



## Subject card

Subject name and code	, PG_00057787						
Field of study	Green Technologies						
Date of commencement of studies	October 2022		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	2		Language of instruction		English		
Semester of study	4		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. Anna Kuczyńska-Łażewska				
	Teachers						
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 basis 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_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.		is aware of its contribution to shaping the awareness of the energy economy and its importance for the country and the world		[SK4] Assessment of communication skills, including language correctness [SK5] Assessment of ability to solve problems that arise in practice		
	[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		knows the formulas and equations needed to calculate the efficiency and performance of various energy sources		[SW1] Assessment of factual knowledge		
	[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		is able to use the knowledge gained during the lecture (calculation formulas) in order to carry out laboratory exercises and vice versa		[SU2] Assessment of ability to analyse information [SU4] Assessment of ability to use methods and tools		

Subject contents	Global energy market. Generating energy from conventional sources: - coal, oil and natural gas - combustion reactions, thermodynamic cycles in combustion and steam engines - basics of nuclear energy - nuclear fission reaction Obtaining energy from renewable sources: - photovoltaic cells and modules - photovoltaic effect, Ohm's law and two Kirchhoff's laws - heat pumps - thermodynamic cycles - wind energy - the phenomenon of lifting force, the principle of operation of wind turbines - hydropower - conversion of potential energy into kinetic energy, tides, currents - biofuels - biofuel production reactions		
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
	Test	60.0%	50.0%
	Laboratory	60.0%	50.0%
Recommended reading	Basic literature	1. Bogdanienko J. Odnawialne źródła energii. W-wa PWN 1989 2. Lewandowski W.M. Proekologiczne źródła energii odnawialnej. Wwa 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 200 5. E.Klugmann-Radziemska. Odnawialne Źródła Energii - Przykłady obliczeniowe. Wyd. P.G. Gdańsk 2009	
	Supplementary literature	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	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		