CE 182 Geotechnical Principles Laboratory

Section A, 2 credits
Spring 20XX
Monday 8:30 - 10:30 am, Votey 127 Geomaterials Lab

Logistical Information

Instructor:	Dr. Mandar M. Dewoolkar, P.E. Office: Votey 213A, e-mail: mdewoolk@uvm.edu, Office hours: TR 10:30-11:30 am
Teaching: Assistants	Jane Smith Office: Perkins 203A, e-mail: jane.smith@uvm.edu, Office hours: MW 1-2 pm John Smith Office: Perkins 203A, e-mail: john.smith@uvm.edu, Office hours: WF 11am-noon
Prerequisite:	CE 180 is a co-requisite (by default CE 100 is a prerequisite)
Designation:	Service-learning

Course Description

The catalog description of this course is: Performing various laboratory tests to determine index, hydraulic, and mechanical properties of soils; computer modeling of geotechnical systems; associated laboratory and project report writing and presentations.

Infrastructure is built on or using geomaterials (soils and rocks). In this course, we will concentrate mostly on soils in their undisturbed or compacted states, which civil engineers and environmental engineers encounter. Geotechnical engineering involves the understanding and predicting the behavior of soils. Through laboratory exercises we will learn to determine a variety of engineering properties of soils including its specific density, densities in dry and wet conditions, compaction (how well can they be compacted, e.g. as a road base or landfill liner), permeability (how quickly liquids can pass through them or can they retain contaminants), compression (how much will they settle under applied loads) and shear strength (how much load will they support). The course also includes a project where we will be applying the skills we learned in experimentation, analysis and interpretation of data, and use of engineering judgment.

Typically, a lab will start with a short recitation explaining the theory behind and details of the experiment, with majority of the time spent in performing the experiment. Students are expected to read the assigned handout before coming to the lab. A short quiz will be administered following the recitation. Some labs will be used to work on a project. There is no mid-term examination in this course, but a final examination is scheduled.

Pedagogy

This course includes service-learning (SL), which is a form of project-based and experiential learning where students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning of academic materials and personal development. In this course, we will partner with Chittenden Solid Waste District (CSWD) on a project proposed by them that aligns very well with our course objectives.

Computer Usage: We will use a commercial software (SEEP/W) to analyze steady-state seepage conditions. In addition, we will employ Excel, Matlab, WORD and PowerPoint to analyze and visualize experimental and project data and prepare technical reports, papers and presentations.

Learning Objectives

After completing this course the students will be able to:

1. demonstrate the ability to perform laboratory tests in accordance with established standards (e.g. American Society for Testing and Materials) and understand the importance of various material properties;
2. demonstrate the ability to compile, analyze, interpret and synthesize collected laboratory data and draw conclusions associated with index, hydraulic, and mechanical properties of soils also using engineering judgment;
3. demonstrate the ability to design a laboratory testing program in support of a civil and environmental engineering design project and/or research project;
4. demonstrate the ability to acquire and apply new knowledge as needed for a civil and environmental engineering design project and/or research project;
5. demonstrate the ability to use modern engineering tools for the analysis of experiments;
6. demonstrate the ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives; and
7. demonstrate the ability to write and present clear technical laboratory and project reports, and make professional presentations.

Required Course Materials

Textbook: *Soil Mechanics Laboratory Manual*, by B. M. Das, Oxford University Press

References: An Introduction to Geotechnical Engineering by Holtz, Kovacs and Sheahan.
Soil Mechanics Design Manual 7.01, Naval Facilities, 1986. Downloadable at:
http://web.mst.edu/~rogersda/umrcourses/ge441/dm7_01.pdf

Software: SEEP/W Professional Version (available on Virtual Votey)

Attendance & Classroom Expectations

Lab attendance is mandatory for receiving the credit for completing the particular lab. Many labs require group work, and therefore, an active and equitable participation in expected from each student.

Students are expected to read the assigned handout before coming to the lab. A short quiz will be administered following the recitation. The reading assignments will be announced through Blackboard. Initial assignments are included in the schedule table.

The coursework will most likely require students to spend 4-6 hours on this course outside the lab period.

