

Subject card

Subject name and code	Green energy technologies, PG_00179539						
Field of study	Chemistry, Environmental Protection						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2025/2026		
Education level	Master's studies		Subject group		Optional subject group		
Mode of study	full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	academic		Assessment form		credit		
Conducting unit	Faculty of Chemistry -> Rector						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Aleksandra Pieczyńska				
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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		20.0	60
Subject objectives	The aim of the course is to introduce students to modern technologies for generating, storing and using energy in a sustainable and environmentally friendly way.						

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[OŚMU2_W09] Applies safety and hygiene principles when working independently on a test or measurement stand in a laboratory or in the field.	Follows established procedures research;	[SW1] oral statement/ conversation/discussion
	[OŚMU2_W08] Explains the mechanisms of unit processes used in environmental protection and waste management methods.	lists and characterizes the basic ways of obtaining renewable energy; classifies raw materials and appropriate technologies for the production of biofuels	[SW5] implementation of a problem task
	[OŚMU2_W04] Chooses methods, techniques and research tools used in environmental protection.	lists and characterizes the basic ways of obtaining renewable energy applies the basic technological and chemical concepts describing the process of obtaining renewable energy discusses the advantages and disadvantages of producing and using energy from renewable sources	[SW3] text preparation/written work
	[OŚMU2_U01] On the basis of the acquired knowledge, proposes to solve environmental problems.	in an understandable manner both in speech and writing, presents correct technological reasoning, performs the analysis of the selected parameter based on the procedure; predicts, verifies and submits to criticism the results of the conducted experiments	[SU2] presentation/project/paper/ report
	[OŚMU2_K02] Recognises threats, creates safe work conditions and is responsible for the safety of own and other people's work.	Demonstrates responsibility for the proper conduct of the experiment	[SK8] observation of student's independent or team work
Subject contents	Students will gain knowledge of renewable energy sources and innovative solutions to improve energy efficiency. Topics will include: renewable energy sources (RES) including solar energy (photovoltaics, solar panels), wind energy, hydropower (hydroelectric, tidal and wave power plants), solid biomass, liquid biomass and biogas (combustion and fermentation technologies), geothermal and energy storage technologies (batteries, hydrogen, heat storage). The problems of the exercises include the performance of exercises thematically related to the acquisition of energy from renewable sources and the production of biofuels.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	activity at classes	50.0%	10.0%
	raport	51.0%	30.0%
	test	51.0%	60.0%
Recommended reading	Basic literature	Proekologiczne odnawialne źródła energii, W.M. Lewandowski, WNT 2012 Biopaliwa, W.M. Lewandowski, M. Ryms, WNT 2013 Biopaliwa, technologie dla zrównoważonego rozwoju, E. Klimiuk, M. Pawłowska, T. Pokój, PWN 2012 Technologie energetyczne, Tadeusz Chmielak, PWN, 2018 Energetyka wodorowa, Tadeusz Chmielak, PWN, 2020	
	Supplementary literature	Pandey A., Handbook of plant-based biofuels, CRC Press Taylor &Francis Group, 2009 Fundaments of Energy generation, Ewa Klugmann-Radziemska, Wydawnictwo PG, 2009	
	eResources addresses		
Example issues/ example questions/ tasks being completed	harakterystyka ogniw fotowoltaicznych Budowa i zasada działania turbiny wiatrowej		

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