



Subject card

Subject name and code	, PG_00062628						
Field of study	Civil Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject				2024/2025	
Education level	first-cycle studies	Subject group					
Mode of study	Part-time studies	Mode of delivery				at the university	
Year of study	2	Language of instruction				Polish	
Semester of study	4	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						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Krzysztof Szarf					
	Teachers	dr inż. Krzysztof Szarf dr inż. Paweł Więclawski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	10.0	10.0	0.0	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		0.0		0.0	30
Subject objectives	The aim of the class is to teach the students basics of soil mechanics						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U02] Analyse & solve engineering issues & problems in the field of civil engineering by applying appropriate and relevant established analytical, numerical and experimental methods.	Student is able to solve exercises on geotechnics using analytical methods			[SU3] Assessment of ability to use knowledge gained from the subject		
	[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 is aware of the role of soil in the engineering tasks. Student is knowledgeable about geotechnical problems			[SW1] Assessment of factual knowledge		
	[K6_U05] Conducts research (obtaining information, simulations, experimental methods) in the field of construction in order to solve specific tasks and report research results.	Student knows how to perform basic testing of soil in a geotechnical lab in order to determine physical and mechanical characteristics of the soil. Student can evaluate lab results in the contexts of using soil as a building material.			[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools		
Subject contents	<p>Lectures:1. Introduction to soil mechanics2. Water in soil3. Filtration. Freezing of soils4. Stresses in soil5. Compressibility of soil6. Strength of soils -- shear strength7. Bearing capacity of shallow foundations8. Consolidation9. Lateral stresses in soil: earth pressure10. Geotechnical failures. Soil reinforcement11. Stability of slopesLaboratory classes:1. Macroscopic tests on coarse soils and on fine soils2. Physical quantities of coarse soils3. State of coarse soils -- density index4. State of fine soils -- consistency limits5. Filtration6. Granulometric curve of a coarse soil7. Experiment with the Proctor apparatus8. Experiments with the oedometer9. Soil strength testing using the triaxial apparatus and the direct shear apparatusAUDITORIAL CLASSES: Physical properties of soil -- three phase system. Water flow through soil. Verticalstresses in soil. Soil strength. Lateral earth pressure</p>						

Prerequisites and co-requisites	<p>Basic knowledge of classical mechanics, mathematics, geology</p> <p>Mathematics, especially mathematical analysis (integral and differential calculus)</p> <p>Physics (mechanics), especially solid mechanics, hydraulics, elasticity theory</p> <p>Geology, especially minerology, petrology and hydrogeology</p> <p>Chemistry, especially physical chemistry and electrochemistry</p> <p>Strength of materials</p> <p>Polish proficiency</p>																	
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 712 794 741">Subject passing criteria</th> <th data-bbox="794 712 1139 741">Passing threshold</th> <th data-bbox="1139 712 1485 741">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 741 794 770">Laboratory classess - reports</td> <td data-bbox="794 741 1139 770">100.0%</td> <td data-bbox="1139 741 1485 770">16.5%</td> </tr> <tr> <td data-bbox="453 770 794 799">Laboratory classess - test</td> <td data-bbox="794 770 1139 799">50.0%</td> <td data-bbox="1139 770 1485 799">16.5%</td> </tr> <tr> <td data-bbox="453 799 794 828">Auditory classes - test</td> <td data-bbox="794 799 1139 828">50.0%</td> <td data-bbox="1139 799 1485 828">33.0%</td> </tr> <tr> <td data-bbox="453 828 794 857">Lecture - test</td> <td data-bbox="794 828 1139 857">50.0%</td> <td data-bbox="1139 828 1485 857">34.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory classess - reports	100.0%	16.5%	Laboratory classess - test	50.0%	16.5%	Auditory classes - test	50.0%	33.0%	Lecture - test	50.0%	34.0%
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Recommended reading	Basic literature	<p>Zenon Witun, Zarys geotechniki, WKiŁ 1982, 2013 Tomasz JeŹ, www.tajnikigeotechniki.pl, Politechnika Poznańska Arnold Verruijt, Soil Mechanics, TU Delft, 2012</p>																
	Supplementary literature	<p>Norma PN-EN 1997-1:2004 Eurokod 7 Projektowanie geotechniczne Norma PN-EN-ISO 14688-1 Badania geotechniczne Oznaczenie i klasyfikowanie gruntu Część 1: Oznaczenie i opis Norma PN-EN-ISO 14688-2 Badania geotechniczne Oznaczenie i klasyfikowanie gruntu Część 2: Zasady klasyfikowania Norma PN-81/B-03020 Grunty budowlane. Posadowienie bezpośrednie budowli. Obliczenia statyczne i projektowanie Norma PN-86/B-02480 Grunty budowlane. Określenia, symbole, podział i opis gruntów Norma PN-88/B-04481 Grunty budowlane. Badanie próbek gruntu</p>																
	eResources addresses	<p>Podstawowe <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37691">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=37691</a> - eNauczanie course Adresy na platformie eNauczanie:</p>																
Example issues/ example questions/ tasks being completed	<p>The entire class and all of its parts are given in Polish. LECTURES: Assessment based on a multiple choice test with negative points for the wrong answers. About 40 - 50 questions, with 3 options each. Exemplary questions: 1. Choose the cohesive soils: A) Sa B) FGr C) saclSi 2. What is the typical value of the specific density of soil skeleton for a quartz sand? A) 2,65 g/cm<sup>3</sup> B) 1500 kg/m<sup>3</sup> C) 2,65 kN/m<sup>3</sup> AUDITORIAL CLASSES: Passing based on a written test. The scope and the contents of the test are chosen by the auditorial class teacher. Exemplary problems: 1. Draw a vertical geostatic stress diagram for a geotechnical section given on a figure 2. Given the values of soil skeleton specific density, bulk density and water content of soil calculate its void ratio 3. Determine the internal friction angle value using the provided laboratory test data LABORATORY CLASSES: The basic requirement is to perform and analyse the laboratory tests correctly and to write a report card (100% passing score). Moreover, if the laboratory classes teacher requires so, students shall write a test. Exemplary problems in the written test: 1. Describe how to determine soil filtration coefficient 2. Draw the triaxial cell. Show the stresses acting on the sample 3. What are the Atterberg limits?</p>																	
Work placement	Not applicable																	

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