

CE527 ADVANCED SOIL MECHANICS I 2026-2027 Fall

INSTRUCTOR

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Instructor Communication: There are no specified office hours for this course. Any student wishing to set up a meeting should contact the course instructor using the e-mail above.

COURSE SCHEDULE

The course lectures will be delivered through three 45-minute classes a week on Wednesday **9:45-12:30** in the lecture Room CZ13. A detailed schedule of the course, including deliverable deadlines will be posted on [teams](#) at the start of the course.

Course Website: Students are required to register themselves at [teams](#) and enroll to CE527. All announcements and course materials (lecture notes, homework etc.) will be uploaded on this site.

COURSE CONTENT

This is a course on the fundamental mechanical behaviour of soil as an engineering material. It is not a design course. Emphasis is on presentation of fundamental concepts leading to a better understanding of the nature of soil and its engineering behaviour.

The topics to be covered are listed below:

Part 1 – Nature of Soils

- Nature of Soils. Introduction to soil origin, soil types and soil classification, definitions of key terms on soil descriptions, soil structure and properties

Part 2 – Fundamental Concepts

- Expression of Stress & Strain. Basic mechanics, soil behavior, models for soil, main features of a soil model, stress Mohr circle, strain Mohr circle
- Effective Stress Principle and Pore Water Pressure
- Concept of Stress
- Concept of Strain
- Stress-strain Relationships
- Basic Equations for a Deformable Body

Part 3 – Stress-Strain Properties and Shear Strength of Reconstituted Soils

- Stress Path Loading.
- Geotechnical Laboratory Element Testing
- Consolidation

Part 4 – Elasto-plastic constitutive model for geomaterials

- Simple theory of strain hardening or softening

GRADING POLICY

Notes on marking and assessments:

Assignments: Students will be given take home assignments and required to make submissions individually except for the team-based project assignment, in which assessment will be based on a submission of a report and a presentation per team. Any assignment that is not received by the specified deadline will be assigned a zero mark. The marks for the course will be allocated as follows.

Paper review, assignments and presentations 20%

Midterm examination 40%

Final Project 40%

A minimum score of 50% on the final project is required for a passing grade in the class.

Textbooks: There is no required textbook for the course. Students are encouraged to refer the suggested books, journal articles and conference papers as it provides valuable complementary information towards a thorough understanding of the subject.

REFERENCES

- 1) David Muir Wood ‘Soil behaviour and critical state soil mechanics’ (1990)
- 2) Harr, M. E., Foundations of Theoretical Soil Mechanics, McGraw Hill, 1966. (Chapter 1: Fundamental Relationships)
- 3) Lambe, W and R. V. Whitman. Soil Mechanics. John Wiley, 1969
- 4) Braja M. Das “Advanced Soil Mechanics”

PRE-REQUISITES:

Students expected to have a solid background in soil mechanics.

Cheating or copying:

If a student is found guilty of copying homework or cheating in tests, he/she will receive “FF” grade for the course.

Wishing all of us an enjoyable and healthy Semester!