



## Subject card

Subject name and code	Energetic and Chemical Raw Materials, PG_00060855						
Field of study	Chemical Technology						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
Education level	first-cycle studies	Subject group			Optional subject group 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	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Anna Zielińska-Jurek					
	Teachers	prof. dr hab. inż. Anna Zielińska-Jurek mgr inż. Anna Grzegórska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	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	2.0		18.0		50
Subject objectives	During the course, the student will gain knowledge, skills and competences in the field of raw material acquisition, key, strategic and critical raw materials, the state's raw material policy and the use of waste as raw materials. At the same time, the student will gain theoretical, technological and engineering knowledge of an interdisciplinary nature regarding mineral and energy resources.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U11] individually plans and implements his/her own learning	Uses chemical terminology to the extent necessary to present (in written and oral form) the subject curriculum content.			[SU1] Assessment of task fulfilment [SU5] Assessment of ability to present the results of task		
	[K6_W05] has knowledge of chemical technology based on mineral or energy resources and modern energy sources, understands the concept of sustainable development, knows the principles of green chemistry and environmentally friendly process engineering, has knowledge of occupational safety in the chemical industry	The student has knowledge that allows for assessing the usefulness and methods of functioning of existing engineering and technical solutions in the chemical industry. The student can characterise raw materials for chemical industries. Has knowledge of raw material production technology in terms of environmental pollution and changes in current technologies to solve the problem. Knows the ways of waste management as raw materials.			[SW1] Assessment of factual knowledge		
	[K6_K02] understands the non-technical aspects and implications of the activities of a chemical engineer, including the impact on the environment, is aware of professional behaviour, observance of professional ethics and respect for diversity of views and cultures	The student is aware of the impact of mineral processing and raw material production processes and their use in the chemical industry, with particular emphasis on the impact on the environment.			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Classification of raw materials. Basic groups of raw materials: chemical, energy, metal and mineral raw materials. Raw materials of the chemical industry. Sources of raw materials for the chemical industry, methods of enriching fossil raw materials, preparation of raw materials for the technological process. Energy raw materials. Types of fuels, production of artificial fuels, raw materials used in nuclear energy, biogas, fuel combustion. Unconventional energy sources. Mineral raw materials. Limestone, gypsum, kaolins and clays. Processed mineral raw materials. Mineral pigments in chemical technology and their use. Obtaining raw materials from anthropogenic deposits and supporting the development of a circular economy. Metallic raw materials: their specific properties, industrial importance, the most important elements of processing, occurrence in the country and around the world. Synthetic minerals produced in industrial conditions. Resources of the seas and oceans. Key, strategic and critical raw materials. State raw material policy. Application of waste as raw materials Grinding of materials Selected methods of testing mineral raw materials: microscopic analysis, X-ray analysis, thermal analysis, dynamic light scattering and zeta potential analysis. Energy production from unconventional sources.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory: practical exercises, tests, reports on exercises performed	50.0%	40.0%
	lectures	50.0%	60.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Praca zbiorowa: Bilans gospodarki surowcami mineralnymi Polski i świata 2001-2005. Wyd. PAN, Instytut Gospodarki Surowcami Mineralnymi i Energią, Kraków, 2007.</li> <li>2. Magda. R: Międzynarodowe rynki metali i surowców mineralnych. Wyd. AGH, Kraków, 2006.</li> <li>3. Manecki A. Encyklopedia minerałów. Wyd. AGH, Kraków, 2004.</li> <li>4. Drzymała J., Podstawy mineralurgii. Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2001.</li> </ol>	
	Supplementary literature	brak	
	eResources addresses	Adresy na platformie eNauczenie: Surowce energetyczne i chemiczne - Moodle ID: 41993 <a href="https://enauczenie.pg.edu.pl/moodle/course/view.php?id=41993">https://enauczenie.pg.edu.pl/moodle/course/view.php?id=41993</a>	
Example issues/ example questions/ tasks being completed	<p>Discuss the sources of iron in the Earth's crust List the main lime raw materials used in chemical technology and, using a selected example, discuss the process of their use.</p> <p>Explain the concept of clay raw materials and discuss the methods of using clay raw materials for the production of ceramics.</p> <p>List and, using a selected example, describe the products of wood processing</p> <p>List the raw materials and techniques used in the production of pigments</p>		
Work placement	Not applicable		

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