



<b>Course Code</b> CVEE-431	<b>Course Title</b> Foundations and Retaining Structure Design	<b>ECTS Credits</b> 6
<b>Department</b> Engineering	<b>Semester</b> Fall, Spring	<b>Prerequisites</b> CVEE-330
<b>Type of Course</b> Required	<b>Field</b> Civil & Environmental Engineering	<b>Language of Instruction</b> English
<b>Level of Course</b> 1 <sup>st</sup> Cycle	<b>Year of Study</b> 4 <sup>th</sup>	<b>Lecturer(s)</b> Dr Ernestos N. Sarris
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b> None

### **Objectives of the Course:**

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:

- 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 Contents:**

- 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, in-class examples and exercises, discussion, projects

**Assessment Methods:**

Homework assignments, mid-term, final exam.

**Required Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
Braja M. Das	Principles of Foundation Engineering, 7 <sup>th</sup> Edition	Cengage Learning	2010	978-0495668107

**Recommended Textbooks/Reading:**

Authors	Title	Publisher	Year	ISBN
R. Day	Foundation Engineering Handbook, 2 <sup>nd</sup> Edition	McGraw-Hill Professional	2010	978-0071740098
D. P. Codulo	Foundation Design: Principles and Practices, 2 <sup>nd</sup> Edition	Prentice Hall	2000	978-0135897065