

DEEP EXCAVATIONS AND RETAINING STRUCTURES

1	Course Title:	DEEP EXCAVATIONS AND RETAINING STRUCTURES	
2	Course Code:	INS5075	
3	Type of Course:	Optional	
4	Level of Course:	Second Cycle	
5	Year of Study:	1	
6	Semester:	1	
7	ECTS Credits Allocated:	6.00	
8	Theoretical (hour/week):	3.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Dr. Öğr. Üyesi YEŞİM SEMA ÜNSEVER	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	unsever@uludag.edu.tr 0224 2942946	
17	Website:		
18	Objective of the Course:	Earth retaining systems for deep excavations. Water pressure acting on earth retaining systems and related problems. Lateral earth pressure acting on earth retaining systems. Lateral supporting elements: Ground anchors and struts. Types, components, production and installation, dimensioning, bearing capacity, corrosion protection, testing and pre-stressing of anchors. Lateral and vertical displacements of adjacent ground. Modes of failure of retaining systems. Sloped excavations in soil and rock. Instrumentation and monitoring of deep excavations. Soil nailing: system description and design.	
19	Contribution of the Course to Professional Development:	This course teaches retaining systems for deep excavations and also types of retaining structures.	
20	Learning Outcomes:		
		1	Be able to learn the types of deep excavations and retaining structures
		2	Be able to learn deep excavations and retaining structures applications
		3	Be able to calculate the forces acting on retaining structures
		4	Be able to learn the design criteria
		5	Be able to apply various methods to calculate the stability of the retaining walls and excavations
		6	Be able to design of retaining walls
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21	Course Content:		
		Course Content:	
Week	Theoretical	Practice	

1	Introduction	
2	Typical retaining walls; Gravity walls, Cantilever walls, Butressed walls, Reinforced earth walls	
3	Theory of Lateral earth pressure	
4	Stability problems of retaining structures	
5	Application and design of retaining structures	
6	Types and application of retaining walls at deep excavations	
7	Pore pressure effect on retaining structures	
8	Modern retaining structures; Anchors, Sheet piles, and their stabilities	
9	Modern retaining structures; Anchors, Sheet piles, and their stabilities	
10	Diaphragm walls, applications and stability	
11	Piled walls and their systems	
12	Reinforced earth walls and applications	
13	The analysis of in-situ retaining walls and placement of instrumentations and monitoring the structures	
14	Design examples	

22	Textbooks, References and/or Other Materials:	R.S.Sinha, Underground Structures, Elsevier, 1989; F. Arıoğlu ve A.O. Yılmaz, Çözümlü problemlerle veraltı yapıları, 2010		
Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical	R	14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Self study and preperation	U	14	9.00	126.00
Homeworks		1	10.00	10.00
Final Exam Projects	1	60.00	0.00	0.00
Field Studies		0	0.00	0.00
Contribution of Term (Year) Learning Activities to Midterm Exams		40.00	2.00	2.00
Others		0	0.00	0.00
Contribution of Final Exam to Success Grade		60.00	2.00	2.00
Total Work Load				182.00
Measurement and Evaluation Techniques Used in the Course		Written exams of numerical and theoretical questions and assignments		
Total Work load / 30 hr				
ECTS Credit of the Course				

25	CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS															
	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	5	4	4	3	0	4	0	0	3	3	0	0	0	0	0	0
ÖK2	5	3	4	0	0	4	0	0	0	0	0	0	0	0	0	0
ÖK3	5	3	4	0	0	4	0	0	0	0	0	0	0	0	0	0
ÖK4	5	5	4	0	0	4	0	0	0	0	4	0	0	0	0	0

ÖK5	5	4	5	3	0	4	0	0	0	3	4	0	0	0	0	0
ÖK6	5	5	4	3	0	5	0	0	0	3	4	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low		2 low		3 Medium		4 High		5 Very High							