Blackboard

Lab handouts, lab report templates, grading rubrics are posted on Blackboard.
Weekly announcements, if any, will be made through Blackboard.

Grading Criteria/Policies

Lab reports (10 - 12):60%
Homeworks/quizzes: 5%
SL Project: 20%
Final exam: 15%

It is highly recommended that you submit your lab reports during the lab, but the absolute deadline is 5 pm on the due date. No late submissions will be accepted. Attending labs in full is mandatory. You are expected to arrive by 8:30; habitual late arrivals will result in 5 points reduction in lab report grades. If you are not able to attend a lab, notify the TAs before the beginning of the lab session. If the reason of your absence is acceptable, you must attend one of the other weekly lab sessions. Failure to attend a lab will result in 40 points reduction in the associated lab report grade.

Grades will be posted on Blackboard. Any inconsistencies in recorded scores must be reported to the instructor/TAs within a week from when the grade is posted. Save all your graded work in case it needs to be reviewed again for grading disputes.

The grades will be assigned per the following table:

100-95	A+	90-87.5	B+	82.5-80	C+	75-72.5	D+	<67.5	F
95-92.5	A	87.5-85	B	80-77.5	C	72.5-70	D		
92.5-90	A-	85-82.5	B-	77.5-75	C-	70-67.5	D-		

Anticipated Course Schedule

The following course schedule is anticipated, but some adjustments may be made as the course progresses.

Week	Lab Exercise	Reading Assignment	HW Assigned	Quiz	Other Notes
1	Lab 1: Intro, safety, and visual classification;		HW 1		
2	MLK Holiday				
3	Lab 2: Phase relations Lab 3a: Soil classification - sieve analysis	Lab 2 Lab 3		√	Lab 1 due HW 1 due
4	Lab 3b: Soil classification -hydrometer analysis and Atterberg limits				Lab 2 due
5	Lab 4a: Compaction I & Project Intro	Lab 4	HW 2	√	Lab 3 due
6	President's Day Holiday				
7	Lab 4b: Compaction II				HW 2 due
8	Lab 5: Permeability	Lab 5	HW 3	√	Lab 4 due
9	Spring Break				
10	Project labs				HW 3 due
11	Project labs				Lab 5 due
12	Lab 6: SEEP/W computer modeling	Lab 6		√	Summary of project data
13	Lab 7: Seepage physical model	Lab 7		√	Lab 6 due
14	Lab 8: Consolidation	Lab 8		√	Lab 7 due
15	Lab 9: Shear strength (demonstration)	Lab 9		√	Lab 8 due
16	Project presentations				Lab report due

Statement about Academic Integrity

UVM takes academic honesty very seriously and those standards will be enforced in this class. Offenses against the Code of Academic Integrity affect the entire university community. Any suspected violations of this code will be forwarded to the Center for Student Ethics and Standards for further investigation. Academic dishonesty includes not only "cheating", but also fabrication, plagiarism and collusion. You are strongly encouraged to read the Code itself, which can be found at:
https://www.uvm.edu/policies/student/acadintegrity.pdf

Statement on Alcohol and Cannabis in the Academic Environment

As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

Statement on Students with Disabilities

In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Disability Services on campus. SAS works with students and faculty in an interactive process to explore reasonable and appropriate accommodations, which are communicated to faculty in an accommodation letter. All students are strongly encouraged to meet with their faculty to discuss the accommodations they plan to use in each course. A student's accommodation letter lists those accommodations that will not be implemented until the student meets with their faculty to create a plan. Contact SAS: A170 Living/Learning Center; 802-656-7753; access@uvm.edu; or https://www.uvm.edu/academicsuccess/student_accessibility_services

Religious Holidays

Students have the right to practice the religion of their choice. Students should submit in writing to the instructor by the end of the second full week of classes their documented religious holiday schedule for the semester. An arrangement could then be made to make up the missed work.

Statement on Student Athletes

In order to be excused from classes, student athletes should submit appropriate documentation to the Professor in advance of all scheduling conflicts within the first two weeks of class. Those missing class are expected to submit make-up assignments within a reasonable time period.