GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00062628		
Field of study	Civil Engineering		
Date of commencement of studies	October 2024	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	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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Krzysztof Szarf	
	Teachers		

Lesson types

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 tech the students basics of soil mechanics

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 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.	[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task
[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

Subject contents

Course content – lecture
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

Prerequisites and co-requisites	Basic knowledge of classical mechanics, mathematics, geology Mathematics, especially mathematical analysis (integral and differential calculus) Physics (mechanics), especially solid mechanics, hydraulics, elasticity theory Geology, especially minerology, petrology and hydrogeology Chemistry, especially physical chemistry and electrochemistry Strength of materials Polish proficiency

Assessment methods and criteria

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%

Recommended reading

Basic literature	Zenon Wiłun, Zarys geotechniki, WKiŁ 1982, 2013Tomasz Jeż, www.tajnikigeotechniki.pl, Politechnika PoznańskaArnold Verruijt, Soil Mechanics, TU Delft, 2012
Supplementary literature	Norma PN-EN 1997-1:2004 Eurokod 7 Projektowanie geotechniczneNorma PN-EN-ISO 14688-1 Badania geotechniczne Oznaczanie i klasyfikowanie gruntu Część 1: Oznaczanie i opisNorma PN-EN-ISO 14688-2 Badania geotechniczne Oznaczanie i klasyfikowanie gruntu Część 2: Zasady klasyfikowaniaNorma PN-81/B-03020 Grunty budowlane. Posadowienie bezpośrednie budowli. Obliczenia statyczne i projektowanieNorma PN-86/B-02480 Grunty budowlane. Określenia, symbole, podział i opis gruntówNorma PN-88/B-04481 Grunty budowlane. Badanie próbek gruntu
eResources addresses	Basic https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45284 - eNauczanie course Supplementary https://enauczanie.pg.edu.pl/moodle/course/view.php?id=45284#section-6 - "Virtual Soil Mechanics Lab" prepared thanks to founding provided by the "Konkurs Innowacji Dydaktycznych" contest. Name of the project: "Wirtualne laboratorium z Mechaniki Gruntów". Project prepared by: dr inż. Witold Tisler, dr inż. Krzysztof Szarf

Example issues/ example questions/ tasks being completed	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 - 50questions, with 3 options each. Exemplary questions:1. Choose the cohesive soils:A) Sa B) FGr C) saclSi2. What is the typical value of the specific density of soil skeleton for a quartz sand?A) 2,65 g/cm^3 B) 1500 kg/m^3 C) 2,65 kN/m^3AUDITORIAL CLASSES:Passing based on a written test. The scope and the contents of the test are chosen by the auditorial classesteacher. Exemplary problems:1. Draw a vertical geostatic stress diagram for a geotechnical section given on a figure2. Given the values of soil skeleton specific density, bulk density and water content of soil calculate its voidratio3. Determine the internal friction angle value using the provided laboratory test dataLABORATORY 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 coefficient2. Draw the triaxial cell. Show the stresses acting on the sample3. What are the Atterberg limits?
Practical activites within the subject	Not applicable

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