Course Code	Course Title	ECTS Credits
CVEE-432	Ground Improvement Techniques	6
Department	**Semester**	**Prerequisites**
Engineering	Fall, Spring	CVEE-330, CVEE-431
Type of Course	**Field**	**Language of Instruction**
Elective	Civil & Environmental Engineering	English
Level of Course	**Year of Study**	**Lecturer(s)**
1st Cycle	4th	Dr Ernestos N. Sarris
Mode of Delivery	**Work Placement**	**Co-requisites**
Face-to-face	N/A	None

Objectives of the Course:

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:

- 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 Contents:

- 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).
- Tunneling in soft grounds.

Learning Activities and Teaching Methods:

Lectures, in-class examples and exercises, discussion.

Assessment Methods/Reading:

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

Required Textbooks:

Authors	Title	Publisher	Year	ISBN
Braja M. Das	Principles of Foundation Engineering, 7th Edition	Cengage Learning	2010	9780495668107

Recommended Textbooks/Reading:

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