ECTS

ΕΥΡΩΠΑΪΚΟ ΣΥΣΤΗΜΑ ΜΕΤΑΦΟΡΑΣ ΑΚΑΔΗΜΑΪΚΩΝ ΜΟΝΑΔΩΝ ΣΤΗΝ ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ

(B) Course information in English

General course information:

Course title:	Deep Foundations and Retaining Diaphragms		**Course code:**	CE09_G07	
Credits:	5		**Work load (hours):**	140	
Course level:	Undergraduate	☑	Graduate		☐
Course type:	Mandatory	☐	Selective		☑
Course category:	Basic	☐	Orientation		☑
Semester:	9th		**Hours per week:**	4	

Course objectives (capabilities pursued and learning results):

Analysis and design of deep foundations and retaining diaphragms.
Construction arrangement, constructive designs, application of special solving codes.
Upon completion of the course, students are able to analyze and plan provisions for deep foundations and retaining diaphragms in civil engineering.

Prerequisites:

- Soil Mechanics I & II
- Foundations & Retaining Structures
- Computational Geotechnical Engineering
- Reinforced Concrete Behavior & Design

Instructor's data:

Name:	Georgios Efraimidis
Level:	Lecturer
Office:	102A Civil Engineering Building University of Thessaly Pedion Areos, GR - 383 34 Volos, Greece
Tel. – Email:	+30-24210-74155, gefraim@uth.gr
Other tutors:	

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	General presentation of deep foundations and retaining diaphragms. Reference to numerical methods use.	4	2
2	Categories of deep foundations. Estimation of ultimate strength and response under vertical and horizontal loading. Eurocode provisions. Construction methods, required equipment. Construction arrangements, pile and pile head reinforcement.	4	2
3	Single pile under vertical loading. Pile bearing capacity. Single pile response. t-z method. Pile tests.	4	4
4	Pile group under vertical loading. Pile group response. Interaction between piles, empirical stiffness and bearing capacity factors. Application of numerical methods to define the response of characteristic piles and pile heads.	4	4
5	Mechanisms of negative friction. Effects in pile groups. Countermeasures.	4	4
6	Single pile under horizontal loading. Pile bearing capacity. Single pile response. p-y method.	4	4
7	Pile group under horizontal loading. Pile group response. Interaction between piles, empirical stiffness and bearing capacity factors. Application of numerical methods to define the response of characteristic piles.	4	4
8	Retaining diaphragm walls. Construction methods. Required mechanical equipment. Construction and simulation stages during design of works.	4	4
9	An example of calculation and design of a retaining diaphragm.	4	6
10	Soil – structures interaction. Application in retaining diaphragms of extensive depth and multiple reaction systems.	4	6
11	Design of anchorages and struts. Assumptions, simulation framework, construction arrangements.	4	4
12	Implementation of 2D and 3D codes for the analysis of deep foundations. Presentation and operation. Example.	4	4
13	Implementation of 2D and 3D codes for the analysis of retaining diaphragms. Presentation and operation. Example.	4	4
14	General retrospection in analysis and design of deep foundations and retaining diaphragms.	4	4

Additional hours for:			
Class project	**Examinations**	**Preparation for examinations**	**Educational visit**
	3	25	

Suggested literature:

1) Comodromos, M.A. (2012). *Foundations – Retaining Structures: limit equilibrium –numerical methods, ISBN 978-960-478-506-3*. Klidarithmos ed., Athens (in Greek).

Other books:

2) Kavvadas, M., (2007), "Foundations in structural constructions ", NTUA, Athens (in Greek) (http://users.ntua.gr/kavvadas/Books/books.htm).
3) Barnes, G.E. (2005*). Soil Mechanics: Principles and Applications*. Klidarithmos Ed., Athens (In Greek).
4) Bowles, E.J., (1996), "Foundation Analysis and Design", McGraw Hill, New York.
5) Poulos, G.H. (1980). Pile foundation analysis and design. J. Wiley & Sons, N.Y.
6) Prakash, S. and Sharma, D.H., (1990), "Pile foundations in engineering practice", John Wiley and Sons Ltd, New York.
7) Sanglerat, G., Olivari, G. and Cambou, B. (1983). Problèmes pratiques de mécanique des sols et de fondations. Deuxième édition, Dunod, Paris.
8) Tomlinson, M.J., (1994), "Pile design and construction practice", E & FN Spon. London.

Teaching method *(select and describe if necessary* - **weight***):*		
Teaching	☑	60%
Seminars	☐	……%
Demonstrations	☐	……%
Laboratory	☐	……%
Exercises	☑	40%
Visits at facilities	☐	……%
Other *(describe):* ……	☐	……%
Total		100%

Evaluation method *(select)* - **weight:**				
	written	*%*	*Oral*	*%*
Homework	☐		☐	
Class project	☐		☐	
Interim examination	☐		☐	
Final examinations	☑	100	☐	
Other *(describe):* ……	☐		☐	