



Subject card

Subject name and code	Mineral Resources, PG_00049200						
Field of study	Chemistry						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Chemistry and Technology of Functional Materials -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Anna Lisowska-Oleksiak					
	Teachers	prof. dr hab. Anna Lisowska-Oleksiak prof. dr hab. inż. Jarosław Chojnacki					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	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	The aim of the Subject " Mineral Resources" is to give basic information about mineralogy, petrography and mineral processing. Indication of the geopolitical aspect of mineral resources.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W02	e student has basic knowledge of mineral resources, knows their origin, is able to choose methods for identifying minerals using mineralogy and chemical methods, and understands the importance of conducting research on the crystallographic structure using XRD methods. Knows the role of strategic raw materials for new pro-environmental and other technologies			[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge		
	[K6_U05] can, on the basis of the collected experimental or source material, prepare an oral communication with a multimedia presentation	The student is able to prepare a speech with a multimedia presentation based on collected experimental or source material regarding the extraction, processing and geopolitical significance of mineral resources.			[SU4] Assessment of ability to use methods and tools [SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		

Subject contents	Lecture topics 1. Basic concepts: mineral, rock, deposit, etc. Basics of petrography. 2. Physical properties of crystals. Hardness scales and basics of preliminary identification of minerals. 3. Outline of crystallography: crystal, unit cell, crystallographic systems, Bravais translation networks, isomorphism, polymorphism, solid solutions, lattice defects, diffusion in solids. 4. Basics of polycrystal X-ray diffractometry (XPD). Bragg's law. Descriptive morphology of crystals, twinning. 5. Thermal analysis in the study of solids: thermogravimetry, differential scanning calorimetry and related methods. 6. Methods of ore enrichment. Outline of mineralurgy. Physicochemical basics of ore processing. Enrichment curves. Physical processes: sieve separation, in a liquid stream, in a gas stream, in dense liquids. 7. Ore enrichment methods: flotation, flocculation, coagulation, use of eddy currents, magnetic, dielectric and electric separation. 8. Structure and classification of silicates and aluminosilicates. 9. Energy minerals - division, resources, importance. 10. Metal ores - Polish resources and basics of their processing. 11. Raw materials of the chemical industry - Polish resources and basics of their processing. 12. Rocks of industrial importance - Polish resources, exploitation. 13. Materials with unique properties. 14. Strategic raw materials for the chemistry of materials of electrical energy storage devices. Examples of seminar topics: 1. Mineral raw materials for nuclear energy. 2. Production of Al ₂ O ₃ and aluminum from ores, ecological aspect. 3. Structure and application of zeolites. 4. Precious and semi-precious stones. Division, construction, application, Polish and world resources. 5. Sulfide minerals and their processing. 6. Obtaining elements from group 17 (halogens). 7. Raw materials for the production of mineral fertilizers - occurrence, transport, processing. Carbon footprint. 8. Obtaining elements from groups 1 and 2 (alkaline and alkaline earth metals). Li is a strategic element. 9. Production of synthetic precious stones (diamonds, rubies, etc.) 10. Meteorites - division and chemical structure. 11. Mineral resources of Poland. Expansion of companies outside the country. 12. Production of ferrous metals. 13. Raw materials for the production of precious metals. 14. Lanthanides. Ore processing and importance in modern technology. 15. Raw materials from the sea and ocean floor. 16. Oil shale as an energy raw material - analysis of decision-making changes in recent decades in Poland. 17. Mineral resources for nuclear power plant.											
Prerequisites and co-requisites												
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>Presentation on seminar</td> <td>51.0%</td> <td>50.0%</td> </tr> <tr> <td>test (written) on lecture course</td> <td>51.0%</td> <td>50.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Presentation on seminar	51.0%	50.0%	test (written) on lecture course	51.0%	50.0%
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Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Main and characterised geological processes responsible for rocks formation. 2. Describe Bowen's reaction series 3. Describe economic importance of sulfide minerals on choices example. 4. Give examples of diadochy. 											
Work placement	Not applicable											

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