GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fundamentals of civil engineering, PG_00064171		
Field of study	Transport		
Date of commencement of studies	October 2026	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	1	Language of instruction	Polish
Semester of study	1	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 inż. Paweł Więcławski	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	15.0	0.0	0.0	0.0	30

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	30	3.0	17.0	50

Subject objectives

To introduce students to the basic building materials, the main structures and building elements used in transport infrastructure construction. To present design methods and limit state conditions of engineering structures.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W02] has knowledge of physics, mechanics, electrical engineering, hydromechanics, thermodynamics, materials science, and measurement techniques necessary to understand the phenomena occurring in transportation, as well as the principles of construction and operation of infrastructure and means of transport	Student is able to identify the environmental conditions: type of substrate; constant and variable loads under which an engineering structure works: road embankment; bridge, tunnel, road culvert. Based on the strength parameters of the substrate and construction materials, Student is able to identify the appropriate construction solution and the principles of their operation.	[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
[K6_U08] able to carry out simple engineering tasks related to the construction and operation of a selected element of the transport system, select the right methods and tools	Student can calculate the values of loads acting on an abutment, bridge pillar and tunnel, taking into account permanent and variable loads. Student can estimate vertical displacements of the structure. Knows what scheme to adopt for static calculations. Knows how to create simple models in the computer programme Robot.	[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task [SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information

Subject contents

Course content – lecture

1. Definition: construction, building, structure, small architecture object. Presentation of the different branches of construction.
2. Review of legislation, regulations and standards used in the design process of various building structures.
3. Introduction to soil subsoil issues: strength parameters, deformation parameters; physical characteristics of soil.
4. Overview of construction materials used in transport infrastructure construction.
5. Characteristics of actions acting on various transport infrastructure structures.
6. Types and principles of foundation design. Design procedures according to Eurocode 7.
7. Analytical and numerical methods, creation of models in various computer programs.
8. Verification of load bearing capacity condition of selected structural elements.
9. Introduction to hydraulic engineering construction. Types of hydraulic engineering structures.
10. Environmental impacts on maritime and inland water transport facilities.
11. Ecology and GOZ in road construction.
12. Characteristics and design principles of vertical and horizontal transport for civil engineering.

Prerequisites and co-requisites

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
TEST	50.0%	30.0%
EXERCISE 2: CULVERT/ NEARSHORE IMPACTS	50.0%	30.0%
EXERCISE 1: BEARING CAPACITY AND SETTLEMENT OF A BRIDGE PILLAR	50.0%	40.0%

Recommended reading

Basic literature

1. Eurokod 1 (2002). Obciążenia konstrukcji Część 2: Obciążenia ruchome mostów drogowych i kolejowych.
2. Eurokod 7 (2008). Projektowanie geotechniczne - Część 1: Zasady ogólne.
3. Sarna, T. (2018). Projektowanie mostów i tuneli w infrastrukturze transportowej. Wydawnictwo Politechniki Krakowskiej.
4. Grzegorzewski, P., & Benduch, P. (2019). Mosty i wiadukty Projektowanie i utrzymanie. Wydawnictwo PWN.
5. Szydło, A., & Kostecki, M. (2019). Podstawy mechaniki gruntów i fundamentowania dla inżynierów transportu. Wydawnictwo Komunikacji i Łączności.

Supplementary literature

1. Żakowska, H. (2016). Podstawy projektowania infrastruktury transportowej. Wydawnictwo Politechniki Krakowskiej.
2. Radomski, W. (2007). Drogi i Mosty. Wydawnictwo Naukowe PWN.

eResources addresses

Example issues/ example questions/ tasks being completed

1. What does specialist construction deal with?
2. What do geological units deal with?
3. What do surveying and cartographic units deal with?
4. What is a structure?
5. Main sources of design and construction principles in construction?
6. What parameters do we use to describe the strength of soil?
7. What are secondary stresses in the ground and what do they depend on?
8. What are characteristic and design values of loads?
9. Give a definition and 3 examples of variable loads in total long term.
10. What is and what are the functions of a water lock?
11. What is a wharf? List the types of wharves by construction.
12. What is meant by the term offshore? List offshore structures.

Practical activites within the subject

Not applicable

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