GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

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| Subject name and code | Soil mechanics and soil science, PG_00059165 | | |
| Field of study | Environmental Engineering | | |
| Date of commencement of studies | October 2023 | Academic year of realisation of subject | 2024/2025 |
| 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 | 2 | Language of instruction | Polish |
| Semester of study | 3 | ECTS credits | 4.0 |
| Learning profile | general academic profile | Assessment form | assessment |
| Conducting unit | Department of Geotechnical and Hydraulic Engineering -> Faculty of Civil and Environmental Engineering | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr inż. Krzysztof Szarf | |
| | Teachers | dr inż. Mariusz Wyrośląk<br>dr inż. Witold Tisler<br>dr inż. Krzysztof Szarf<br>mgr inż. Katarzyna Lisewska<br>dr inż. Katarzyna Staszewska | |

| Lesson types and methods of instruction | Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|---|
| | Number of study hours | 15.0 | 0.0 | 30.0 | 0.0 | 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 | 6.0 | 50.0 | 101 |

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| Subject objectives | The aim of the class is to tech the students basics of soil mechanics and soil classification. |

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
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| [K6_W04] possesses elementary knowledge in the field of land mechanics, ground science, land reclamation and geotechnics; has basic knowledge about the composition of air, water and soil, environmental pollution and processes responsible for their formation and ways to reduce them, knows the principles and organization of sustainable water management | Student learnt soil mechanics in the scope of the course<br><br>Student learnt soil classification in the scope of the course<br><br>Student is knowledgeable about geotechnical problems | [SW1] Assessment of factual knowledge |
| [K6_U16] can, when formulating and solving engineering tasks in environmental engineering, evaluate, select and apply appropriate methods and tools, recognize their non-technical aspects, including environmental, economic and legal aspects | Student is able to solve exercises on geotechnics using analytical methods | [SU1] Assessment of task fulfilment |
| [K6_K01] can think and act in a creative and enterprising way; can set priorities for the implementation of an individual or group task; understands the need for continuous training and professional responsibility for their activities and team | Student is aware of the role of soil in the engineering tasks<br><br>Student is able to work in the laboratory in a team | [SK2] Assessment of progress of work<br>[SK3] Assessment of ability to organize work |

## Subject contents

Lectures:1. Introduction to soil mechanics2. Water in soil3. Filtration. Freezing of soils4. Stresses in soil5. Compressability of soil6. Strength of soils -- shear strength7. Bearing capacity of shallow foundations8. Consolidation9. Lateral stresses in soil: earth pressure10. Geotechnical failures. Soil reinforcement11. Stability of slopesLaboratory classes:1. Macroscopic tests on coarse soils and on fine soils2. Physical quantities of coarse soils3. State of coarse soils -- density index4. State of fine soils -- consistency limits5. Filtration6. Granulometric curve of a coarse soil7. Experiment with the Proctor apparatus8. Experiments with the oedometer9. Soil strength testing using the triaxial apparatus and the direct shear apparatus

## Prerequisites and co-requisites

Basic knowledge of classical mechanics, mathematics, geology

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
|---|---|---|
| laboratory work passed | 100.0% | 50.0% |
| test | 45.0% | 50.0% |

## Recommended reading

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| Basic literature | Arnold Verruijt, Soil Mechanics, TU Delft, 2012 |
| Supplementary literature | Braja M. Das, Fundamentals of Geotechnical Engineering, Cengage Learning, 2012 |
| eResources addresses | Podstawowe<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=33426 - eNauczanie course (in Polish, winter semester 2023/2024)<br>Adresy na platformie eNauczanie:<br>Mechanika Gruntów i Gruntoznawstwo - stacjonarne IŚ zima 2024/2025 - Moodle ID: 40924<br>https://enauczanie.pg.edu.pl/moodle/course/view.php?id=40924 |

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| Example issues/ example questions/ tasks being completed | Lectures:<br><br>Give a typical value of particle density of soil<br><br>Name the basic law describing the shear strength of soil<br><br>What quantities are used in Darcy's Law?<br><br>Laboratory:<br><br>To perform every test in the laboratory. Prepare a lab report for each test. Test. |
| Work placement | Not applicable |

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