(B) Course information in English

General course information:

Course title:	Foundations & Retaining Structures	**Course code:**	ΓΚ3602
Credits:	5	**Work load (hours):**	121
Course level:	Undergraduate	×	Graduate
Course type:	Mandatory	×	Selective
Course category:	Basic	×	Orientation
Semester:	7th	**Hours per week:**	4

Course objectives (capabilities pursued and learning results):

Analysis and design of foundations and retaining structures.

Prerequisites:

Soil Mechanics I & II

Instructor's data:

Name:	Emilios Comodromos
Level:	Professor
Office:	218
Tel. – email:	+30 24210 74143, ecomo.users.uth.gr
Other tutors:	

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	General presentation of foundations and retaining structures. Short reference to limit equilibrium methods (advantages – disadvantages). Reference to the implementation of numerical methods in foundation and retaining design.	4	
2	Shallow foundations. Brief reference to methods estimating ultimate strength (description of failure mechanism – limit equilibrium) – Description of Eurocode 7 provisions. Bearing capacity under seismic loading – Reference to EAK-2000 and EC-8 code provisions.	4	4
3	Parametric definition of the bearing capacity envelope under the combination of vertical and horizontal loading and bending moment. Analysis and design of strip and mat foundations.	4	4
4	Deep foundations. Pile bearing capacity under vertical loading (DIN 4014, EC-7). Single pile response under vertical loads. t-z method.	4	4
5	Pile bearing capacity under horizontal loading (Broms method). Single pile response under horizontal loads. P-y method.	4	6
6	Pile tests. Results elaboration, back analysis using numerical methods.	4	
7	Pile group response under vertical loading. Interaction between piles, empirical stiffness and bearing capacity factors. Application of numerical methods to define characteristic piles' and pile heads' response.	4	4
8	Pile group response under horizontal loading. Interaction between piles, empirical stiffness and bearing capacity factors. Application of numerical methods to define characteristic piles' response.	4	4
9	Example of a pile group under vertical and horizontal loading. Analysis and design of piles' and pile head's reinforcement.	4	6
10	Retaining structures. Reference to earth pressures (earth pressures at rest, active, passive). Pressure variation according to displacements. Pressure variation due to seismic action. Design of	4	2

	reinforced concrete retaining walls (flexible).		
11	Design of sheet piles retaining walls (constructive details).	4	4
12	Design of pile and diaphragm walls, with or without anchorages or struts.	4	4
13	Examples of sheet piles and diaphragm retaining structures.	4	6
14	Introduction to solving retaining problems by using numerical methods. Assumptions and basic simulation principles. Examples.	4	

Additional hours for:			
Class project	**Examinations**	**Preparation for examinations**	**Educational visit**
	3	14	

Suggested literature:
Comodromos, E. (2019) *Deep foundations – Retaining Structures: limit equilibrium – numerical methods*, ISBN 978-960-478-506-3, editions Kleidarithmos, Athens (in Greek).

Recommended additional books:

Barnes, G.E. (2005*). Soil Mechanics: Principles and Applications*. Kleidarithmos Ed., Athens (In Greek).

Bowles, E.J. (1996). *Foundation analysis and design*. 5th edition, McGraw Hill, N.Y.

Poulos, G.H. (1980). *Pile foundation analysis and design*. J. Wiley & Sons, N.Y.

Tomlinson, M. J. (1994). *Pile design and construction practice*. E&FN Spon, London.

Prakash, S. and Sharma, D.H. (1990). *Pile foundations in engineering practice*.   J. Wiley & Sons, N.Y.

Sanglerat, G., Olivari, G. and Cambou, B. (1983). *Problèmes pratiques de mécanique des sols et de fondations*. Deuxième édition, Dunod, Paris.

Teaching method *(select and describe if necessary - **weight***):		
Teaching	þ	60%
Seminars	þ	5%

Demonstrations	þ	5%
Laboratory	- -	……….%
Exercises	þ	30%
Visits at facilities	- -	……….%
Other *(describe):* ………………………	- -	……….%
Total		100%

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