GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069213		
Field of study	Civil Engineering		
Date of commencement of studies	October 2022	Academic year of realisation of subject	2025/2026
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Witold Tisler	
	Teachers	dr inż. Witold Tisler mgr inż. Katarzyna Lisewska	

Lesson types and methods of instruction

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_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.	[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice
[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.	[SK5] Assessment of ability to solve problems that arise in practice [SK3] Assessment of ability to organize work [SK1] Assessment of group work skills

Subject contents

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.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="2"><table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Participation in classes</td><td>100.0%</td><td>20.0%</td></tr>
<tr><td>Term paper</td><td>50.0%</td><td>80.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. User manual for the Plaxis 2D program.
2. User manual for the ZSoil program.
3. Verruijt, A. (2001). Soil mechanics (p. 315). Delft: Delft University of Technology.
4. Teaching materials for the subject of soil mechanics and foundations design.</td></tr>
<tr><td>Supplementary literature</td><td>1. Wiłun, Z. (2008). Zarys geotechniki: podręcznik akademicki. Wydawnictwa Komunikacji i Łączności.

2. Szymański, A. (2007). Mechanika gruntów. Wydawnictwo SGGW, Warszawa, 7-20.

3. Mazurkiewicz, B. (1986). Encyklopedia inżynierii morskiej. Wydawn. Morskie.</td></tr>
<tr><td>eResources addresses</td><td>Basic
https://geo.verruijt.net/ - Link to home page created by Arnold Verruijt</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">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.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
</table>

Document generated electronically. Does not require a seal or signature.