GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | Fundamentals of civil engineering, PG_00064171 | | |
| Field of study | Transport | | |
| Date of commencement of studies | October 2025 | Academic year of realisation of subject | 2025/2026 |
| Education level | first-cycle studies | Subject group | Obligatory subject group in the field of study<br>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 -> 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 | 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_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. | [SU2] Assessment of ability to analyse information<br>[SU4] Assessment of ability to use methods and tools<br>[SU5] Assessment of ability to present the results of task<br>[SU1] Assessment of task fulfilment |
| [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. | [SW1] Assessment of factual knowledge<br>[SW2] Assessment of knowledge contained in presentation<br>[SW3] Assessment of knowledge contained in written work and projects |

**Subject contents**

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 |
|---|---|---|
| EXERCISE 1: BEARING CAPACITY AND SETTLEMENT OF A BRIDGE PILLAR | 50.0% | 40.0% |
| EXERCISE 2: CULVERT/ NEARSHORE IMPACTS | 50.0% | 30.0% |
| TEST | 50.0% | 30.0% |

**Recommended reading**

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|---|---|
| Basic literature | 1. Eurokod 1 (2002). Obciążenia konstrukcji Część 2: Obciążenia ruchome mostów drogowych i kolejowych.<br>2. Eurokod 7 (2008). Projektowanie geotechniczne - Część 1: Zasady ogólne.<br>3. Sarna, T. (2018). Projektowanie mostów i tuneli w infrastrukturze transportowej. Wydawnictwo Politechniki Krakowskiej.<br>4. Grzegorzewski, P., & Benduch, P. (2019). Mosty i wiadukty Projektowanie i utrzymanie. Wydawnictwo PWN.<br>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.<br>2. Radomski, W. (2007). Drogi i Mosty. Wydawnictwo Naukowe PWN. |
| eResources addresses | Adresy na platformie eNauczanie: |

**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.

**Work placement**

Not applicable

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