GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00069243						
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	2.0			
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. Paweł Więcławski				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 1385 BIM w geotechnice i hydrotechnice sem. VII_2025/26 https://enauczanie.pg.edu.pl/2025/course/view.php?id=1385						
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		2.0		18.0	50
Subject objectives	To provide students with knowledge and practical skills related to the application of the BIM (Building Information Modeling) methodology in the design, analysis, and implementation of geotechnical and hydrotechnical projects, with particular emphasis on the integration of physical models, analytical models, and field data.						

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W07] Understand the investment's impact on the environment and the interrelationships and dependencies between the building structure and the natural environment	The student understands the purpose of introducing the BIM system into the design process. They understand the financial, technical, and environmental aspects, as well as the application of optimization in the design of geotechnical and hydrotechnical structures.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
[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 present the workflow in the design process of a selected geotechnical or hydrotechnical structure, indicating both simple and complex issues that require simplifications and explaining their impact on the analysis results.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
[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 is prepared to independently make design decisions and evaluate their consequences in social, environmental, and technical contexts.	[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness [SK3] Assessment of ability to organize work [SK1] Assessment of group work skills
[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 independently create a physical model of any geotechnical or hydrotechnical structure in Autodesk Revit. They can use it to develop an analytical model and perform numerical analysis.	[SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment
[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 models an engineering structure by selecting appropriate construction materials depending on the execution technology. If necessary, the student is able to define a new construction material and assign it the required physical and strength parameters.	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents

1. REVIT STRUCTURE BASIC TOPICS: interface; axes and levels; columns, beams, walls, slabs; foundations slab, footing, strip footing; reinforcement.
2. REVIT STRUCTURE CONCRETE STRUCTURE (bridge pier/reservoir/quay/etc.).
3. REVIT STRUCTURE STEEL STRUCTURE (piling/seawall/pier/etc.).
4. ROBOT STRUCTURAL ANALYSIS (RSA): export of the model from Revit to RSA; analysis in RSA.
5. CIVIL 3D: Ground profiles in Geotechnical Modeler.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Individual project	55.0%	70.0%
Joint projects	55.0%	30.0%

<table>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>1. ASCENT Center for Technical Knowledge. (2025). Autodesk Revit 2026: Fundamentals for Structure. 18. wydanie. SDC Publications. ISBN: 978-1-63057-744-5 (druk), 978-1-63056-986-0 (e-book).
2. Toprak, S., & Demirkesen, S. (2023). Building Information Modeling (BIM) in Geotechnics and Infrastructures. W: Automation in Construction toward Resilience: Robotics, Smart Materials, and Intelligent Systems. CRC Press. DOI: 10.1201/9781003325246-6.
3. Boley, C., & Wilfing, L. (2023). Digitalization and BIM in geotechnics opportunities and challenges. W: Smart Geotechnics for Smart Societies. CRC Press. DOI: 10.1201/9781003299127-350.
4. Henriques, A., Silva, N., & Lopes, M. (2024). Use of BIM methodology in Geotechnical Projects Construction of underground reservoirs. W: Geotechnical Engineering Challenges to Meet Current and Emerging Needs of Society. CRC Press. DOI: 10.1201/9781003431749-79.</td></tr>
<tr><td>Supplementary literature</td><td>1. Filipczyk, J., Mokwa, M., Kędzia, D., Krasodomski, J., Dorada, P., & Radecki-Pawlik, A. (2022). Innowacyjność wykorzystania technologii BIM w hydrotechnice. Materiały Budowlane, 602(10), 4348. DOI: 10.15199/33.2022.10.11.
2. Zima, K., Ciepłucha, W., & Majta, M. (2022). Technologia BIM w projektowaniu architektonicznym. Materiały Budowlane, 602(10), 3942. DOI: 10.15199/33.2022.10.10.</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">1. Create a physical model of a raft-and-pile foundation for a bulk material storage tank located on a port quay.
2. Create an analytical model and perform foundation calculations for a bridge pier on precast reinforced concrete piles.
3. Create a geotechnical profile based on source files using the Geotechnical Modeler module.</td></tr>
<tr><td>Work placement</td><td colspan="2">Not applicable</td></tr>
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