COURSE INFORMATON						
Course Title	Code	Semester	L+P+L Hour	Credits	ECTS	
Designing with Geosynthetics	CE 554	-	3+0+0	3	10	

## Prerequisites

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Language of Instruction	English
Course Level	Master's Degree (Second Cycle Programs)
Course Type	Departmental Elective
Course Coordinator	Assoc. Prof. Dr. Hakkı Oral Özhan
Instructors	Assoc. Prof. Dr. Hakkı Oral Özhan
Assistants	-
Goals	To introduce the students the types, main properties and importance of geosynthetics in civil engineering applications; to design with geosynthetics in various civil engineering applications; to teach and apply different analyses in terms of geosynthetics usage.
Content	Types of geosynthetics, functions of geosynthetics, physical, mechanical and hydraulic properties of geosynthetics, drainage, filtration and seperation applications of geosynthetics, reinforcement and stabilization applications of geosynthetics, waste landfill applications of geosynthetics, soil improvement applications of geosynthetics.

Course Learning Outcomes	Program Learning Outcomes	Teaching Methods	Assessment Methods
1) Ability to identify types and main properties of geosynthetics.	1, 5, 7	1, 2, 3	А, В
2) Ability to identify functions of geosynthetics in civil engineering.	1, 5, 7	1, 2, 3	А, В
3) Ability to design with geosynthetics in civil engineering applications.	1, 2, 5, 7	1, 2, 3	А, В
4) Ability to identify and interpret the parameters needed for obtaining the engineering properties of geosynthetics.	1, 2, 5, 7	1, 2, 3	А, В

<b>Teaching Methods:</b>	1: Lecture, 2: Problem solving by instructor, 3: Problem solving assignment
Assessment Methods:	A: Written exam, B: Homework

	COURSE CONTENT				
Week	Topics	Study Materials			
1	Introduction; General description of the course contents and other information about the course	Lecture Notes			
2	Description and importance of Geosynthetics in Civil Engineering; Types of Geosynthetics: Geotextiles, Geogrids Geomembranes, Geosynthetics Clay Liners, Geocomposites	Lecture Notes			
3	Functions of Geotextiles: Seperation, Filtration, Drainage	Lecture Notes			
4	Functions of Geotextiles: Reinforcement	Lecture Notes			
5	Functions of Geotextiles: Reinforcement and Stabilization	Lecture Notes			
6	Functions of Geogrids	Lecture Notes			
7	Functions of Geomembranes	Lecture Notes			
8	Midterm exam, Functions of Geocomposites	Lecture Notes			
9	Functions of Geocells	Lecture Notes			
10	Functions of Geosynthetic Clay Liners	Lecture Notes			
11	Slope Stability Applications of Geosynthetics	Lecture Notes			
12	Waste Landfill Applications of Geosynthetics	Lecture Notes			
13	Soil Improvement Applications of Geosynthetics	Lecture Notes			
14	Foundation Engineering Applications of Geosynthetics	Lecture Notes			
15	Erosion and Scour Control Applications of Geosynthetics	Lecture Notes			

RECOMMENDED SOURCES					
Lecture Notes	These are the notes that the students wrote during the lectures.				
Textbook	-				
Additional Resources	Designing with Geosynthetics, Robert M. Koerner, Prentice Hall, 5th Edition, 2005 Fundamentals of Geosynthetic Engineering, S.K. Shukla, J.H. Yin, Taylor & Francis, 2006				

MATERIAL SHARING				
Documents	-			
Homeworks	Homeworks are returned to students after they are graded.			
Exams	Exams questions are solved if demanded.			

ASSESSMENT				
NUMBER	PERCENTAGE			
1	50			
5	50			
-	-			
-	-			
-	-			
	100			
	40			
	60			
	100			
	NUMBER 1 5 - - - -			

COURSE CATEGORY

Expertise Courses

COURSE'S CONTRIBUTION TO PROGRAM							
No	No Program Learning Outcomes		Contribution				
			2	3	4	5	
1	Attains knowledge through wide and in-depth investigations his/her field and surveys, evaluates, interprets, and applies the knowledge thus acquired.			٧			
2	Has a critical and comprehensive knowledge of contemporary engineering techniques and methods of application.	_	-	٧			
3	By using unfamiliar, ambiguous, or incompletely defined data, completes and utilizes the required knowledge by scientific methods; is able to fuse and make use of knowledge from different disciplines.						
4	Has the awareness of new and emerging technologies in his/her branch of engineering profession, studies and learns these when needed.						
5	Defines and formulates problems in his/her branch of engineering, develops methods of solution, and applies innovative methods of solution.	-		٧			

6	Devises new and/or original ideas and methods; designs complex systems and processes and proposes innovative/alternative solutions for their design.			-
7	Has the ability to design and conduct theoretical, experimental, and model- based investigations; is able to use judgment to solve complex problems that may be faced in this process.		v	
8	Functions effectively as a member or as a leader in teams that may be interdisciplinary, devises approaches of solving complex situations, can work independently and can assume responsibility.			
9	Has the oral and written communication skills in one foreign language at the B2 general level of European Language Portfolio.			
10	Can present the progress and the results of his investigations clearly and systematically in national or international contexts both orally and in writing.			
11	Knows social, environmental, health, safety, and legal dimensions of engineering applications as well as project management and business practices; and is aware of the limitations and the responsibilities these impose on engineering practices.			
12	Commits to social, scientific, and professional ethics during data acquisition, interpretation, and publication as well as in all professional activities	_		_

ECTS ALLOCATED BASED ON STUDENT WORKLOAD BY THE COURSE DESCRIPTION						
Activities	Quantity	Duration (Hour)	Total Workload (Hour)			
Course Duration (Excluding the exam weeks: 14x Total course hours)	14	3	42			
Hours for off-the-classroom study (Pre-study, practice)	14	10	140			
Hours for exam studies	2	7	14			
Midterm	1	2	2			
Homework	5	8	40			
Final	1	2	2			
Total Work Load			240			
Total Work Load / 25 (h)			10			
ECTS Credit of the Course			10			