COURSE CATALOG

Course Code: CE 331				**Course Name**: Soil Mechanics			
Semester	**T + P + L**	**Credits**	**ECTS**	**Language of Instruction**	**Course Type**	**Instruction Methods**	**Prequisite(s)**
5	3 + 0 + 2	4	7	English	Required (D1)	Lecture + Laboratory	None
Course Objectives			To introduce students a fundamental knowledge of soil types, soil properties, engineering behavior of soils as well as the basics of experimental soil mechanics through laboratory experiments.				
Topics Covered			Introduction. Soil as a three phase material. Grain size distributions (mechanical and hydrometer). Atterberg limits and index properties of soils. Classification of soils (USCS). Soil compaction. Capillarity effects in soils. Hydraulic conductivity. Darcy's equation. Seepage. Laplace equation and flow nets. Pore water pressure and effective stress. Strength characteristics of soils. Mohr's circle. Consolidation. Terzaghi's theory of 1D consolidation. Slope stability.				
Learning Outcomes of the Course			The students who pass this course should: 1- gain basic knowledge of soil mechanics and develop analytical and mathematical skills to identify the soil mechanics problems [1, 2, 3, 12] 2- have a working knowledge on soil mechanics laboratory experiments, e.g. sieve analysis, hydrometer tests, compaction tests, etc. [4,5] 3- be able to analyze, assess and manipulate laboratory and field data obtained by lab- and insitu – experiments [4, 5] 4- develop skills for computer usage of packages such as word, excel, matlab [4,5] 5- understand the practical applications of soil mechanics concepts used in geotechnical designs of engineering structures [7, 12, 13, 14] 6- gain a basic knowledge about various case studies of geotechnical engineering designs and state-of-the-art insitu experiments [7, 8,11, 12, 13,14] 7- develop skills of conveying technical material through oral presentations and written papers/reports [6, 15, 16] *[Note that the numbers in brackets refer to the bullet numbers in the program outcomes list.]*				
ISCED Category of the Course			52 Engineering				
Textbook			1- R. Holtz and W. Kovacs. *An Introduction to Geotechnical Engineering*. 1981. 2-J. P. Bardet. *Experimental Soil Mechanics.* Prentice Hall, 1997. (*For lab section*)				
Recommended Sources			R.F. Craig. *Craig's Soil Mechanics*. Spon Press, 1997. *(Available online through library)*				

WEEKLY SCHEDULE

Week	Theoretical Topic	Applied / Laboratory Topics
1	Introduction. An overview of soil mechanics and geotechnical engineering.	
2	Soil as a three phase material	Introduction and orientation to soil mechanics laboratory.
3	Grain size distribution (Sieve analysis & hydrometer test).	Specific gravity test. Water content determination.
4	Atterberg limits and index properties of soils.	Grain size distribution by mechanical and hydrometer test.
5	Classification of soils (USCS). Soil Compaction.	Atterberg limit tests.
6	Capillarity effects. Hydraulic conductivity.	Compaction tests.
7	Hydraulic conductivity. Darcy's equation. Midterm 1.	
8	Seepage. Laplace equation. Flow net.	Hydraulic conductivity test.
9	Pore water pressure. Effective stress.	
10	Strength characteristics of soils. Mohr's circle.	Direct shear test.
11	Strength characteristics of soils. Mohr's circle.	Unconfined compression test.
12	Consolidation. Terzaghi's theory of consolidation. Midterm 2.	Consolidation (Oedometer) test-1
13	Consolidation. Terzaghi's theory of consolidation.	Consolidation (Oedometer) test-2
14	Slope stability.	Triaxial Tests.

COURSE ASSESSMENT POLICY

	Activities	Number	Contribution (%)
Studies throughout the term	Quizes	-	-
	Term Homework/ Project	-	-
	Reports	-	-
	Graduation Thesis/ Project	-	-
	Seminar	-	-
	Homeworks	7	20
	Presentations	-	-
	Midterm Exams	2	25
	Project		
	Laboratory	10	20
	Other (field work)	-	-
FINAL EXAM		1	35
Total			100

CONTRIBUTION OF THE COURSE TO CIVIL ENGINEERING PROGRAM OUTCOMES

	Program Outcomes	1	2	3
1	The ability to apply knowledge of mathematics, science, and engineering			X
2	The ability to identify, formulate, and solve engineering problems			X
3	The ability to design a system or component to meet desired needs with realistic constraints such as economic, environmental, social, ethical, health and safety, manufacturability and sustainability		X	
4	The ability to analyze and interpret data			X
5	The ability to design and conduct experiments and apply experimental results to improve processes			X
6	The ability to convey technical material through oral presentations and written papers/reports			X
7	The ability to function within multidisciplinary teams		X	
8	The understanding of professional and ethical responsibilities		X	
9	The understanding of the impact of engineering on society	X		
10	The understanding of the necessity to engage in life-long learning	X		
11	The understanding of management and leadership principles and techniques		X	
12	The appreciation of the role of research in civil engineering problems		X	
13	A knowledge of contemporary issues in civil engineering		X	
14	The ability to use modern engineering techniques, skills, and tools			X
15	The ability to understand and explain basic concepts in management, business, and leadership		X	
16	A commitment to quality, punctuality and continuous improvement		X	

Contribution Level: 1 low, 2 medium, 3 high

ECTS-WORKLOAD TABLE

ACTIVITIES	Number	Duration (Hour)	Workload(Hour)
Lecture Time	14	3	42
Final Exam (Including Prepation Time)	1	24	24
Quizes	-	-	-
Term Homework / Project	-	-	-
Reports	-	-	-
Graduation Thesis/Project	-	-	-
Seminar	-	-	-
Study Time Outside the Class	14	1	14
Homeworks	7	3	21
Presentations	-	-	-
Midterm Exams (Including Prepation Time)	2	12	24
Project	-	-	-
Laboratory	10	5	50
Total Workload			175

ECTS Credits of the Course (Total Workload / 25)			7

Last update on **04.11.2013**	**Coordinator / PREPARED BY** **Cihan BAYINDIR**	**APPROVED BY** **Esin İnan**