GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Renewable energy sources, PG_00060853		
Field of study	Chemical Technology		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2025/2026
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Anna Dettlaff	
	Teachers	dr inż. Anna Dettlaff dr hab. inż. Andrzej Nowak prof. dr hab. inż. Anna Zielińska-Jurek	

Lesson types and methods of instruction

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=1058

Moodle ID: 1058 Odnawialne źródła energii 2025 2026
https://enauczanie.pg.edu.pl/2025/course/view.php?id=1058

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_W12] knows the chemical nomenclature in Polish and specialized terms related to chemical technology	The student knows and understands terms related to energy conversion and storage technologies.	[SW1] Assessment of factual knowledge
[K6_W03] has knowledge of environmental protection in chemical technology, the classification of technological processes in terms of their environmental impact and how to eliminate the environmental impact of technological installations	The student understands the environmental impact of conventional energy sources.	[SW1] Assessment of factual knowledge
[K6_K02] understands the non-technical aspects and implications of the activities of a chemical engineer, including the impact on the environment, is aware of professional behaviour, observance of professional ethics and respect for diversity of views and cultures	The student understands the need to use renewable energy sources in the context of environmental protection and climate change.	[SK2] Assessment of progress of work

Subject contents	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	Supplementary https://naukaoklimacie.pl/ - Webpage about the climate changes
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	
Work placement	Not applicable	

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