GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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|---|---|---|---|
| Subject name and code | , PG_00069777 | | |
| Field of study | Transport | | |
| Date of commencement of studies | February 2026 | Academic year of realisation of subject | 2026/2027 |
| Education level | second-cycle studies | Subject group | |
| Mode of study | Full-time studies | Mode of delivery | at the university |
| Year of study | 1 | Language of instruction | Polish |
| Semester of study | 2 | ECTS credits | 3.0 |
| 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. Angelika Duszyńska | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 15.0 | 15.0 | 0.0 | 15.0 | 0.0 | 45 |

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 | 45 | 0.0 | 0.0 | 45 |

**Subject objectives**

Acquiring knowledge, skills and competencies related to solving geotechnical problems in transport engineering.

**Learning outcomes**

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [K7_K101] acknowledges the importance of knowledge related to the field of study in solving cognitive and practical problems, critically assessing the information obtained | The student recognizes the importance of geotechnical knowledge in transportation engineering. | [SK5] Assessment of ability to solve problems that arise in practice |
| [K7_W101] is able to make an in-depth identification of key objects and phenomena related to the field of study, as well as theories that describe them and applicable analytical and design methods | The student identifies areas of difficult geotechnical situations and selects appropriate techniques for the safe foundation of transport infrastructure facilities. | [SW3] Assessment of knowledge contained in written work and projects |
| [K7_U101] is able to formulate complex research problems and adopts appropriate methods, obtaining innovative solutions, cooperating with other people, both as a leader and a team member | Student formułuje problemy geotechniczne i dobiera właściwe metody ich rozwiązywania (wzmacnianie gruntu, zabezpieczanie stateczności skarp, wykorzystanie geosyntetyków). | [SU2] Assessment of ability to analyse information |

**Subject contents**

Course content – lecture

Identification of water and soil conditions. Stability of slopes and embankments. Subgrade reinforcement. Fundamentals of geotechnical design. Geosynthetics in earth structures. Underground construction.

Course content – exercises

Identification of rocks, soils, and geosynthetics. Geotechnical calculations - SLS and ULS analyses.

Course content – project

Soil reinforced structure with geosynthetics - calculation of external and internal stability - according to EBGEO and BS8006 recommendations

**Prerequisites and co-requisites**

Basics of civil engineering (including soil mechanics).

<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>lecture test</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>exercise report</td><td>60.0%</td><td>30.0%</td></tr>
<tr><td>project</td><td>60.0%</td><td>40.0%</td></tr>
</table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td>• Bzówka J. i inni: Geotechnika komunikacyjna. Wydawnictwo Politechniki Śląskiej. 2015.<br>• Eurokod 7. Projektowanie geotechniczne.<br>• Wiłun Z.: Zarys geotechniki. Wydawnictwo Komunikacji i Łączności, Warszawa 2013.<br>• Gonet A., Stryczek S.: Podstawy geoinżynierii. Wydawnictwo AGH. Kraków 2021<br>• Urbański (red.): Podstawy projektowania geotechnicznego. Wprowadzenie do nowych technologii w geotechnice, Wyd. Politechniki Krakowskiej, 2016</td></tr>
<tr><td>Supplementary literature</td><td>• AGH, PG, PIG-PIB, IBDIM: Wytyczne doboru rozwiązań geotechnicznych wzmacniania podłoża gruntowego w budownictwie drogowym. RID II. 2025<br>• BS 8006:2010. Code of practice for strengthened/ reinforced soils and other fills.<br>• EBGEO: Recommendations for Design and Analysis of Earth Structures using Geosynthetic Reinforcements, Ernst W. & Sohn Verlag. 2011<br>• Duszyńska A.: Wymiarowanie konstrukcji oporowych z gruntu zbrojonego geosyntetykami. Materiały dydaktyczne dla studentów. Politechnika Gdańska. 2025</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="2">Identification of water and soil conditions. Subsoil investigations (laboratory and insitu). Identification of difficult geotechnical situations.<br>Landslide processes. Slope and embankment stability (calculation, protection).<br>Selection of techniques for soft soil improvement.<br>Geotechnical design. Earth structures. Geosynthetics in transportation engineering.<br>Underground construction. Excavation and trenchless technologies.</td></tr>
<tr><td>Practical activites within the subject</td><td colspan="2">Not applicable</td></tr>
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