COURSE DESCRIPTION CARD - SYLLABUS

Course name
Mechanics of soils and loose media [S1MiBP1>MGiOS]

Course

Field of study
Mechanical and Automotive Engineering

Year/Semester
3/6

Area of study (specialization)
–

Profile of study
general academic

Level of study
first-cycle

Course offered in
Polish

Form of study
full-time

Requirements
elective

Number of hours

Lecture
30

Laboratory classes
15

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

3,00

Coordinators

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Lecturers

Prerequisites

KNOWLEDGE: the student knows the basic concepts of mechanics of continuous media, basic concepts and laws of physics, and has elementary knowledge of organic and inorganic chemistry. SKILLS: the student is able to use the basic measuring equipment for measuring mechanical and linear quantities, temperatures and pressures. SOCIAL COMPETENCES: the student knows how to work in a group and understands the importance of soil and soil in the natural environment of human life.

Course objective

Systematics and classification of terms in the field of soil mechanics. Understanding the properties of land and methods of their research.

Course-related learning outcomes

Knowledge:
Has basic knowledge in the field of chemistry, in the construction of the periodic table of elements and their properties, the theory of chemical bonds, organic and inorganic compounds, types of chemical reactions, chemical analysis: in the scope enabling the understanding of lectures on metal and non-metallic materials, environment, fuels and lubricants, building materials and soil, biomechanics and

biological materials processed by agricultural and food machinery.
Has basic knowledge of technical thermodynamics, ie the theory of thermodynamic changes, heat flow, thermal machines and heating, drying and cooling devices.
Has basic knowledge of the strength of materials, including the basics of the theory of elasticity and plasticity, stress hypotheses, calculation methods for beams, membranes, shafts, joints and other simple structural elements, as well as methods of testing the strength of materials and the state of deformation and stress in mechanical structures.

Skills:
Can obtain information from literature, the Internet, databases and other sources. Can integrate the obtained information, interpret and draw conclusions from it, and create and justify opinions.
Can use computer office packages for editing technical texts, including formulas and tables, technical and economic calculations using a spreadsheet and running a simple relational database.
Can properly use modern equipment for measuring major physical quantities, used in machine research and production control.
Can interact with other people as part of teamwork (also of an interdisciplinary nature).
Has the ability to self-educate with the use of modern teaching tools, such as remote lectures, websites and databases, teaching programs, e-books.

Social competences:
Is ready to critically assess his knowledge and received content.
Is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in case of difficulties in solving the problem on its own.
Is ready to fulfill social obligations and co-organize activities for the benefit of the social environment.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Final Test:

The final test takes place during the last class.
The test includes the following types of questions:
a) multiple-choice questions with one correct answer,
b) fill-in-the-blank questions,
c) open-ended questions.
The test consists of 30 questions, each scored as follows: 0 points for an incorrect answer, 1 point for a correct answer.
The time allocated for the test is 35 minutes.
In case of using unauthorized sources during the written assessment:
First warning: grade reduced by 1 level,
Second warning: unsatisfactory grade (2.0).
Active participation in lectures adds +0.5 to a passing grade from the written test.
Completing additional tasks for those wishing to expand their knowledge of the subject adds +0.5 to a passing grade from the written test.

Exercises:

Preparedness for exercises is assessed through oral or written checks, as well as reports from laboratory sessions.
Each task is graded. Achieving a passing grade for each task is required to pass the exercises.
The final grade for the exercises is the average of all grades received.
In case of absence, students must make up for missed tasks.
Each absence from exercises must be justified.

Programme content

Physical and mechanical properties of soils. Land fractions. Shear strength of the soil. Laboratory methods. Methods for determining the strength properties directly in the deposit. Soil classification

according to workability criterion. Manual mining criterion. The uniaxial compression criterion. Criterion of unit cutting resistance (mining. Criterion of shear pressure. Criterion of soil compactness. Substrate with specific characteristics. Soil, marshy, frozen. Rock basics of geology. Basic scope of geological works.

Course topics

1. Introduction to Soil Mechanics
2. Soil Classification
3. Physical Properties of Soils
4. Mechanical Properties of Soils
5. Earth Pressure on Structures
6. Soil Consolidation and Settlement
7. Capillary Phenomena in Soil
8. Water Flow Through Soil
9. Stability of Slopes and Embankments
10. Soil as a Cohesionless Medium
11-15: Case Studies and Knowledge Integration

Teaching methods

1. Lectures with multimedia presentation.
2. Laboratories for calculating soil parameters.
3. Preparation of reports from laboratory classes.

Bibliography

Basic
1. Pisarczyk S. (2010): Mechanika gruntów. Wyd. Politechnika Warszawska
2. Sawicki A. (2012): Zarys mechaniki gruntów sypkich. Wyd. Instytut Budownictwa Wodnego PAN
Additional
1. Myślińska, E. (2016). Laboratoryjne badania gruntów i gleb. Wydawnictwa Uniwersytetu Warszawskiego.
2. Młynarek, Z., & Wierzbicki, J. (2007). Nowe możliwości i problemy interpretacyjne polowych badań gruntów. Geologos, 11.
3. Gabrys, K., Sas, W., & Szymanski, A. (2013). Kolumna rezonansowa jako urządzenie do badań dynamicznych gruntów spoistych. Przegląd Naukowy. Inżynieria i Kształtowanie Środowiska, 22(1 [59]).
4. Jastrzębska, M. (2010). Badania zachowania się gruntów spoistych poddanych obciążeniom cyklicznym w zakresie małych odkształceń. Wydawnictwo Politechniki Śląskiej.

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,00
Classes requiring direct contact with the teacher	45	2,00
Student's own work (literature studies, preparation for laboratory classes/ tutorials, preparation for tests/exam, project preparation)	30	1,00