

CEE4405 Introduction to Geotechnical Engineering

Schedule and Location:

Lecture:	MW 10:10 am - 11:00 am	Kendeda 230
Lab:	T/Th 12:00 pm - 2:45 pm or 3:00 pm – 5:45 pm	Mason 1132

Instructor:

Sheng Dai, Assistant Professor, Geosystems Engineering
 Contact: sheng.dai@ce.gatech.edu | (404) 385 4757 | Mason, 2251

Teaching Assistants:

Hejintao Huang Email: huanghejintao@gatech.edu Office: Mason, 2264
 Yumeng Zhao Email: ymzhao@gatech.edu Office: Mason, 2131

Course Objectives:

This course introduces students to the engineering properties of soils and their use in common geotechnical and geoenvironmental engineering applications. Specific topics include: soil characterization and classification; compaction and soil improvement; stresses in soils; shear strength; fluid flow through porous media; settlement analyses; and earth retaining structures. The course includes 7 laboratory sessions.

Textbook:

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

Grading:

Exam I	Wednesday, February 12, 2018	20%
Exam II	Monday, March 23, 2018	20%
Final Exam	Wednesday, April 29, 8-10:50 AM	25%
Pop quizzes/Seminars		5%
Lab reports	due throughout the semester	15%
Homework		15%

Office Hours:

Sheng Dai M 1-2 pm, W 12-1 pm (Mason 2251)
 Hejintao Huang T 10:00am – 11:00am (Mason 2264)
 Yumeng Zhao Th 10:00pm – 11:00am (Mason 2131)

Please note that we have an open door policy. Feel free to stop by to discuss any aspect of this course (setting up a meeting time in advance via email will give the highest probability of success).

Academic Honor Code:

This course will be conducted under the guidelines of the Georgia Tech Academic Honor Code. Please refer to <http://www.honor.gatech.edu> for further questions involving the 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 systems of all kinds must be turned off while in the classroom.

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 8 homework (HW) throughout the semester. HW is due at 4:00pm on the due date.

HW can be turned in during class or at the TA Hejintao's office (Mason 2264). 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. All graphs must be computer generated. Hand drawn graphs will not be graded.
4. Experimental data should be plotted as discrete points, while theoretical relationships should be shown as continuous lines.
5. Show all units. Be certain to track units throughout the assignment and include them in the final answer.
6. 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 7 lab meetings. The experimental tests will cover: (1) Soil classification, (2) Grain size analysis, (3) Atterberg limits, (4) Compaction, (5) Hydraulic conductivity, (6) Consolidation, and (7) Shear strength.

Each lab report is due to your teaching assistant by 4:00pm *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: 1) in hard copy to your teaching assistant, AND 2) electronically through Canvas. Reports that are not submitted in both formats will not be graded. While you will conduct the experiments in a group, you need to submit your own copy of the lab report.

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 accommodations.

Class Schedule

Week	Day	Class	Date	Topic	Reading	Assigned	Due	Lab
1	M	1	6-Jan	Introduction	1, 2.0-2.3			--
	W	2	8-Jan	Clay minerals	2.4	HW#1		
2	M	3	13-Jan	Clay minerals/Fabric	2.4			L1
	W	4	15-Jan	Phase diagrams	4.0-4.3	HW#2	HW#1	
3	M	--	20-Jan	MLK Day				L2
	W	5	22-Jan	Grain size analysis	2.5-2.7			
4	M	6	27-Jan	Plasticity/Classification	4.4-4.8	HW#3		L3
	W	7	29-Jan	Compaction	5.0-5.9		HW#2	
5	M	8	3-Feb	Compaction	5.0-5.9			L3
	W	9	5-Feb	Hydraulic conductivity	6.0-6.9		HW#3	
6	M	10	10-Feb	Hydraulic conductivity	6.0-6.9	HW#4		L4
	W	11	12-Feb	Exam I				
7	M	12	17-Feb	Stress-strain	7.0-7.6			L4
	W	13	19-Feb	Stress-strain	7.0-7.6	HW#5	HW#4	
8	M	14	24-Feb	Mohr circle	7.8-7.9			L5
	W	15	26-Feb	Total and Effective stress	7.9-7.10	HW#6	HW#5	
9	M	16	2-Mar	Surface loads	7.11-7.12			L5
	W	17	4-Mar	Lateral earth pressure	15.0-15.4, 15.7-15.9	HW#7	HW#6	
10	M	18	9-Mar	Retaining wall design	7.9.4			L5
	W	19	11-Mar	Seepage	14.0-14.4, 14.7-14.9		HW#7	
11	M	--	16-Mar	Spring Break				L6
	W	--	18-Mar	Spring Break				
12	M	20	23-Mar	Exam II				
	W	21	25-Mar	Stress paths	8.0-8.5			
13	M	22	30-Mar	Consolidation	9.0-9.4	HW#8		L7
	W	23	1-Apr	Time rate of settlement	9.5-9.9			
14	M	24	6-Apr	Time rate of settlement	9.5-9.9			L7
	W	25	8-Apr	Shear strength	10.0-10.4.3, 10.5			
15	M	26	13-Apr	Shear strength	10.0-10.4.3, 10.5			L7
	W	27	15-Apr	Shear strength	10.6-10.7		HW#8	
16	M	28	20-Apr	Final Instructional Class Day				--
	W	--	22-Apr	Reading Period				
17	M	--	27-Apr					--
	W	29	29-Apr	Final Exam: 8:00 am – 10:50 am				

Lab Schedule

Lab #	Week	Day	Date	Group	Laboratory tests
	1	T	1/7	--	No Lab
		Th	1/9	--	
L1	2	T	1/14	All students in D1	Classification
				All students in D2	
		Th	1/16	All students in D3	
				All students in D4	
L2	3	T	1/21	All students in D1	Grain size analysis
				All students in D2	
		Th	1/23	All students in D3	
				All students in D4	
L3	4	T	1/28	D1 Group A	Atterberg limits
				D2 Group A	
		Th	1/30	D3 Group A	
				D4 Group A	
	5	T	2/4	D1 Group B	
				D2 Group B	
		Th	2/6	D3 Group B	
				D4 Group B	
L4	6	T	2/11	D1 Group A	Compaction
				D2 Group A	
		Th	2/13	D3 Group A	
				D4 Group A	
	7	T	2/18	D1 Group B	
				D2 Group B	
		Th	2/20	D3 Group B	
				D4 Group B	
L5	8	T	2/25	D1 Group A	Hydraulic conductivity
				D2 Group A	
		Th	2/27	D3 Group A	
				D4 Group A	
	9	T	3/3	D1 Group B	
				D2 Group B	
		Th	3/5	D3 Group B	
				D4 Group B	

L6	10	T	3/10	D1 Group A	Consolidation
				D2 Group A	
		Th	3/12	D3 Group A	
				D4 Group A	
	11	T	3/17	Spring Break	No Lab
		Th	3/19	Spring Break	
	12	T	3/24	D1 Group B	Consolidation
				D2 Group B	
Th		3/26	D3 Group B		
			D4 Group B		
L7	13	T	3/31	D1 Group A	Strength
				D2 Group A	
		Th	4/2	D3 Group A	
				D4 Group A	
	14	T	4/7	D1 Group B	
				D2 Group B	
		Th	4/9	D3 Group B	
				D4 Group B	