



Subject card

Subject name and code	Physical and chemical basis of energy generation, PG_00048791						
Field of study	Green Technologies						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
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			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Katarzyna Januszewicz					
	Teachers	dr inż. Katarzyna Januszewicz dr inż. Anna Kuczyńska-Łażewska					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	30.0	0.0	0.0	45
	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	45	2.0	28.0	75		
Subject objectives	The student becomes acquainted with the subject of obtaining energy from various sources - from conventional to renewable. The course explains the physical and chemical attitudes related to obtaining energy, the efficiency of its conversion and storage, and the calorific value of fuels. In addition, environmental aspects are discussed in relation to the different ways of producing electricity and heat.						
Learning outcomes	Course outcome	Subject outcome		Method of verification			
	[K6_U05] can formulate and solve engineering tasks analytical methods, simulation as well as experimental, able to apply knowledge of basic physics and mathematics to analyze the results of experiments, is able to analyze and assess existing technical solutions	The student knows how to calculate the costs of producing energy from various sources and the environmental costs related to the generation, conversion and transmission of energy		[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools			
	[K6_W01] has a basic knowledge from some branches of mathematics and physics useful for formulating and solving simple problems in the field of environmental technologies and modern analytical methods	The student can explain the physical and chemical processes related to the production, conversion and storage of energy. Understands the processes related to the production and movement of pollutants related to the energy industry		[SW1] Assessment of factual knowledge [SW3] Assessment of knowledge contained in written work and projects			
	[K6_K02] is aware of the social role of a technical college graduate, take the reflections on the ethical, scientific and social aspects of the work performed, understands the need to promote, formulating and providing the public with information and opinions concerning the activities of the profession of engineer.	The student can explain the physical and chemical processes related to the production, conversion and storage of energy. Understands the processes related to the production and movement of pollutants related to the energy industry.		[SK3] Assessment of ability to organize work [SK1] Assessment of group work skills			

Subject contents	<p>Global and Polish energy market.</p> <p>Generating energy from conventional sources: coal, oil and natural gas, nuclear energy.</p> <p>Obtaining energy from renewable sources: solar energy, solar collectors, photovoltaic cells and modules, geothermal energy, heat pumps, wind energy, biomass, biogas.</p> <p>The greenhouse effect, capture and storage of CO₂</p>		
Prerequisites and co-requisites	Prerequisites: basic knowledge of mathematics, physics, chemistry, computer science. Completion of the course takes place in accordance with the rules that were announced to the students at the beginning of the semester.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory	60.0%	60.0%
	Test	60.0%	40.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Bogdanienko J. Odnawialne źródła energii. W-wa PWN 1989 2. Lewandowski W.M. Proekologiczne źródła energii odnawialnej. W-wa WNT 2001 3. Boyle G. Renewable Energy. 2nd ed. New York Oxford University Press Inc. 2004 4. E. Klugmann-Radziemska. Fundamentals of Energy Generation. Wyd. P.G. Gdańsk 2009 5. E. Klugmann-Radziemska. Odnawialne Źródła Energii -Przykłady obliczeniowe. Wyd. P.G. Gdańsk 2009 	
	Supplementary literature	<ol style="list-style-type: none"> 1. E. Klugmann-Radziemska E.Klugmann, Systemy słonecznego ogrzewania i zasilania elektrycznego budynków Wydawnictwo Ekonomia i Środowisko, 2002 2. E. Klugmann, E. Klugmann-Radziemska, Ogniwa i moduły fotowoltaiczne oraz inne niekonwencjonalne źródła energii Wydawnictwo Ekonomia i Środowisko, 2005 	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Enter the principle of operation of the selected power plant. List the advantages and disadvantages of operating a hydro, wind and solar power plant.		
Work placement	Not applicable		