

ECTS

ΕΥΡΩΠΑΪΚΟ ΣΥΣΤΗΜΑ ΜΕΤΑΦΟΡΑΣ ΑΚΑΔΗΜΑΪΚΩΝ ΜΟΝΑΔΩΝ  
ΣΤΗΝ ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ

**(B) Course information in English**

**General course information:**

<b>Course title:</b>	Deep Foundations and Retaining Diaphragms	<b>Course code:</b>	ΓΕ0903
<b>Credits:</b>	6	<b>Work load (hours):</b>	140
<b>Course level:</b>	Undergraduate <input checked="" type="checkbox"/>	Graduate	<input type="checkbox"/>
<b>Course type:</b>	Mandatory <input type="checkbox"/>	Selective	<input checked="" type="checkbox"/>
<b>Course category:</b>	Basic <input type="checkbox"/>	Orientation	<input checked="" type="checkbox"/>
<b>Semester:</b>	9 <sup>th</sup>	<b>Hours per week:</b>	4
<b>Course objectives (capabilities pursued and learning results):</b>			
Analysis and design of deep foundations and retaining diaphragms. Construction arrangement, constructive designs, application of special solving codes. Upon completion of the course, students can to analyze and plan provisions for deep foundations and retaining diaphragms in civil engineering.			
<b>Prerequisites:</b>			
<ul style="list-style-type: none"> <li>• Soil Mechanics I &amp; II</li> <li>• Foundations and Retaining Structures</li> <li>• Computational Geotechnical Engineering</li> </ul>			

**Instructor's data:**

<b>Name:</b>	Georgios Efraimidis
<b>Level:</b>	Assistant Professor
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<b>Other tutors:</b>	

**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	

<b>Suggested literature:</b>	
<u>In Greek:</u>	
1) Comodromos, M.A. (2019). Foundations – Retaining Structures: limit equilibrium –numerical methods., Klidarithmos ed., Athens (in Greek).	
2) Kavvadas, M., (2007), "Foundations in structural constructions ", NTUA, Athens (in Greek) ( <a href="http://users.ntua.gr/kavvadas/Books/books.htm">http://users.ntua.gr/kavvadas/Books/books.htm</a> ).	
<u>In English:</u>	
1) Barnes, G.E., (2005), "Εδαφομηχανική: Αρχές και Εφαρμογές", Εκδόσεις Κλειδάριθμος, Αθήνα.	
2) Bowles, E.J., (2001), "Foundation Analysis and Design", McGraw Hill, New York.	
3) Das, B.M., (2011), "Principles of Foundation Engineering", Cengage Learning, Stamford.	
4) Prakash, S. and Sharma, D.H., (1990), "Pile foundations in engineering practice", John Wiley and Sons Ltd, New York.	
5) Tomlinson, M.J., (2014), "Pile design and construction practice", E & FN Spon, London.	
<u>Related scientific journals:</u>	
1) Computers and Geotechnics, ISSN: 0266-352X	
2) Géotechnique, ISSN 0016-8505	
3) International Journal of Geomechanics, ISSN: 1532-3641	
4) International Journal for Numerical and Analytical Methods in Geomechanics, ISSN: 0363-9061	
5) Journal of Geotechnical and Geoenvironmental Engineering, ISSN: 1090-0241	
6) Soil Mechanics and Foundation Engineering, ISSN: 0038-0741	

<b>Teaching method (select and describe if necessary - weight):</b>		
Teaching	<input checked="" type="checkbox"/>	50%
Seminars	<input type="checkbox"/>	.....%
Demonstrations	<input type="checkbox"/>	.....%
Laboratory	<input type="checkbox"/>	.....%
Exercises	<input checked="" type="checkbox"/>	50%
Visits at facilities	<input type="checkbox"/>	.....%
Other (describe): .....	<input type="checkbox"/>	.....%
<b>Total</b>		<b>100%</b>

<b>Evaluation method (select) - weight:</b>				
	<i>written</i>	<i>%</i>	<i>Oral</i>	<i>%</i>
Homework	<input type="checkbox"/>		<input type="checkbox"/>	
Class project	<input type="checkbox"/>		<input type="checkbox"/>	
Interim examination	<input type="checkbox"/>		<input type="checkbox"/>	
Final examinations	<input checked="" type="checkbox"/>	100	<input type="checkbox"/>	
Other (describe): .....	<input type="checkbox"/>		<input type="checkbox"/>	