



Subject card

Subject name and code	Mineral Resources, PG_00049200						
Field of study	SUROWCE MINERALNE						
Date of commencement of studies	October 2023		Academic year of realisation of subject		2025/2026		
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 -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. Anna Lisowska-Oleksiak				
	Teachers						
Lesson types	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						
	eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=1092 Moodle ID: 1093 SUROWCE MINERALNE 2026 https://enauczanie.pg.edu.pl/2025/course/view.php?id=1093						
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.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U05] can, on the basis of the collected experimental or source material, prepare an oral communication with a multimedia presentation		Is able to prepare a presentation, including a multimedia component, based on collected source material		[SU1] Ocena realizacji zadania [SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu [SU5] Ocena umiejętności zaprezentowania wyników realizacji zadania		
	K6_W02		Possesses structured general knowledge related to the chemistry of mineral resources, their geological origin, general processing technologies, and has knowledge of their economic and geopolitical significance.		[SW1] Ocena wiedzy faktograficznej [SW2] Ocena wiedzy zawartej w prezentacji [SW3] Ocena wiedzy zawartej w opracowaniu tekstowym i projektowym		

Subject contents	Course content – lecture Lecture Topics 1. Basic concepts: mineral, rock, ore deposit, etc. Fundamentals of petrography. 2. Physical properties of crystals. Hardness scales and the basics of preliminary mineral identification. 3. Outline of crystallography: crystal, unit cell, crystallographic systems, Bravais lattices, isomorphism, polymorphism, solid solutions, lattice defects, diffusion in solids. 4. Fundamentals of X-ray powder diffraction (XPD). Braggs law. Descriptive crystal morphology, twinning. 5. Thermal analysis in solid-state studies: thermogravimetry, differential scanning calorimetry, and related methods. 6. Ore beneficiation methods. Outline of mineral processing. Physicochemical fundamentals of ore treatment. Beneficiation curves. Physical processes: screening, separation in liquid streams, in gas streams, and in dense liquids. 7. Ore beneficiation methods: flotation, flocculation, coagulation, application of eddy currents, magnetic, dielectric, and electrical separation. 8. Structure and classification of silicates and aluminosilicates. 9. Energy minerals classification, resources, significance. 10. Metal ores Polish resources and fundamentals of processing. 11. Raw materials for the chemical industry Polish resources and fundamentals of processing. 12. Rocks of industrial importance Polish resources, exploitation. 13. Materials with unique properties.
	Course content – seminar Example Seminar Topics 1. Mineral raw materials for electrochemical energy storage. 2. Production of AlO and aluminum from ores. 3. Critical and strategic raw materials in the EU. 4. Gemstones and semi-precious stones: classification, structure, applications, Polish and global resources. 5. Sulfide minerals and their processing. 6. Production of group 17 elements (halogens). 7. Raw materials for mineral fertilizer production.

	8. Production of group 1 and 2 elements (alkali and alkaline earth metals). Lithium as a strategic element.									
	9. Production of synthetic gemstones (diamonds, rubies, etc.).									
	10. Meteorites classification and chemical composition.									
	11. Mineral resources of Poland.									
	12. Production of ferrous metals through the ages.									
	13. Raw materials for the production of precious metals.									
	14. Mineral resources of rare earth elements ore processing and importance in modern technology.									
	15. Raw materials from the seabed and ocean floor.									
	16. Oil shales as an energy resource.									
	17. Mineral raw materials for nuclear energy									
Prerequisites and co-requisites										
Assessment methods and criteria	<table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>test (written) on lecture course</td><td>51.0%</td><td>50.0%</td></tr><tr><td>Presentation on seminar</td><td>51.0%</td><td>50.0%</td></tr></table>	Subject passing criteria	Passing threshold	Percentage of the final grade	test (written) on lecture course	51.0%	50.0%	Presentation on seminar	51.0%	50.0%
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Recommended reading	<table><tr><td>Basic literature</td><td>Bolewski A., Manecki A., Mineralogia szczegółowa, Wyd. Polskiej Agencji Ekologicznej, Warszawa, 1993, Manecki, Andrzej Encyklopedia minerałów, 2004; Bolewski, Andrzej, Kubisz, Jan, Żabiński - Mineralogia ogólna; 1975; E. Liber-Madzisz, B. Teisseyre, Mineralogia I petrografia, Oficyna Wydawnicza Wrocław 2000; .Willer Joanna, Pacholewska Małgorzata, Agnieszka Fornalczyk, Mariola Saternus Wprowadzenie do hydrometalurgii i biometalurgii metali nieżelaznych Wydawnictwo Politechniki Śląskiej, Gliwice 2015. Internet: http://webmineral.com http://http://surowce-mineralne.pgi.gov.pl/index.htm</td></tr><tr><td>Supplementary literature</td><td>Jan Drzymała, Podstawy mineralurgii, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2009</td></tr><tr><td>eResources addresses</td><td></td></tr></table>	Basic literature	Bolewski A., Manecki A., Mineralogia szczegółowa, Wyd. Polskiej Agencji Ekologicznej, Warszawa, 1993, Manecki, Andrzej Encyklopedia minerałów, 2004; Bolewski, Andrzej, Kubisz, Jan, Żabiński - Mineralogia ogólna; 1975; E. Liber-Madzisz, B. Teisseyre, Mineralogia I petrografia, Oficyna Wydawnicza Wrocław 2000; .Willer Joanna, Pacholewska Małgorzata, Agnieszka Fornalczyk, Mariola Saternus Wprowadzenie do hydrometalurgii i biometalurgii metali nieżelaznych Wydawnictwo Politechniki Śląskiej, Gliwice 2015. Internet: http://webmineral.com http://http://surowce-mineralne.pgi.gov.pl/index.htm	Supplementary literature	Jan Drzymała, Podstawy mineralurgii, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2009	eResources addresses				
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Example issues/ example questions/ tasks being completed	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. 5. Strategic and critical mineral resources, EU definition.									
Practical activities within the subject	Not applicable									