GDAŃSK UNIVERSITY OF TECHNOLOGY

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	1	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		

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

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 hydotechnical 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

<table>
<tr><td>Subject contents</td><td>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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td></td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>written test (exercises in "marine" part)</td><td>60.0%</td><td>50.0%</td></tr>
<tr><td>written test (exercises in "hydro" part)</td><td>60.0%</td><td>50.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>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.</td></tr>
<tr><td>Supplementary literature</td><td>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.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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