



Subject card

Subject name and code	Hydro and marine civil engineering, PG_00041516						
Field of study	Civil Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
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	2		ECTS credits		2.0		
Learning profile			Assessment form		assessment		
Conducting unit	Department of Geotechnics, Geology and Marine Civil Engineering -> Faculty of Civil and Environmental Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Waldemar Magda				
	Teachers		dr inż. Witold Sterpejkowicz-Wersocki				
Lesson types	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						
	eNauczanie source addresses: Moodle ID: 29229 Hydro and marine civil engineering https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29229						
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_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 has a wide knowledge on hydro and marine civil engineering structures. Student knows some complex systems of environmental loads acting on a structure.		[SU1] Assessment of task fulfilment		
	[K7_W10] knows modern building materials as well as technologies and methods of its manufacturing and production of construction elements		Student is able to analyze complex patterns of environmental loadings acting on: seabed, vertical-wall breakwater, rubble mound breakwater, submarine pipelines, weirs, embankment and concrete dams.		[SW1] Assessment of factual knowledge		
	[K7_W11] has deep knowlege of marine and inland hydrotechnical constructions; has knowledge about hydraulical and hydrological constrains in design and exploitation of buildings		Student has a knowledge on different types of construction materials used in hydro-and marine civil engineering.		[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture 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. 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.		
Prerequisites and co-requisites			
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	1. Shore Protection Manual, US Corps of Engineers, 1984. 2. Hydraulic Structures P. Novak A.I.B. Moffat and C. Nalluri, R. Narayanan, Taylor & Francis, 2007. 3. The Engineering of Large Dams Henry H. Thomas, John Wiley & Sons, 1976. 4. Design of Small Dams US Department of the Interior Bureau of reclamation.	
	Supplementary literature	1. Mani J. S.: Coastal Hydrodynamics, PHI Learning Private Limited, New Delhi, 2012. 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.	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Practical activites within the subject	Not applicable		

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