



Subject card

Subject name and code	ROCK MECHANICA, PG_00041424						
Field of study	Civil Engineering						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional 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			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Geotechnics, Geology and Marine Civil Engineering -> Faculty of Civil and Environmental Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Marcin Cudny				
	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	5.0		15.0	50	
Subject objectives	Presentation of basic problems of rock mechanics including account hard soils (e.g. highly overconsolidated clays).						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U15] has advanced skills in civil engineering within offered specialization/profile	Knowledge of the mechanical characteristics of bedrock represented generally by high stiffness and strength with the presence of discontinuities (joints).			[SU3] Assessment of ability to use knowledge gained from the subject [SU5] Assessment of ability to present the results of task		
	[K7_U14] is able to plan and to interpret the geotechnical investigations, to analyse the foundation stability; can design direct and deep foundations in complex soil conditions for complicated static and dynamical loads	The ability to identify types of rock mass in terms of their mechanical properties. Knowledge of the parameters describing the mechanical properties of rocks.			[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_W15] has deep and adequate knowledge of civil engineering, within offered specialization and profile	Ability to select methods of modeling the bedrock with the selection of parameters and methods of strengthening the rock mass.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	[K7_W12] has deep and theoretical firm knowledge about geotechnical investigation, the rules of geotechnical design and engineering geology; knows the complicated processes in soil, techniques of foundations, draining systems, soil strengthening, geosynthetics applications, underground constructions and earthworks	Knowledge on choosing methods of in situ and laboratory testing of rocks. Ability to interpret the rockbed testing results. Ability to assess water conditions in a rock mass.			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		

Subject contents	1. Introduction, summary of general mechanics and soil mechanics. 2. Basic knowledge of rocks, classification of rock mass. 3. Mechanical properties of rocks, stiffness, strength, anisotropy. 4. Rock joints, material description, laboratory tests, modelling. 5. Problems of water flow in a rock mass. 6. Field and laboratory testing. 7. Stability of rock slopes. 8. Underground excavations (tunneling). 9. Stability issues of mountain arch dams. 10. Numerical modeling of rock mechanics. 11. Soft rocks and hard soils, mechanical characteristics, modelling											
Prerequisites and co-requisites	Basic knowledge of general mechanics and soil mechanics.											
Assessment methods and criteria	<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:33%;">Subject passing criteria</th> <th style="width:33%;">Passing threshold</th> <th style="width:33%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>exam</td> <td>50.0%</td> <td>90.0%</td> </tr> <tr> <td>activity during lectures and exercises</td> <td>10.0%</td> <td>10.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	exam	50.0%	90.0%	activity during lectures and exercises	10.0%	10.0%
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Recommended reading	Basic literature	1. Borecki M., Chudek M, Mechanika górotworu, Wydawnictwo Śląsk, Katowice. 2. Hückel S., Aktualne problemy mechaniki skał, w Wybrane zagadnienia budownictwa wodnego, mechaniki gruntów i skał, część 2, Ossolineum, Wrocław. 3. Izbicki R.J., Mróz Z., Metody nośności granicznej w mechanice gruntów i skał, PWN, Warszawa. 4. Kisiel I., Reologia skał. Podstawy naukowe, Ossolineum, Wrocław. 5. Thiel K., Mechanika skał, w Stan i kierunki rozwoju nauk geotechnicznych, NOT, Warszawa. 6. Thiel K., Badanie i prognozowanie stateczności zboczy skalnych, Prace IBW PAN, 2, Gdańsk. 7. Thiel K., Mechanika skał w inżynierii wodnej, PWN, Warszawa. 8. Thiel K., Rock mechanics in hydroengineering, PWN, Warszawa										
	Supplementary literature	Papers from journals: Rock Mechanics and Rock Engineering, International Journal of Rock Mechanics and Mining Sciences										
	eResources addresses	Adresy na platformie eNauczanie:										
Example issues/ example questions/ tasks being completed	1. Types of rockmass. 2. Rock strength indexes. 3. Parameters of rock material models. 4. Stereographic net. 5. Stability of a rock mass - various methods of safety analysis. 6. Hydraulic problems in the rock mass.											
Work placement	Not applicable											