CEE 3400 Syllabus

Introduction to Geotechnical Engineering, Section A (Laboratory Sections A1–A4), 3 Credit Hours

Spring 2027

Instructor Information

Instructor: Dr. Fernando Patino-Ramirez

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Office: Mason 2251

Office Hours: M,W 1400:15:30. Appointments can also be made by email.

Class Meetings:

- Lecture: Monday and Wednesday, 9:30 – 10:20 AM, Mason 1133
- Lab A1: Wednesday, 12:30 – 3:15 PM, Mason 1132
- Lab A2: Wednesday, 3:30 – 6:15 PM, Mason 1132
- Lab A3: Monday, 12:30 – 3:15 PM, Mason 1132
- Lab A4: Monday, 3:30 – 6:15 PM, Mason 1132

Communication: Please use the email function in Canvas for class communication. Piazza will be used as the online class discussion forum; you are required to sign up, and activity will be monitored by the teaching assistants.

General Course Information

Description

This course introduces engineering properties of soils and their use in common geotechnical and geoenvironmental engineering applications. Specific topics include soil formation, characterization, and classification; flow through soils; compaction and soil improvement; stresses in soils; earth retaining structures; shear strength; and settlement analyses. The course includes seven laboratory sessions.

Course Learning Outcomes

Upon successful completion of this course, you should be able to:

- Develop an understanding of the concepts of geotechnical engineering with an emphasis on the engineering behavior of particulate soils.
- Demonstrate an ability to apply concepts learned in earth science and mechanics of materials to solve problems in geotechnical engineering.
- Conduct laboratory experiments, analyze and interpret data on the engineering behavior of soils, and present the results of the laboratory experiments in written form.
- Design components of engineered systems, e.g., an earth retaining wall, using soil as an engineering construction material.

Required Course Materials

- Budhu, M. (2015). Soil Mechanics Fundamentals (Metric Version). Wiley-Blackwell, 368 pp.
- Lecture supplements and laboratory handouts posted on Canvas.

Grading Policy

Final course grades are determined by the weighted components listed below. Final grades will not be curved.

Assignments

- Homework: 20%
- Laboratory reports: 20%
- In-class pop quizzes: 5%
- Midterm exams: 30% (15% each)
- Final exam: 25%
- Bonus: up to 1.5% (1% for the bonus homework set; 0.5% if the CIOS class response rate exceeds 75%)

Final letter grades are assigned as follows: A ≥ 90% > B ≥ 80% > C ≥ 70% > D ≥ 60% > F. Georgia Tech does not award +/− grades (see Georgia Tech Regulation V.A Grades).

All laboratory reports must be submitted before the reading period (Wednesday, April 28, 2027) to receive a passing final grade.

Description of Graded Components

Homework (20%). There will be eight homework sets during the semester, plus one bonus set. Homework is due at 11:59 PM on the due date and can only be turned in on Canvas; do not submit homework by email. The following formats are required for all homework assignments:

1. Turned-in homework must be neat, legible, and organized.
2. Be certain to place your name, the homework 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 reports (20%). There are seven laboratory meetings, covering (1) soil classification, (2) grain size analysis, (3) Atterberg limits, (4) compaction, (5) hydraulic conductivity, (6) consolidation, and (7) shear strength. You will conduct the experiments in a group, but you must submit your own lab report electronically through Canvas. Due dates are listed in the laboratory schedule.

In-class pop quizzes (5%). Short quizzes are given in lecture without advance notice. Quizzes are closed book and notes, and in person.

Exams (55%). There will be two midterm exams (15% each) and one cumulative final exam (25%):

- Exam 1: Wednesday, February 10, 2027 (in class)
- Exam 2: Monday, March 22, 2027 (in class)
- Final Exam: Friday, April 30, 2027, 8:00 – 10:50 AM

Exams are based, in part, on assigned homework problems and are conducted in person in the classroom. All exams are closed book, but one letter-size sheet of notes (a “cheat sheet”) is allowed per exam, along with a calculator of any type.

Course Policies

Attendance and/or Participation

Attendance in all lectures and laboratory sessions is mandatory. 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. Time stamp of your Canvas activities will serve as evidence of class participation.

