GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069236						
Field of study	Civil Engineering						
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	Full-time studies		Mode of delivery	at the university			
Year of study	4		Language of instruction	Polish			
Semester of study	7		ECTS credits	2.0			
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. Witold Tisler				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=46478						
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	30		3.0	17.0	50	
Subject objectives	The aim of the lecture is to introduce students to the different types of civil structures, divided into marine and hydraulic ones. Students will gain knowledge about the classification of structures, the interactions that affect them, and their engineering purposes. The design phase will present a chamber cofferdam design constructed in sheet piles and preliminary design of flat gate.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] Design engineering objects and details, processes and engineering systems by applying appropriate standards and methods of design.	Students can create a bar model for a sheet pile wall profile, fixed and/or simply supported in the ground. They can select spring stiffnesses based on the data specified in the design and then perform iterative calculations using dedicated software.	[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools
[K6_U07] Design and build engineering structures in a sustainable manner, with care for the natural environment and a minimum carbon footprint	The student can verify the stresses of each structural element according to the appropriate standard or design recommendations. They can then optimize the structural elements.	[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information
[K6_K04] Engages in independent lifelong learning and individually follows the development of science and technology in the field of civil engineering.	Students know where to find information regarding the design of hydraulic structures. They can evaluate and distinguish between recommendations and guidelines.	[SK1] Assessment of group work skills [SK2] Assessment of progress of work
[K6_U04] Reads and prepares construction documentation (including drawings, graphic documentation in the CAD environment), efficiently uses maps as well as architectural, construction and geodetic drawings.	Based on the provided geotechnical and field data, the student is able to create a soil model and then adopt the initial dimensions of the steel structure.	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[K6_W03] Demonstrate knowledge and understanding of the processes, established standards and design methods in the civil engineering subject area and of their limitations.	Based on the calculations performed, the student is able to interpret the calculation results and, for the obtained internal forces, adopt appropriate profiles that meet established standards and design principles.	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects

Subject contents

The general lecture schedule includes a discussion and presentation of basic concepts and definitions of marine and inland hydrotechnical facilities: ports, marinas, docks, slipways, port channels, fairways, weirs, gates, etc. The topics of cargo handling and mooring and fendering facilities, which constitute the main components of quay equipment, will also be addressed. The final part of the course will present methods for eliminating waterlogging at quays, as well as the maintenance and periodic inspections of marine and inland hydrotechnical structures. The design portion focuses on the design of a chamber cofferdam based on given terrain and geotechnical data. Students will acquire knowledge on collecting ground and water loads, taking into account the flow under the wall. As part of the course, the student will also prepare a preliminary design of a steel flat gate.

Prerequisites and co-requisites

Mastery of material from previous semesters: soil mechanics, structural modeling, AutoCAD, foundation engineering, hydraulic and marine engineering. Knowledge of technical drawing principles and the Windows environment. Knowledge of Polish and basic English.

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Attendance at classes	100.0%	20.0%
Project	60.0%	80.0%

Recommended reading

Basic literature

1. Wiłun, Z. (2008). *Zarys geotechniki: podręcznik akademicki*. Wydawnictwa Komunikacji i Łączności.

2. Szymański, A. (2007). Mechanika gruntów. *Wydawnictwo SGGW, Warszawa*, 7-20.

3. Mazurkiewicz, B. K. (2008). Morskie budowle hydrotechniczne: zalecenia do projektowania i wykonywania Z 1-Z 45.

4. Mazurkiewicz, B. (2004). Porty jachtowe-mariny. Projektowanie.

5. Boretti i inni Przykłady obliczeń konstrukcji stalowych, Wydawnictwo Arkady, Warszawa 1993

6. Bednarczyk, Bolt, Mackiewicz Stateczność oraz bezpieczeństwo jazów i zapór, Wydawnictwo PG, Gdańsk 2009

7. Balcerski i inni Budownictwo Betonowe tom XVII, Budowle Wodne Śródlądowe, Arkady, Warszawa, 1969

	Supplementary literature	1. Materiały dydaktyczne do przedmiotu fundamentowanie oraz mechanika gruntów. 2. Pisarczyk, S. J. (2012). *Fundamentowanie dla inżynierów budownictwa wodnego*. Oficyna Wydawnicza Politechniki Warszawskiej. 3. Klosinski, B. (2013). Ocena i przyszłość Eurokodu 7 Projektowanie geotechniczne. *Scientific Review Engineering and Environmental Sciences*, *22*(2 [60). 4. Depczyński, Szamowski Budowle i zbiorniki wodne, Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa, 1999
	eResources addresses	
Example issues/ example questions/ tasks being completed	1. Determine the active and passive pressures, as well as the groundwater pressure acting on the sheet pile wall, taking into account the possibility of flow beneath the wall. 2. Perform iterative calculations for the sheet pile wall in Robot, selecting the minimum length of the sheet pile wall. 3. Verify the vertical and horizontal load-bearing capacity of the foundation. 4. Determine the stiffness of the springs characterizing the passive earth pressure 5. Select the thickness of the sheet metal supporting the flat gate. 6. Determine the loads and select the profile of the grid beam in the flat gate.	
Work placement	Not applicable	

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