



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Soil Mechanics and granular media

		Course
Field of study		Year/Semester
Construction and Exploation of Means of Transport		3/6
Area of study (specialization)		Profile of study
Machines		general academic
Level of study		Course offered in
First-cycle studies		Polish
Form of study		Requirements
full-time		compulsory

		Number of hours
Lecture	Laboratory classes	Other (e.g. online)
15	15	0
Tutorials	Projects/seminars	
0	0	
<b>Number of credit points</b>		
2		

		Lecturers
Responsible for the course/lecturer:		Responsible for the course/lecturer:
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**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 metallic and non-metallic materials, sciences on environmental protection, fuels and lubricants, building materials and soil, biomechanics and biological materials processed by agricultural and food machinery.

Has basic knowledge of technical thermodynamics, i.e. 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, strain 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

He 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.

He 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.

Is able to properly use modern equipment for measuring the main 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, internet websites and databases, teaching programs, and e-books.

#### Social competences

He is ready to critically assess his knowledge and received content.

He is ready to recognize the importance of knowledge in solving cognitive and practical problems and to consult experts in the event of difficulties in solving the problem on his own.

It 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:

Written tests on the topics presented in the lecture. Tasks for independent work on the subject of



lectures. Control of preparation for exercises in the oral and written form and protocols of laboratory classes.

### 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.

### Teaching methods

1. Lectures with multimedia presentation.
2. Materials made available to students in the form of films, pdfs or presentations.
3. Laboratories for calculating soil parameters.
4. 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	60	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes, preparation of laboratory reports, execution of lecture tasks, preparation for tests) <sup>1</sup>	30	1,0

<sup>1</sup> delete or add other activities as appropriate