

DEPARTMENT OF CIVIL ENGINEERING

Course Details				
<b>Code</b>		<b>Academic Year</b>		<b>Semester</b>
BAU451		4		Fall
<b>Title</b>		<b>T</b>	<b>A</b>	<b>L</b>
Water Resources		3	2	6
<b>Language</b>				
German				
<b>Level</b>		<b>Undergraduate</b>	✓	<b>Graduate</b>
<b>Department / Program</b>		Civil Engineering		
<b>Forms of Teaching and Learning</b>		Formal		
<b>Course Type</b>		<b>Compulsory</b>		<b>Elective</b>
				✓
<b>Objectives</b>		Teaching the basics of hydrology and rural water management and related practical applications in various fields of water resources engineering		
<b>Content</b>		Hydraulic engineering: hydrology, river engineering, dams, hydropower plants, hydraulic engineering, coastal engineering Engineering hydrology: water cycle and household, precipitation, evaporation, infiltration, groundwater, runoff, basics of river basin modeling, runoff formation models, system hydrology, unit gait processes, translation and retention models, watercourse models, physically based hydrological models, agricultural hydraulic engineering Water management projects, interaction of urban water management, hydrological and hydraulic engineering aspects		
<b>Prerequisites</b>		"Fluid Mechanics"		
<b>Coordinator</b>				
<b>Lecturer(s)</b>				
<b>Assistant(s)</b>				
<b>Work Placement</b>				
Recommended or Required Reading				
<b>Books / Lecture Notes</b>		„Hydraulik für Bauingenieure: Grundlagen und Anwendungen“, Robert Freimann „Hydrologie und Wasserwirtschaft – Eine Einführung für Ingenieure“, Ulrich Maniak		
<b>Other Sources</b>				
Additional Course Material				
<b>Documents</b>				
<b>Assignments</b>				
<b>Exams</b>				
Course Composition				
<b>Mathematics und Basic Sciences</b>				%

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Engineering	100	%
Engineering Design		%
Social Sciences		%
Educational Sciences		%
Natural Sciences		%
Health Sciences		%
Expert Knowledge		%

**Assessment**

Activity	Count	Percentage (%)
Midterm Exam	1	26
Quiz		
Assignments	8	24
Attendance		
Recitations		
Projects		
Final Exam	1	50
<b>Total</b>		<b>100</b>

**ECTS Points and Work Load**

Activity	Count	Duration	Work Load (Hours)
Lectures	14	3	42
Self-Study	14	2	28
Assignments	8	4	32
Presentation / Seminar Preparation			
Midterm Exam	1	1	2
Recitations	14	2	28
Laboratory			
Projects			
Final Exam	1	2	10
<b>Total Work Load</b>			<b>142</b>
<b>ECTS Points (Total Work Load / Hour)</b>			<b>6</b>

**Learning Outcomes**

1	Hydraulic engineering: scientific basics and their application in the planning, calculation and dimensioning of simple hydraulic engineering systems
2	Engineering hydrology: scientific foundations and their implementation for the planning, calculation and measurement of simple hydrological systems in rural and urban areas. Examples of applications from the water sector: Independent processing of simple engineering projects from the water sector
3	

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12	

**Weekly Content**

1	Fundamentals of hydrology, laws used in hydrology, water cycle
2	Precipitation, evapotranspiration, infiltration, groundwater hydraulics
3	Runoff and surface flow, surface drainage, well hydraulics
4	River flow, measurements and analysis, hydrograph theory
5	Unit hydrograph theory and applications
6	River morphology, sediment motion in rivers
7	Flood protection, structural measures and design
8	Dams and reservoirs.
9	Dams, stability
10	Weirs and regulators, watertightness, weir hydraulics
11	Hydropower, navigation channels
12	Physical and numerical modeling in water resources engineering
13	Environment-structure-hydrology interaction in water resources
14	Fundamentals of coastal engineering, coastal morphology, water wave mechanics and practical applications
15	Breakwaters and shore protection structures

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

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

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<b>8</b>							
<b>9</b>							
<b>10</b>							
<b>11</b>							
<b>12</b>							
<b>Contribution Level</b>	1: Low 2: Low-intermediate 3: Intermediate 4: High 5: Very High						

<b>Compiled by:</b>	M. Adil Akgul, PhD.
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