, which are administered through The Office of Disability Services: http://disabilityservices.gatech.edu. For students with disabilities, please contact this Office to request classroom accommodation.

Lecture Schedule

Week	Day	Class	Date	Topic	Reading	HW	Due	Lab
1	M	1	05/15	Introduction/composition of soils	1.0-1.2, 2.0-2.4			
1	W	2	05/17	Phase diagram	4.0-4.3	#1		
2	M	3	05/22	Grain size analysis/plasticity/classification	2.5-2.7,4.4-4.8			#1
2	W	4	05/25	Compaction	5.0-5.9	#2	#1	
3	M		05/29	Holiday				
3	W	5	05/31	Flow/Darcy's law	6.0-6.5		#2	
4	M	6	06/05	Hydraulic conductivity	6.6-6.9	#3		#2
4	W	7	06/07	Stress-strain	7.0-7.6			
5	M	8	06/12	Stress-strain	7.8			#3
5	W	9	06/14	Total and effective stresses	7.9	#4	#3	
6	M		06/19	Holiday				
6	W	10	06/21	Lateral earth pressure	7.10-7.12		#4	
7	M	11	06/26	Exam I				
7	W	12	06/28	Retaining wall design	15.7	#5		
8	M		07/03	Holiday				
8	W	13	07/05	Consolidation	9.0-9.4		#5	
9	M	14	07/10	Consolidation	9.5-9.7			#4
9	W	15	07/12	Time rate of settlement	9.5-9.9	#6		
10	M	16	07/17	Shear strength	10.0-10.4.3			#5
10	W	17	07/19	Shear strength	10.0-10.4.3		#6	
11	M	18	07/24	Final Instructional class day				
			07/26	Reading period				
			08/02	Final exam8:00 – 10:50 a.m.				

(*The tentative syllabus is subject to change*)