



## Subject card

Subject name and code	Hydro and marine civil engineering, PG_00041516						
Field of study	Civil Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	1	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geotechnics, Geology and Marine Civil Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Waldemar Magda					
	Teachers	dr inż. Witold Sterpejkowicz-Wersocki dr hab. inż. Waldemar Magda dr inż. Andam Mustafa					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
Learning activity and number of study hours	Learning activity	Participation in didactic classes included in study plan	Participation in consultation hours		Self-study		SUM
	Number of study hours	45	5.0		0.0		50
Subject objectives	Presentation of basic hydro and marine civil engineering structures together with basic computational procedures for determining environmental forces acting on a structure (vertical-wall breakwater, rubble mound breakwater, weir, dam).						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W11] has deep knowledge of marine and inland hydrotechnical constructions; has knowledge about hydraulical and hydrological constrains in design and exploitation of buildings	Student has a wide knowledge on hydro and marine civil engineering structures. Student knows some complex systems of environmental loads acting on a structure			[SW1] Assessment of factual knowledge		
	[K7_W10] knows modern building materials as well as technologies and methods of its manufacturing and production of construction elements	Student has a knowledge on different types of construction materials used in hydro-and marine civil engineering			[SW1] Assessment of factual knowledge		
	[K7_U10] can analyse complicated environmental loads acting on a construction; can apply proper processes to design marine and hydroengineering constructions taking into consideration hydrological and hydraulical impact	Student is able to analyse complex patterns of environmental loadings acting on: seabed, vertical-wall breakwater, rubble mound breakwater, submarine pipelines, weirs, embankment and concrete dams			[SU1] Assessment of task fulfilment		

Subject contents	<p>Lecture: Basic wave parameters, wave theories, progressive and standing wave, wave reflection, hydrostatic and hydrodynamic loads acting on a vertical-wall breakwater, hydrostatic and hydrodynamic uplift force, stability conditions for a vertical-wall breakwater, rubble mound breakwater, Hudson formula, types of concrete armour units, wave run-up on inclined slope of breakwater. Hydraulics of spillways and outlets. Seepage. Concrete dam engineering – classification, requirements, loads. Embankment dam engineering – classification, requirements, loads. Energy dissipation. Drainages. Water power engineering – energy resources, types of hydropower, types of water turbines.</p> <p>Excercise: Computation of: basic regular surface water wave parameters, hydrostatic and hydrodynamic forces acting on a vertical-wall breakwater, breakwater stability, reduced forces acting on a breakwater founded on a rip-rap foundation layer, weight of individual armour unit used for rubble mound breakwater protection. Hydraulic and stability calculations of low head hydraulic structure (weir) – discharge capacity of spillway, stilling basin, seepage, loads, stability.</p>		
Prerequisites and co-requisites	No preliminary and additional requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	written test (exercises in "marine" part)	60.0%	50.0%
	written test (exercises in "hydro" part)	60.0%	50.0%
Recommended reading	Basic literature		<ol style="list-style-type: none"> <li>1. Shore Protection Manual, US Corps of Engineers, 1984</li> <li>2. Hydraulic Structures – P. Novak A.I.B. Moffat and C. Nalluri, R. Narayanan, Taylor &amp; Francis, 2007</li> <li>3. The engineering of large dams – Henry H. Thomas, John Wiley &amp; Sons, 1976</li> <li>4. Design of small dams – US Department of the Interior – Bureau of reclamation</li> </ol>
	Supplementary literature		<ol style="list-style-type: none"> <li>1. Mani J. S.: Coastal Hydrodynamics, PHI Learning Private Limited, New Delhi, 2012.</li> <li>2. Dean R. G., Dalrymple R. A.: Water Wave Mechanics for Engineers and Scientists. Advanced Series on Ocean Engineering – Volume 2, World Scientific Publishing Co. Pte. Ltd., Fourth reprinting 1994, Singapore.</li> </ol>
	eResources addresses		Adresy na platformie eNauzanie:
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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