CE 361 - SOIL MECHANICS I (3+2 Credits)
SYLLABUS
Fall 2025-2026

Instructor: Prof. Dr. Nurhan Ecemiş, Civil Engineering Department, C225, Phone: 750-6812
nurhanecemis@iyte.edu.tr

TAs: Burak Albayrak (Phone: 750-6826), Mustafa Ergin (Phone: 750-6823)

Lectures, Recitations, and Laboratory Hours: Laboratory studies will be in groups. The working times of the groups will be announced at the first laboratory hour.

	Monday	Tuesday	Wednesday	Thursday	Friday
08.45-09.30					
09.45-10.30					LECTURE B213
10.45-11.30					LECTURE B213
11.45-12.30					LECTURE B213
13.30-14.15					
14.30-15.15					
15.30-16.15					LABORATORY Geotechnical Lab.
16.30-17.15					LABORATORY Geotechnical Lab.

Textbook: Soil Mechanics & Foundations – John Wiley: Muni Budhu

Course Website: All announcements and course material will be uploaded on IYTE cloud-LMS (https://cloud-lms.iyte.edu.tr/)

Outline: A study of granular and cohesive soils' physical and mechanical properties. The nature of water flow in soil, stress distribution, deformation analysis, consolidation, and strength of soils. Laboratory procedures for classifying soils and determining their properties and behavior.

Description: Soils are weak, compressible, porous earthen materials. Develop a good understanding of the mechanics of soil behavior under various natural and imposed loading conditions. Attention will be focused on the behavior of idealized soil elements from which the behavior of large soil masses may be inferred. Various phenomena of vital interest to geotechnical engineers arising from the interaction of soil grains and pore water (and air) through time and space will be discussed. The significant factors governing the strength and compressibility of soils, including the memory of geotechnical events, will be developed within a coherent theoretical framework. Such theoretical knowledge will prove invaluable in the field, where the diversity of observed phenomena often obscures the mechanics of soil behavior. To complement theoretical studies, students will have the opportunity to carry out standard laboratory tests on soils.

Lectures and reading assignments: Students MUST read the relevant chapters before class. Quizzes will be given during the class hours.

The topics to be covered are listed below:

1. Introduction to Geotechnical Engineering – Practical Problems (Ch 1)
2. Soil composition, Soil identification & Classification: Soil formation and geological cycles, Clay minerals, Coarse and fine-grained soils – comparison, Phase relations, void ratio, porosity, unit weight (Ch 2)
3. Soil classification schemes: Particle size analysis, index properties, liquid limit/plastic limit (Ch 2)
4. Flow of water through soils: Darcy's law, hydraulic conductivity (Ch 2)
5. Flow through soils and problems, introduction to flow nets (Ch 2 and Ch 9)
6. Soil compaction (Ch 2)
7. Stresses, strains, and elastic deformations in soils (Ch 3)
8. Stresses and strains, Hook's law, Mohr's circle for stress and strain, stress invariants (Ch 3)

Midterm Exam– Closed book (the date will be announced)

9. Total and effective stress concept, pore water pressure (Ch 3)
10. Stress due to geostatic stress fields, vertical and horizontal stress, lateral earth pressure at rest (Ch 3)
11. Stresses in soils due to surface load: point load, line load, uniformly distributed load (Ch 3)
12. Consolidation settlement in fine-grained soils (Ch 4)
13. Shear strength of soils (Ch 5)

Final Exam – Closed book (the date will be announced)

Term Project: A common project with **`ENV413 Solid Waste Engineering`** course students will be assigned. Project will be in groups. The groups will be announced once the term project is given.

Grading Policy: Hmw (4pts), Quizzes (6pts), Term Project Report and Presentation (20p), Lab. works (10pts), Midterm Exam (30pts), Final Exam (30pts)

How to pass and do well in the course:

1. Come regularly to class & lab and pay attention. Ask questions.
2. Take good notes and understand what you wrote.
3. Before you attempt to solve your homework problems, read the appropriate chapter from the book as well as the class notes and try to understand (concept) solved problems.
4. Do **all** the homework by yourself.
5. Get help if you needed.
6. Prepare for each test beginning at least a week before the exam.

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.