



Subject card

Subject name and code	, PG_00069213						
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		5.0		
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. Witold Tisler				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	30.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source address: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=46475#section-3						
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		10.0		70.0	125
Subject objectives	The course aim is to teach students how to use computer programs designed for solving geotechnical problems, such as Plaxis, ZSoil, and Slide. During the course, analytical engineering problems will be discussed, which will then be modeled in dedicated programs.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_K03] Can effectively, clearly and unambiguously convey information, describe activities and communicate their results/ outcomes to engineers or a wider audience using appropriate communication methods and tools.		Students will work in small groups to perform analytical calculations. Then, based on the analytical results, they will prepare a numerical model in a program of their choice.		[SK1] Assessment of group work skills [SK3] Assessment of ability to organize work [SK5] Assessment of ability to solve problems that arise in practice		
	[K6_K04] Engages in independent lifelong learning and individually follows the development of science and technology in the field of civil engineering.		The student will have a basic understanding of computer programs designed for calculating geotechnical and hydrotechnical problems. They will also know where to find guidelines to help them get started with the software.		[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work		
Subject contents	Course content – lecture Lectures will demonstrate the use of specialized software (ZSoil, Plaxis) for analyzing civil marine structures and their interaction with the subsoil. Methods for modeling key structural elements of structures such as quays and excavation linings will be presented. A case study will present numerical models of investments completed in recent years, including the reconstruction of the Długie Pobrzeże quay in Gdańsk, from the Green Bridge to the Straganiarska Gate on the left bank of the Motława River in Gdańsk, the protection of the slope along the city bank in Rozewie, and the reinforcement of the subsoil at the seaport in Gdańsk. Laboratory sessions will discuss the structure and operation of ZSoil and Plaxis. Computational models for basic soil mechanics issues, such as slope stability, settlement, consolidation, and earth pressure on structures, will be developed. Based on the analysis of an anchored sheet pile wall, students will learn how to create a numerical model and then recalculate the design, taking into account the phased nature of geotechnical work and load variations during construction. The course will also include a model of a pile foundation, where the pile length will be selected based on the displacement-settlement curve.						
Prerequisites and co-requisites	Mastery of material from previous semesters: soil mechanics, hydraulics and hydrology, AutoCAD, foundation engineering, hydraulic and marine engineering. Knowledge of technical drawing principles and the Windows environment. Knowledge of Polish and basic English.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Term paper	50.0%	80.0%
	Participation in classes	100.0%	20.0%
Recommended reading	Basic literature	1. User manual for the Plaxis 2D program. 2. User manual for the ZSoil program. 3. Verruijt, A. (2001). <i>Soil mechanics</i> (p. 315). Delft: Delft University of Technology. 4. Teaching materials for the subject of soil mechanics and foundations design.	
	Supplementary literature	1. Wiłun, Z. (2008). <i>Zarys geotechniki: podręcznik akademicki</i> . Wydawnictwa Komunikacji i Łączności. 2. Szymański, A. (2007). <i>Mechanika gruntów</i> . Wydawnictwo SGGW, Warszawa, 7-20. 3. Mazurkiewicz, B. (1986). <i>Encyklopedia inżynierii morskiej</i> . Wydawn. Morskie.	
	eResources addresses	Basic https://geo.verruijt.net/ - Link to home page created by Arnold Verruijt	
	Example issues/ example questions/ tasks being completed	1. Preparation of a numerical model for the plane-strain problem. 2. Application of the Coulomb-Mohr material model for cohesive and non-cohesive soils, assigning appropriate material properties. 3. Assigning boundary conditions for flow. 4. Determining the calculation steps and selecting the appropriate calculation type. 5. Presentation of displacement, saturation, and strain results for the selected node/element.	
Practical activities within the subject	Not applicable		

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