



## Course Syllabus

<b>Course Code</b>	<b>Course Title</b>	<b>ECTS Credits</b>
CEE-431	Foundations and Retaining Structure Design	5
<b>Prerequisites</b>	<b>Department</b>	<b>Semester</b>
CEE-330	Engineering	Spring
<b>Type of Course</b>	<b>Field</b>	<b>Language of Instruction</b>
Required	Civil & Environmental Engineering	English
<b>Level of Course</b>	<b>Lecturer(s)</b>	<b>Year of Study</b>
1 <sup>st</sup> Cycle	Dr Loizos Papaloizou	4 <sup>th</sup>
<b>Mode of Delivery</b>	<b>Work Placement</b>	<b>Corequisites</b>
Face-to-face	N/A	None

### Course Objectives:

The main objectives of the course are to:

- Introduce students to the main concepts and techniques involved in shallow and deep foundations analysis and design.
- Teach the students to calculate the soil strength (ultimate bearing capacity) where geotechnical structures will be built for shallow foundations.
- Help the students understand the basic calculations for the stresses that are developing due to self-weight loading and due to geotechnical structure-weight loading.
- Calculate the ultimate bearing capacity and estimate the factor of safety of the soil where the structures will be built under special conditions (e.g. layered soils, on top of slopes weak soils).
- Application of numerical calculations for estimating the allowable bearing capacity and settlement in shallow foundations with computational tools.
- Provide techniques and specialized technical knowledge to help the students understand the earth lateral pressure useful in the design of retaining walls, sheet pile walls and slope stability analysis.
- Explain major issues involved in the design of pile foundations, brace cuts and mat foundations.
- Introduce the students to building code regulations.

**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 shallow and deep foundations.
- Understand very well the concepts of the ultimate and allowable bearing capacity and its importance in the analysis and design of geotechnical structures.
- Understand techniques to perform settlement and consolidation analysis of a variety of foundations.
- Perform stability analysis with the various methods.
- Understand the design of geotechnical structures (e.g slopes, retaining walls, piles).
- Understand how to use building code regulations for different types of foundations and retaining structures for designing.

**Course Content:**

- Shallow and deep foundations (stability).
- Bearing capacity of foundations.
- Settlement of foundations.
- Lateral earth pressure.
- Retaining walls.
- Slope stability.
- Pile foundations.
- Building code regulations for foundations design.

**Learning Activities and Teaching Methods:**

Lectures, Projects, Experiments, in-class assignments, discussion.

**Assessment Methods:**

Homework, Project, mid-term exam, final exam.

**Required Textbooks / Readings:**

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

**Recommended Textbooks / Readings:**

<b>Title</b>	<b>Author(s)</b>	<b>Publisher</b>	<b>Year</b>	<b>ISBN</b>
Foundation Engineering Handbook, 2 <sup>nd</sup> Edition	R. Day	McGraw-Hill Professional	2010	978-0071740098
Foundation Design: Principles and Practices, 3 <sup>rd</sup> Edition	D. P. Codulo William A. Kitch Man-chu Ronald Yeung	Pearson	2015	978-0133411898