GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Exploitation of Renewable Energy Sources, PG_00055966		
Field of study	Power Engineering		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	6	ECTS credits	1.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Electrical Power Engineering -> Faculty of Electrical and Control Engineering	
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Izabela Prażuch
	Teachers	

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	0.0	0.0	0.0	15

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	15	1.0	9.0	25

Subject objectives

To acquaint students with renewable energy technologies.

To teach students how to calculate technical parameters of renewable energy sources

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K04] is able to formulate opinions on technical and technological processes in energy and sanitary engineering	The student knows the basic issues concerning the operation of power equipment in systems using renewable energy resources	[SK5] Assessment of ability to solve problems that arise in practice
[K6_W03] knows the basics of automation and automatic regulation, knows the principles of the selection of electrical devices, drive systems and their control	The student knows the basic issues regarding the selection of devices in RES installations.	[SW1] Assessment of factual knowledge
[K6_W08] has basic knowledge in the field of intellectual property protection and patent law, knows and understands the basic processes of energy production and use, knows and understands the principles of modern heating and power systems	The student explains and develops ways of converting renewable energy into electricity and heat in a useful form. The student learns general information about energy consumption.	[SW1] Assessment of factual knowledge

Subject contents	Presentation of the overall situation of the national energy sector. Presentation of the shares and development trends in the domestic use of renewable energy. Discussion of the laws affecting the development and use of renewable energy sources cogeneration high economy. Presentation of the national potential of solar energy. Discussion of the types of solar collectors. A discussion of the different mounting methods. The use of solar collectors for hot water. Collectors cooperation systems with other sources. The possibility of using solar energy for heating purposes. Operational problems with solar collectors. The economics of solar collectors solutions. Types of photovoltaic cells (PV). Ways to use electricity from PV cells. Methods for assembly and construction of PV plants. The economics of small and large PV plants. Wind energy potential in the Polish market. The innfluence of terrain on wind energy potential. The types of power plants and wind turbines. The economics of a small wind turbine construction. The economics of the construction of the wind farm. Types of heat exchangers for heat pumps. Sizing of the heat exchanger for heating system with heat pump. Conditions for the effective heat pump operation. Cascade heat pump systems. Sources of biogas. The composition and quality of biogas. Ways to use. The economics of biogas production. Sources of biomass. Plant energy crops. Performance of energy crops. Biomass combustion plants. Biofuels in transport sector: types biofuels and methods of preparation.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
test	50.0%	100.0%

Recommended reading	Basic literature	1. Witold M. Lewandowski, Proekologiczne odnawialne źródła energii. Wydawnictwo Naukowo-Techniczne, 2010. 2. Bogdan Szymański, Instalacje fotowoltaiczne. GlobEnergia 2020.
	Supplementary literature	1. Ewa Klugman-Radziszewska, Fotowoltaika w teorii i praktyce. BTC, 2010. 2. Articles and websites devoted to renewable energy sources
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Selection of PV installations Design, construction and exploitation problems of renewable energy sources	
Work placement	Not applicable	