



## Subject card

Subject name and code	, PG_00059158						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject	2024/2025				
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	3	Language of instruction	Polish				
Semester of study	5	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						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Adam Krasieński					
	Teachers	dr inż. Paweł Więclawski dr hab. inż. Adam Krasieński					
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						
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	20.0	55		
Subject objectives	Acquiring basic knowledge in the field of construction and design of shallow and deep foundations and other selected geotechnical structures. Learning basic methods of calculating and designing foundations. Preparation for independent work as an environmental engineer.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_U16] can, when formulating and solving engineering tasks in environmental engineering, evaluate, select and apply appropriate methods and tools, recognize their non-technical aspects, including environmental, economic and legal aspects	In engineering tasks in environmental engineering, is able to evaluate, select and apply appropriate methods and solutions for the foundation of structures, taking into account environmental, legal and economic aspects.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject
	[K6_W04] possesses elementary knowledge in the field of land mechanics, ground science, land reclamation and geotechnics; has basic knowledge about the composition of air, water and soil, environmental pollution and processes responsible for their formation and ways to reduce them, knows the principles and organization of sustainable water management	Has basic knowledge of soil mechanics, soil science, land reclamation and geotechnics and is able to use it in the field of foundations. Knows and applies the principles of sustainable development in foundations.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation
	[K6_U06] knows and applies the basic provisions of construction law, water law and environmental law	Knows and applies the basic provisions of construction law, water law and environmental protection law in the area of foundations and selected geotechnical issues.	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
[K6_U03] can prepare documentation regarding the implementation of an engineering task/project and prepare a text or presentation including a discussion of the results of the implementation	Is able to design simple shallow and deep foundations and sheet pile walls for general, sanitary and infrastructure construction. Is able to prepare documentation for the implementation of a simple engineering task/project in the field of foundations.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment	
Subject contents	Lectures1. Classification of soils and geotechnical categories of buildings.2. Field tests of soil subgrades.3. Application and classification of shallow foundations.4. Calculation and design of shallow foundations.5. Pile foundations - application and types of construction technologies.6. Basics of calculation of piles and pile foundations and load-bearing capacity tests.7. Retaining structures and excavation lining - technologies.8. Sheet piles - structures and basics of calculations.9. Ground anchorages - structures and calculations.10. Drainage of foundation excavations.11. Ground improvements - technologies.12. Use of geosynthetics in geotechnics and foundations. Design1. Examples of calculation tasks for the design of shallow foundations.2. Project 1 - direct foundation of an infrastructure facility - footing, strip or slab.3. Examples of calculation tasks for the design of pile foundations.4. Examples of calculation tasks for the design of sheet pile walls.5. Project 2 - cantilever or strutted sheet pile wall		
Prerequisites and co-requisites	Completion of general level courses:- geoenvironmental engineering- basics of construction- building materials- general mechanics- technical drawing		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Activity during lectures	0.0%	10.0%
	Passing 2 projects	60.0%	50.0%
	Colloquium of lectures	55.0%	40.0%
Recommended reading	Basic literature	1. Z. Wiłun: Zarys geotechniki WKŁ, Warszawa, 2004 2. E. Dembicki i inni: Fundamentowanie, t. I i II. Arkady, Warszawa 1988. 3. K. Biernatowski: Fundamentowanie. PWN, Warszawa 1984. 4. E. Motak: Fundamenty bezpośrednie. Wzory, tablice, przykłady. Arkady, Warszawa 1988. 5. K. Gwizdała: "Fundamenty palowe" Tom 1 i 2. PWN, Warszawa, 2011, 2013. 6. A. Krasieński: Teaching aids for the subject Foundations. e-Learning Platform PG	
	Supplementary literature	1. Puła O., Rybak C., Sarniak W.: Fundamentowanie. Projektowanie posadowień. DWE, Wrocław 1999 2. A. Jarominiak: Lekkie konstrukcje oporowe. WKŁ, Warszawa 2000. 3. Czasopisma: Inżynieria Morska i Geotechnika, Geinżynieria	
	eResources addresses	Podstawowe <a href="https://enauczanie.pg.edu.pl/moodle/">https://enauczanie.pg.edu.pl/moodle/</a> - A. Krasieński: Teaching aids for the subject Foundations. Uzupełniające Adresy na platformie eNauczanie: Fundamentowanie-IŚ - 24/25 - Moodle ID: 40581 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40581">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40581</a>	

<p>Example issues/ example questions/ tasks being completed</p>	<p>Lectures: 1. List and describe the types of soils and geotechnical categories of buildings. 2. What is soil subgrade testing documentation and what basic elements should it consist of? 3. What does drilling and probing of the soil subgrade involve? 4. Sketch an example of a footing and foundation strip. 5. Sketch the pressure distributions on the ground under the foundation strip for different values of the eB eccentricity. 6. What are the differences in the construction technologies and applications of Vibro, SDP and CFA piles? 7. The basic principle of calculating the pile capacity for compression and extraction. 8. Draw approximate diagrams of bending moments in a sheet pile wall: a) cantilever, b) single-strut. 9. What is the difference between soil replacement and vibroreplacement? (sketches) 10. List the methods of strengthening the soil subgrade made of cohesive and organic soils and briefly describe two of them. 11. Principle of operation of deep wells and wellpoints. When do we use one and when the other? 12. Describe three selected types of synthetic materials and their application. Project: 1. Calculate the load-bearing capacity of the soil subgrade under a direct foundation in conditions with and without water drainage from the ground. 2. Calculate the settlement of the footing or strip foundation. 3. Provide the procedure for calculating and designing a direct foundation. 4. Calculate the value and distribution of soil and water pressure on the sheet pile wall. 5. Calculate the required depth and bending of the sheet pile wall. 6. Provide the procedure for calculating and designing a sheet pile wall</p>
<p>Work placement</p>	<p>Not applicable</p>

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