



Subject card

Subject name and code	Soil mechanics and soil science, PG_00059165						
Field of study	Environmental Engineering						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		Subject group		Obligatory subject group in the field of study Subject group related to scientific research in the field of study		
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	3		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		dr inż. Krzysztof Szarf dr Mariusz Wyroślak inż. Rafał Grubba				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 7605 Mechanika gruntów i gruntoznawstwo - stacjonarne IŚ zima 2026/2027 https://enauczanie.pg.edu.pl/2025/course/view.php?id=7605						
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	45		6.0		50.0	101
Subject objectives	The aim of the class is to tech the students basics of soil mechanics and soil classification.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[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	Student learnt soil mechanics in the scope of the course Student learnt soil classification in the scope of the course Student is knowledgeable about geotechnical problems	[SW1] Assessment of factual knowledge
	[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	Student is able to solve exercises on geotechnics using analytical methods	[SU1] Assessment of task fulfilment
	[K6_K01] can think and act in a creative and enterprising way; can set priorities for the implementation of an individual or group task; understands the need for continuous training and professional responsibility for their activities and team	Student is aware of the role of soil in the engineering tasks Student is able to work in the laboratory in a team	[SK2] Assessment of progress of work [SK3] Assessment of ability to organize work
Subject contents	Course content – lecture Lectures:1. Introduction to soil mechanics2. Water in soil3. Filtration. Freezing of soils4. Stresses in soil5. Compressability 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 apparatus		
Prerequisites and co-requisites	Basic knowledge of classical mechanics, mathematics, geology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory work passed	100.0%	50.0%
	test	45.0%	50.0%
Recommended reading	Basic literature	Arnold Verruijt, Soil Mechanics, TU Delft, 2012	
	Supplementary literature	Braja M. Das, Fundamentals of Geotechnical Engineering, Cengage Learning, 2012	
	eResources addresses	Basic https://enauczenie.pg.edu.pl/moodle/course/view.php?id=33426 - eNauczanie course (in Polish, winter semester 2023/2024)	
Example issues/ example questions/ tasks being completed	Lectures: Give a typical value of particle density of soil Name the basic law describing the shear strength of soil What quantities are used in Darcy's Law? Laboratory: To perform every test in the laboratory. Prepare a lab report for each test. Test.		

Practical activities within the subject	Not applicable
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