



Course Syllabus

Course Code	Course Title	ECTS Credits
CEE-432	Ground Improvement Techniques	5
Prerequisites	Department	Semester
CEE-330	Engineering	Fall, Spring
Type of Course	Field	Language of Instruction
Elective	Civil & Environmental Engineering	English
Level of Course	Lecturer(s)	Year of Study
1 st Cycle	Dr Ernestos Sarris	1 st
Mode of Delivery	Work Placement	Corequisites
Face-to-face	N/A	None

Course Objectives:

The main objectives of the course are to:

- Introduce the students to the appropriate advanced techniques of solving geotechnical problems that are encountered in the field.
- Provide the general concepts of soft, weak and expansive soils.
- Obtain the knowledge of the technique of the drilled shaft, which is also known as cast-in-place method usually performed on weak and soft soils.
- Appraise the temporary measures that are applied in the field for reinforcing weak and soft soils before large-scale excavations.
- Teach methods for controlling landslides and slope stability analysis.
- Teach methods of soil improvement and ground modification to achieve soil strengthening by pore pressure dissipation, reinforced soils and compaction in weak and expansive soils.
- Provide the principles of the critical state theory in order to gain critical thinking in dealing with these problematic soils.
- Explain to the students the main elements of tunnel design in soft grounds.

Learning Outcomes:

After completion of the course students are expected to be able to:

- Apply fundamental knowledge and techniques for the analysis and design of foundations in weak soils.
- Know very well the concepts of the critical state theory of clays.
- Demonstrate techniques that are applied to foundations on weak soils.
- Perform analysis for temporary measures before large scale excavations to avoid caving and collapse of weak soils.
- Employ methods of soil improvement and ground modification.
- Demonstrate the concepts of tunnel design in soft grounds.

Course Content:

- Drilled shaft foundations.
- Temporary measures for excavations (Braced cuts).
- Foundations on weak and expansive soils (critical state theory).
- Soil improvement (reinforced earth and pore pressure dissipation techniques)
- Ground modification to improve soils strength (compaction).
- Tunnelling in soft grounds.

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises, discussion.

Assessment Methods:

Homework assignments, project, mid-term exams, final exam.

Required Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Principles of Foundation Engineering	Braja M. Das, Nagaratnam Sivakugan	Cengage Learning; 9 edition	2018	978-1337705028

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
Soil Improvement and Ground Modification Methods.	Peter Nicholson	ButterworthHeinemann, Elsevier	2014	9780124080768
The Mechanics of soils and Foundations, 2nd Edition	John Atkinson	Taylor Francis, New York	2007	9780203012888