GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Renewable Energy Sources, PG_00060853		
Field of study	Odnawialne źródła energii		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
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	Polish
Semester of study	3	ECTS credits	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Energy Conversion and Storage -> Faculty of Chemistry -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. Ewa Klugmann-Radziemska	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	30.0	0.0	0.0	0.0	0.0	30

E-learning hours included: 0.0

eNauczanie source address: https://enauczanie.pg.edu.pl/2025/course/view.php?id=2803

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	2.0	18.0	50

Subject objectives

Introducing students to the topic of renewable energy sources and the environmental consequences associated with the use of conventional energy sources

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_K02] is aware of the responsibility for his/her work and is ready to work in a team and share responsibility for common tasks.	The student is aware of the responsibilities related to designing and operating renewable energy systems and is able to collaborate effectively within a team, sharing responsibility for joint tasks.	[SK2] Ocena postępów pracy
[K6_W03] Has knowledge in the field of chemical technology and environmental protection, including sustainable development, green chemistry, modern energy sources and the principles of minimizing the impact of industrial processes on the environment and work safety	The student understands the need to use renewable energy sources in the context of environmental protection and climate change.	[SW1] Ocena wiedzy faktograficznej

Subject contents	Course content – lecture 1. Introduction to renewable energy sources, including current European Union regulations on RES 2. Consequences of using conventional energy sources: -acid rain -smog (temperature inversion phenomenon; London-type smog, Los Angeles-type smog, Polish-type smog; -global warming (greenhouse effect; fast and slow carbon cycle, carbon thermostat; mechanisms and feedback loops controlling climate change; climate models) 3. Resources, characteristics and discussion of the principles of energy conversion from renewable energy sources: -solar energy (low- and high-temperature solar energy systems; active and passive systems) 4. Discussion of the potential of renewable energy in Poland, including the availability and use of various RES sources: -geographical conditions: -explanation of the geographical factors that influence the selection and location of RES installations in Poland and worldwide. -examples of localities and regions with high potential for various RES sources. 5. Energy storage methods: -discussion of energy storage technologies (batteries, capacitors, fuel cells, etc.) 6. Installation and equipment diagrams: -presentation of various diagrams and designs of RES-based installations, including a discussion of the equipment used, its functions and role in the energy production process. 7. Technologies for hydrogen production and use. Hydrogen economy. 8. Use of biomass, biofuels, biogas. Biogas plants powered by waste biomass. 9. Integrated ways of using available renewable energy sources.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Test	60.0%	100.0%

Recommended reading	Basic literature	Energetyka i ochrona środowiska. Generowanie i magazynowanie energii. Odpady energetyczne. Analiza cyklu życia, Wydawnictwo Naukowe PWN, 2023 G. Jastrzębska, Energia ze źródeł odnawialnych i jej wykorzystanie, WKŁ 2021 W. M. Lewandowski, E. Klugmann-Radziemska Proekologiczne odnawialne źródła energii. Kompendium, Wydawnictwo Naukowe PWN, 2017
	Supplementary literature	Krawiec F., Odnawialne źródła energii w świetle globalnego kryzysu energetycznego, Wydawnictwo Difin, ISBN: 978-83-7641-241-2, Warszawa 2010 S. Radkowski, A. Piętak, S.W. Kruczyński, K.W. Szewczyk, M. Struś, Wieloaspektowa analiza stosowania paliw alternatywnych w Polsce ze szczególnym uwzględnieniem biopaliw, Politechnika Warszawska, 2006
	eResources addresses	
Example issues/ example questions/ tasks being completed	What is a carbon thermostat? What principles are applied in passive construction? What determines the choice of wind energy storage? What is the role of a solar panel? The use of a selected renewable energy source in municipal services Describe the factors stimulating and limiting biogas production	
Practical activites within the subject	Not applicable	

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