

(B) Course information in English

General course information:

Course title:	Geotechnical Earth Structures	Course code:	CE08-G06
Credits:	5	Work load (hours):	120
Course level:	Undergraduate <input checked="" type="checkbox"/>	Graduate <input type="checkbox"/>	
Course type:	Mandatory <input type="checkbox"/>	Selective <input checked="" type="checkbox"/>	
Course category:	Basic <input type="checkbox"/>	Orientation <input checked="" type="checkbox"/>	
Semester:	8	Hours per week:	4
Course objectives (capabilities pursued and learning results):			
The students study: the analysis and design of embankments, and earth and rockfill dams. Site geology, possible foundation problems and various construction materials. Slope stability analysis and seepage analysis. Design of filters, diaphragms and grouting. Embankment construction quality control. Seismic analysis and performance-based design of earth and rockfill dams. Case histories of dams showing good performance and bad performance. Site visits on actual dams with technical presentations.			
Prerequisites:			

Instructor's data:

Name:	Panos Dakoulas
Level:	Professor
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Name:	
Level:	
Office:	
Tel. - email:	

Specific course information:

Week No.	Course contents	Hours	
		Course attendance	Preparation
1	Introduction. Embankments, earth dams and rockfill dams. Selection of dam type and zoning. Frequent causes of failure.	4	2
2	Geologic conditions, foundation problems, construction materials. Special geotechnical problems associated with common geologic formations.	4	2
3	Geotechnical site investigation. Permeability tests. Laboratory investigation of foundation and construction materials. Geotechnical parameters.	4	2
4	Methods of slope stability analysis of embankments and dams.	4	2
5	Applications of slope stability of embankments and natural slopes. 1st Set of Problems	4	5
6	Seepage flow through the foundation and embankment. Liquefaction. Pore water pressures within the embankment. 2nd Set of Problems	4	2
7	Design and construction of filters. Special problems in clayey soils, piping erosion. Specifications and quality control in the embankment zones, Proctor's tests. Dam Design Project assignment	4	20
8	Preparation of foundation, excavation at the abutments and associated problems. Diaphragms and cement grouting.	4	2
9	Construction details of embankments. Stages of construction and related works (diversion tunnel, spillway, etc).	4	2
10	Concrete-faced rockfill dams. Comparative advantages. Investigation of case histories of the performance of such dams.	4	2
11	Site visit of an actual dam. Analysis of the specific geologic conditions, foundation conditions, used materials, and other topics of design and safety.	4	
12	Seismic analysis of dams. Methods of analysis. Permanent seismic displacements of slopes. Examples of numerical simulations of actual dams.	4	2
13	Issues on dam safety. Monitoring the performance of dams with instruments.	4	2
14	Student Presentations of the Dam Design Projects.	4	

Additional hours for:			
Class project	Examinations	Preparation for examinations	Educational visit
	3	12	

Suggested literature:

1. Χωμάτινες Κατασκευές, Θανόπουλος, Ι, 2012 (διανέμεται)
2. Geotechnical Engineering of Dams, Robin Fell, Patrick MacGregor, David Stapledon, Graeme Bell, Taylor & Francis, 2014, p 1338.

Άλλα βοηθήματα

3. Εδαφομηχανική, Barnes, Κλειδάριθμος, 2005.
4. Τεχνικές προδιαγραφές φραγμάτων, Υ.ΠΕ.ΧΩ.Δ.Ε, 2004.
5. Geotechnical engineering of embankment dams, R.Fell, P.MacGregor, D.Stapledon, A.A. Balkema Publishers, 1992.
6. Design of small dams, U.S Dep. of the Interior, A Water Resources, Technical Publication, 3rd Edition, 1987.
7. Instrumentation of embankment dams and levees, U.S. Army Corps of, Eng., Eng. Manual 1110-2-1908, 1995.
8. Design and construction of levees, U.S. Army Corps of Eng., Eng. Manual, 1110-2-1913, 2000.
9. Stability of earth and rock-fill dams, U.S. Army Corps of Eng., Eng., Manual 1110-2-1902, 1970.
10. Construction control for earth and rock-fill dams, U.S. Army Corps of Eng., Eng. Manual 1110-2-1911, 1995.

Teaching method (select and describe if necessary - weight):

Teaching	<input checked="" type="checkbox"/>	70%
Seminars	<input type="checkbox"/>	
Demonstrations	<input type="checkbox"/>	
Laboratory	<input type="checkbox"/>	
Exercises	<input checked="" type="checkbox"/>	22%
Visits at facilities	<input checked="" type="checkbox"/>	8%
Other (describe):	<input type="checkbox"/>	
Total		100%

Evaluation method (select)- weight:				
	<u>written</u>	<u>%</u>	<u>Oral</u>	<u>%</u>
Homework	<input checked="" type="checkbox"/>	10%	<input type="checkbox"/>	
Class project	<input checked="" type="checkbox"/>	30%	<input type="checkbox"/>	
Interim examination	<input type="checkbox"/>		<input type="checkbox"/>	
Final examinations	<input checked="" type="checkbox"/>	60%	<input type="checkbox"/>	
Other (describe):	<input type="checkbox"/>		<input type="checkbox"/>	