



Subject card

Subject name and code	Energy resource technologies, PG_00069023						
Field of study	Chemical Technology						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2028/2029	
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	3	Language of instruction				Polish	
Semester of study	5	ECTS credits				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Process Engineering and Chemical Technology -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Donata Konopacka-Łyskawa					
	Teachers						
Lesson types	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	10.0		35.0	75	
Subject objectives	The aim of the course is to familiarize students with the physicochemical properties of energy resources, present technologies for obtaining, processing and converting energy, including alternative fuels and hydrogen, develop environmental awareness and knowledge of economy conditions.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_K03] Understands the need for continuous learning and knows the opportunities to improve professional, personal and social competences, and is able to think and act in an entrepreneurial manner.	is ready to continuously improve his/her knowledge in the field of energy raw materials technology and understands the importance of an entrepreneurial approach to the processing of energy raw materials.			[SK5] Assessment of ability to solve problems that arise in practice [SK4] Assessment of communication skills, including language correctness		
	[K6_W07] Has knowledge of raw materials and technologies in the chemical and polymer industries, also covering issues of corrosion and material protection.	has knowledge of the properties and technologies of energy resources.			[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Course content – lecture						
	<ul style="list-style-type: none"> Introduction to energy resources classification, resources, and importance (2h) Coal: types, properties, and enrichment methods; combustion, gasification, and pyrolysis technologies (2h) Biomass and waste as energy resources: characterization, processing, and combustion (4h) Hydrogen: production methods (SMR, electrolysis, biomass gasification), storage, and transport (4h). Environmental and economic assessment of energy technologies (2h) Directions of energy transformation and development trends (including the hydrogen economy) (1h). 						
	Course content – laboratory						
	<ol style="list-style-type: none"> Properties of coal and biomass (moisture, ash, calorific value) (3h). Characterization of RDF (3h). Obtaining hydrogen (2x3h) / Obtaining biogas (2x3h). Obtaining hydrogen by electrolysis (3h) 						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	lecture - written test	60.0%			50.0%		
	laboratory (performance of laboratory exercises, tests, reports)	100.0%			50.0%		

Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. T. Chmielniak, Technologie energetyczne, PWN, 2021 2. M. Malaczewski, J. Stawska, D. Mowczan, Rynek surowców energetycznych a konkurencyjność gospodarki Polski surowce energetyczne, mix energetyczny, konkurencyjność gospodarki, źródła energii energochłonność ceny energii, Wydawnictwo Uniwersytetu Łódzkiego, 2024 3. B. Kołodziej, M. Matyka, T. Golec, Odnawialne źródła energii: rolnicze surowce energetyczne, Powszechnie Wydawnictwo Rolnicze i Leśne, 2012 4. F. Shi, Reactor and process design in sustainable energy technology, Elsevier 2014.
	Supplementary literature	<ul style="list-style-type: none"> • M. Nowicki, Wodór paliwem przyszłości? PWN 2025 • K. S. V.Santhanam, R. Iosifović, M. J. Massoud, G. A. Takacs, A. V. Bailey, Introduction to hydrogen technology, Wiley 2018
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> • How are energy resources classified based on their origin? • What is the difference between primary and secondary resources? • What are the global trends in the consumption of specific fuel types? • What criteria determine the suitability of an energy resource? • Explain the concept of energy efficiency in the context of resource use. 	
Practical activities within the subject	Not applicable	

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