



Subject card

Subject name and code	Foundation of hydrotechnical structures, PG_00044240						
Field of study	Civil Engineering						
Date of commencement of studies	October 2020		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group		Optional 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		3.0		
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. Adam Krasieński				
	Teachers		dr hab. inż. Adam Krasieński				
			dr inż. Witold Tisler				
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						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15166						
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		5.0		40.0	75
Subject objectives	Solving problems in hydrotechnical construction. Skills in designing and constructing structures of hydrotechnical engineering and their foundations, such as bulkheads, sheet piling, quays, weirs, locks.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U07] Can design and properly dimension basic elements of construction or basic foundations of general, hydrotechnical and bridge constructions	knows how to design foundations for hydrotechnical, maritime and water construction facilities	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	[K6_W08] knows the codes of modern geotechnical investigations and technologies, knows the principles of foundations and safe design of foundations of typical buildings	knows the calculation procedures for foundation based on European standards	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
	[K6_U12] knows rules of manufacturing and application of building materials, is able to properly choose them; is able to make simple laboratory experiments for judging quality of building materials	the correct choice of materials to the environmental conditions	[SU2] Assessment of ability to analyse information
	[K6_U14] can read geological maps and profiles, recognizes most popular rocks and minerals, recognizes the soil-water conditions of construction site	knowledge of classification and names of soils in accordance with European standards	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K6_W07] has basic knowledge on natural processes (hydrological, hydraulic or geological) and its influence on building subsoil; understands specific aspects of surface and underground water, which constraints the design and exploitation of buildings and engineering objects	knows how to interpret geotechnical documentation and knows soil parameters	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
Subject contents	<p>General overview of hydrotechnical structures. Geotechnics repertory. Calculation of geotechnical structures by the method of interaction with an elasto-plastic soil medium. Steel and prefabricated piles in foundations of hydrotechnical structures. Sheet piling and sheet piles in the foundations of hydrotechnical structures. Hydrotechnical cofferdams: application, types, structures, calculation and design. Foundation of maritime structures: breakwaters, wharves, piers and port platforms, dolphins, offshore wind farms. Foundation of inland structures: weirs, locks, dams. Designing of a hydrotechnical cofferdams made of two sheet piling.</p>		
Prerequisites and co-requisites	<p>Completion of the courses:</p> <ul style="list-style-type: none"> - foundation -Soil Mechanics -general mechanics -technical drawing -basis of general construction, construction of reinforced concrete and steel. 		

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Activity at lectures	0.0%	10.0%
	Completion of the project	60.0%	50.0%
	Test of lectures	55.0%	40.0%
Recommended reading	Basic literature	<p>1. S. Hueckel: Budowle morskie tom I-IV, Wydawnictwo Morskie, Gdańsk 1972.</p> <p>2. Hueckel: Grodze. Wyd. 2, Wydawnictwo Arkady, Warszawa, 1968.</p> <p>3. S. Massel i in.: Poradnik hydrotechnika. Obciążenia budowli hydrotechnicznych wywołane przez środowisko morskie. Wydawnictwo Morskie, Gdańsk 1992.</p> <p>4. B. Mazurkiewicz: Encyklopedia inżynierii morskiej, Wyd.: Fundacja Promocji Przemysłu Okrętowego i Gospodarki Morskiej, Gdynia 2009.</p> <p>5. J.W. Drażkiewicz: Portowe budowle Hydrotechniczne. Konstrukcje dalb." Wydawnictwo "Marpress", Gdańsk, 2017.</p> <p>6. M. Kosecki: Statyka ustrojów palowych. PZITB O/Szczecin, 2006.</p> <p>7. K. Gwizdała: Fundamenty palowe". Tom 1 i 2, Warszawa, 2010, 2013.</p> <p>8. Polish codes and Eurocodes,</p> <p>9. Journals: Inżynieria Morska i Geotechnika, Geoinżynieria</p>	
	Supplementary literature	<p>1. Z. Wiłun: Zarys geotechniki WKŁ., Warszawa.</p> <p>2. K. Gwizdała: Fundamenty palowe". Tom 1 i 2, Warszawa, 2010, 2013.</p> <p>3. E. Motak: Fundamenty bezpośrednie. Wzory, tablice, przykłady. Arkady, Warszawa, 1988.</p> <p>4. J. Kobiak, W. Stachurski: Konstrukcje żelbetowe. Arkady, Warszawa, 1989.</p>	
	eResources addresses	<p>Podstawowe</p> <p>https://imig.pl/ - Journal: Marine Engineering and Geotechnics</p> <p>https://inzynieria.com/b/geoinzynieria - Journal: Geoinżyniering</p> <p>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=15166 - E-course: Foundation of Hydrotechnical Structures - 2021</p> <p>Uzupełniające</p> <p>Adresy na platformie eNauczanie:</p> <p>Fundamentowanie Budowli Hydrotechnicznych - 23_24 - Moodle ID: 34580</p> <p>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=34580</p>	

Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. List and sketch 3-4 selected structures of sea breakwaters with the methods of their foundation. 2. List and sketch 3-4 selected port quay structures. 3. Draw a calculation diagram of an exemplary slab-pile quay together with the assumed load diagrams. 4. Sketch typical systems of walls made of box piles made of PU and AZ profiles. 5. Describe the principle of calculating the pile layouts of port structures using the generalized method. 6. What is the mechanism of increasing the load capacity of open steel piles using the wing method and the internal rib method? 7. Sketch an example of a fender and mooring dolphin structure and describe the principle of its calculation. 8. Sketch examples of structures of weir foundations placed on the rock, on the ground and on piles. 9. Sketch an example of a hydrotechnical lock with a plate-rib structure. 10. Make calculations and design a hydrotechnical chamber cofferdam.
Work placement	Not applicable