



Subject card

Subject name and code	, PG_00069246						
Field of study	Civil Engineering						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2026/2027		
Education level	first-cycle studies		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		2.0		
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 hab. inż. Marcin Cudny				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	30.0	0.0	45
	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	45		2.0		3.0	50
Subject objectives	The aim of the course is to provide knowledge of soil improvement methods in civil engineering, rules of their application, evaluation of soil conditions and the design of ground enhancement solutions. The student acquires skills in analysing and designing soil reinforcement with consideration of technological, environmental and economic constraints.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_K01] Is aware of the key aspects of professional, ethical and social responsibility related to management, business operation, decision making and opinion formulation in civil engineering.	The student becomes familiar with the consequences of negligence and risk-taking in the context of potential failures of ground improvement systems.	[SK5] Assessment of ability to solve problems that arise in practice
	[K6_U06] Conduct engineering activities in civil engineering subject area, using and applying practical knowledge and understanding of materials, equipment and tools, processes and technologies.	The student is able to organize/ create an appropriate program for an investment involving ground improvement, i.e., a program of necessary investigations, selection of technologies suited to site conditions, and the adoption of design, monitoring, and verification methods to ensure the correctness of the applied improvement.	[SU3] Assessment of ability to use knowledge gained from the subject
	[K6_U07] Design and build engineering structures in a sustainable manner, with care for the natural environment and a minimum carbon footprint	The student is able to select appropriate design methods (analytical or modelling) for individual ground improvement techniques. The student learns how to optimize reinforcement parameters with regard to environmental protection.	[SU4] Assessment of ability to use methods and tools
	[K6_W06] Demonstrates practical knowledge and understanding of materials, devices and tools, processes and technologies in the field of civil engineering (and their limitations).	The student learns how to select appropriate machinery for various ground improvement technologies and how these machines operate.	[SW1] Assessment of factual knowledge
	[K6_W07] Understand the investment's impact on the environment and the interrelationships and dependencies between the building structure and the natural environment	As part of the course, the student learns about ground improvement methods and their impact on the surrounding environment (soil, water, and structures).	[SW3] Assessment of knowledge contained in written work and projects
Subject contents	Course content – lecture Classification and properties of soils introduction. Assessment of soil conditions and field investigations. Ground improvement methods: soil replacement, compaction, gravel and concrete columns. Piles and micropiles as reinforcement elements. Injection and soil stabilisation. Geosynthetics in construction functions, selection and design. Design principles and performance control. Case studies from engineering practice.		
	Course content – project Assessment of ground conditions analysis of real data. Selection and design of soil improvement method for a structure. Capacity and settlement calculations. Development of a partial design documentation.		
Prerequisites and co-requisites	Basic knowledge of geotechnics and soil mechanics. Understanding of the fundamentals of foundation design and soil condition assessment.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project report grade	50.0%	100.0%

Recommended reading	Basic literature	EN 1997 (Eurocode 7). Selected guidelines and standards on geotechnics. Duncan J.M., Wright S.G.: Soil Strength and Slope Stability.
	Supplementary literature	Dembicki, E.: Ground Improvement by microblasting method. Lancellotta, R.: Geotechnical Engineering, Taylor & Francis
	eResources addresses	
Example issues/ example questions/ tasks being completed	Do not concern	
Practical activities within the subject	Not applicable	

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