DEPARTMENT OF CIVIL ENGINEERING

Course Details				
Code	**Academic Year**			**Semester**
BAU465	3-4			Fall, Spring
Title	**T**	**A**	**L**	**ECTS**
Introduction to Coastal Engineering	3	2	-	6

Language	German					
Level	**Undergraduate**	✓	**Graduate**		**Postgraduate**	
Department / Program	Civil Engineering					
Forms of Teaching and Learning	Formal					
Course Type	**Compulsory**		**Elective**	✓		
Objectives	The lecture aims to provide theoretical and technical knowledge for coastal engineering and coastal structures with applications focusing on design fundamentals.					
Content	Purpose and contents of coastal engineering, coastal morphology and hydrodynamics, classification of coastal structures, introduction to water wave mechanics, linear wave theory, wave-sea bottom interaction, wave-structure interaction, wave breaking. Characteristics of ocean waves and spectral representation. Wave estimation methods. Breakwaters, types and type selection. Design of rubble mound breakwaters. Design of vertical breakwaters. Special breakwaters. Ports and berthing structures. Coastal sediment transport. Groins and revetments. Wave energy. Fundamentals of offshore engineering. Numerical and physical modeling in coastal engineering.					
Prerequisites	“Fluid Mechanics”					
Coordinator						
Lecturer(s)						
Assistant(s)						
Work Placement						

Recommended or Required Reading	
Books / Lecture Notes	Lecture notes and applications are shared online with the students.
Other Sources	Kamphuis, J.W. (2000) “Introduction to Coastal Engineering and Management”, World Scientific Publishing, Singapore. EM 1110-2-1100 (2005) “Coastal Engineering Manual”, US Army Corps of Engineers, Washington D.C.

Additional Course Material	
Documents	
Assignments	
Exams	

Course Composition

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Mathematics und Basic Sciences		%
Engineering	100	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

Assessment

Activity	Count	Percentage (%)
Midterm Exam	1	20
Quiz		
Assignments	4	10
Attendance		
Recitations		
Projects	1	30
Final Exam	1	40
	Total	**100**

ECTS Points and Work Load

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	3	42
Assignments	4	4	16
Presentation / Seminar Preparation			
Midterm Exam	1	2	2
Recitations	14	2	28
Laboratory			
Projects	1	36	36
Final Exam	1	2	2
		Total Work Load	**168**
		ECTS Points (Total Work Load / Hour)	**6**

Learning Outcomes

1	Knowledge of the morphological and dynamic characteristics of the coastal area and their impact on the design of coastal structures.
2	Knowledge of the types and functions of coastal structures.
3	Ability to perform simple calculations of water wave problems.

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4	Ability to design rubble mound and vertical breakwaters.
5	Ability to make the conceptual design a port project and associated infrastructure..
6	Knowledge of sediment movement on a coast and coastal erosion protection.
7	
8	
9	
10	
11	
12	

Weekly Content	
1	Scope and contents of coastal engineering, classification of coastal structures
2	Coastal morphology and hydrodynamics, coastal processes
3	Properties of water waves, linear wave theory
4	Wave-sea bottom and wave-structure interaction. Wave breaking.
5	Characteristics of ocean waves, wave specta. Simplified wave estimation methods.
6	Breakwaters. Types and type selection. Design wave concept.
7	Planning and design of rubble mound breakwaters.
8	Interm exam.
9	Planning and design of vertical breakwaters.
10	Special breakwaters.
11	Ports
12	Berthing structures
13	Coastal sediment transport, design of groins and revetments.
14	Wave energy. Principles of offshore engineering.
15	Physical and numerical modeling in coastal engineering.

Contribution of Learning Outcomes to Program Objectives (1-5)

	P1	**P2**	**P3**	**P4**	**P5**	**P6**	**P7**
1	5	5	3	5	1	5	3
2	5	5	1	5	1	1	1
3	5	5	1	1	1	5	1
4	5	5	1	5	1	5	1
5	5	5	1	5	1	1	1
6	5	5	1	5	1	3	1
7							
8							

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9							
10							
11							
12							

Contribution Level	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High
Compiled by:	Dr. M. Adil Akgül
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