Academic Integrity

Georgia Tech aims to cultivate a community based on trust, academic integrity, and honor. Students are expected to act according to the highest ethical standards. Review Georgia Tech's Honor Code and the student Code of Conduct.

Any student suspected of cheating or plagiarism on a quiz, exam, or assignment will be reported to the Office of Student Integrity, who will investigate the incident and identify the appropriate penalty for violations.

Core IMPACTS

Core IMPACTS is the University System of Georgia's General Education curriculum. If you are teaching a course that counts towards Core IMPACTS, you should include a syllabus statement about the Core area and associated career competencies. This resource developed by the Center for Excellence in Teaching and Learning and Online Education at Georgia State University includes template syllabus statements for each of the Core IMPACTS areas that you may adapt for your course.

Accommodations for Students with Disabilities

If you are a student with learning needs that require special accommodation, contact the Office of Disability Services (404-894-2563) as soon as possible to make an appointment to discuss your special needs and to obtain an accommodations letter. Please also e-mail me as soon as possible in order to set up a time to discuss your learning needs.

Student-Faculty Expectations Agreement

At Georgia Tech, we believe that it is important to strive for an atmosphere of mutual respect, acknowledgement, and responsibility between faculty members and the student body. The Student-Faculty Expectations articulate some basic expectations that you can have of me and that I have of you. In the end, simple respect for knowledge, hard work, and cordial interactions will help build the environment we seek. Therefore, I encourage you to remain committed to the ideals of Georgia Tech while in this class.

Prerequisites

COE 3001 (Mechanics of Deformable Bodies) or equivalent.

Extra Credit Opportunities

Up to 1.5% in bonus points is available: 1% for completing the bonus homework set (assigned on the final instructional day, Monday, April 26, 2027), and 0.5% for the whole class if the CIOS course survey response rate exceeds 75%.

Collaboration, Group Work, and Use of Generative AI

You are allowed to discuss homework in study groups, but each completed assignment must be your own work. It is never acceptable for different students to turn in copies of the same work. Please list any people with whom you studied for each assignment. Laboratory experiments are conducted in groups, but each student must write and submit an individual lab report.

Using appropriate tools effectively is part of engineering, whether it is a slide rule, a computer, or ChatGPT. In the classroom, AI tools can help you to identify errors and direct you in the right way; however, they should not replace thinking and the 'productive struggle of learning'. To borrow an analogy, think of AI like an e-bike. If our goal is to only get somewhere faster, an e-bike might do the job. If our goal is to become a better cyclist, an e-bike can interfere with that happening. In your goal to become a great engineer, you need to develop your own 'engineering muscle', where you understand the task, think about the way of solving the problem on your own, and start doing so. Using your tools effectively means three things: (1) using them thoughtfully, (2) using them ethically, and (3) retaining responsibility for their outputs. Remember, you are responsible for the work you submit, and you must disclose the use of AI, with the details of how you used it.

Extensions, Late Assignments, & Re-Scheduled/Missed Exams

Grades for homework and lab reports turned in after the deadline will be reduced by 10% per day late, including weekends and holidays. All laboratory reports must be submitted before the reading period (Wednesday, April 28, 2027) to receive a passing final grade. Exceptions for Institute-approved absences and religious observances follow Georgia Tech Regulation IV.

Additional Course Policies

Course schedule. The tentative lecture and laboratory schedules, including reading assignments and homework and lab report due dates, are provided in the separate CEE

3400 Course Themes and Schedule document posted on Canvas. Changes will be announced in class and on Canvas.

Campus Resources for Students

Undergraduate Student Academic Success Resources

A list of resources for undergraduate students' academic success and information about advising can be found at Success at Tech.

- Academic Support: Academic Success and Advising (a unit in the Office of Undergraduate Education & Student Success) provides free support for your courses. Students can attend scheduled supplemental review (PLUS) sessions, stop by Drop-In Tutoring, or schedule a one-on-one appointment through Knack. To explore what options work best for you, please visit us online at success.gatech.edu/tutoring, email us at tutoring@gatech.edu, or come see us at Clough Undergraduate Learning Commons, Suite 283.

Student Well-Being

At Georgia Tech, we are concerned about your overall physical, social, and mental well-being. A comprehensive list of wellness-related resources has been compiled and maintained by the Office of the Vice President for Student Engagement and Well-being.