GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069417		
Field of study	Budownictwo wodne i morskie		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	
Mode of study	Part-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish
Semester of study	7	ECTS credits	4.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Remigiusz Duszyński	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	10.0	15.0	0.0	0.0	0.0	25

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	25	5.0	70.0	100

Subject objectives

The aim of the subject is to familiarize students with the basics of design, construction, and operation of hydrotechnical structures used in water and marine construction, taking into account environmental, material, and technological aspects. The student gains the knowledge necessary to solve engineering problems related to water management, flood protection, and the construction of port and marine infrastructure

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] Demonstrate knowledge and understanding of the processes and established methods of analysis / solution of engineering issues & problems in the field of civil engineering and of their limitations.	Student understands the need to apply an engineering approach while adhering to the principles of safety, economics, and sustainable development.	[SW1] Ocena wiedzy faktograficznej
[K6_W07] Understand the investment's impact on the environment and the interrelationships and dependencies between the building structure and the natural environment	Student understands the impact of water and marine structures on the natural environment and knows the principles of designing hydrotechnical objects, taking into account environmental protection and sustainable development requirements.	[SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym
[K6_U01] Apply knowledge and understanding of mathematics as well as sciences and engineering disciplines underlying civil engineering to solve engineering problems and issues.	Student can calculate the forces of water pressure, buoyancy, filtration, and wave action on hydraulic structures.	[SU1] Ocena realizacji zadania
[K6_U02] Analyse & solve engineering issues & problems in the field of civil engineering by applying appropriate and relevant established analytical, numerical and experimental methods.	The student applies analytical and computational methods in the dimensioning of elements of hydraulic structures (e.g., calculations of pressure, filtration, slope stability, wave action), using available computational tools (spreadsheets, engineering software) for simulation and verification of results.	[SU4] Ocena umiejętności korzystania z metod i narzędzi

Subject contents

Course content – lecture

1. Introduction to hydraulic and marine engineering classification, significance, division of structures.
2. Basic issues of hydraulics and hydrology applied in hydraulic engineering.
3. Dam structures: dams, weirs, thresholds, retention reservoirs.
4. Spillways and fish passes.
5. Flood protection structures embankments, polders, reservoirs.
6. Port and marine construction quays, breakwaters, piers, port basins.
7. Foundations for hydrotechnical structures.
8. Materials and technologies used in water and marine construction.
9. Operation and maintenance of water structures.
10. Environmental protection in water and marine engineering.

Course content – exercises

1. Analysis of filtration through a dam.
2. Selection of the type of hydraulic structure and its basic parameters.
3. Hydrostatic and stability calculations for simple hydraulic structures.
4. Design of the cross-section of a flood embankment.
5. Design of a quay or breakwater basic assumptions.

Prerequisites and co-requisites

The student should have basic knowledge of:

- strength of materials,
- hydrology,
- geotechnics.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Exercises - project completion	60.0%	60.0%
Lecture - colloquium	60.0%	40.0%

Recommended reading

Basic literature	1.Mazurkiewicz B., Wiśniewski F.: Morskie budowle hydrotechniczne. Zalecenia do projektowania, wykonywania i utrzymywania. Wyd. 6, 2019 2. W. Magda, Budownictwo Morskie. Wybrane zagadnienia wraz z przykładami obliczeniowymi. Wyd. PWN 2020 3. Duszyński R.: Zastosowanie konstrukcji gabionowych w regulacji koryt cieków wodnych. Maccaferri. Warszawa 2017 4. Thoresen Carl A.: Port designer's handbook. 2018
Supplementary literature	1. Bednarczyk S., Duszyński R.: Hydrauliczne i hydrotechniczne podstawy regulacji i rewitalizacji rzek. Gdańsk 2008 2. Mazurkiewicz B.: Porty jachtowe-mariny: projektowanie. Wyd. 2 rozsz. 2010 3. Lewko E.: Portowe roboty czerpalne i podwodne. 2006
eResources addresses	

Example issues/ example questions/ tasks being completed	1. Describe the basic types of water and marine structures and their functions. 2. List and discuss the basic elements of an earth dam and their functions. 3. What is the phenomenon of soil filtration? What are the methods of limiting it in hydraulic structures? 4. What is a weir and what are its basic types? 5. Explain the importance of breakwaters in marine construction. 6. Discuss the main types of loads acting on hydrotechnical structures. 7. What building materials are most commonly used in water and marine construction? 8. What are the most important factors affecting the durability of hydrotechnical structures? 9. Explain the difference between a concrete dam and an earth dam. 10. What is the role of spillway devices in retention reservoirs?
Practical activites within the subject	Not applicable

Document generated electronically. Does not require a seal or signature.