



Subject card

Subject name and code	Renewable energy seminar I, PG_00037311						
Field of study	Technical Physics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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	5		ECTS credits		1.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Institute of Physics and Applied Computer Science -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Daniel Pelczarski				
	Teachers		dr inż. Daniel Pelczarski				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	0.0	15.0	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		2.0		8.0	25
Subject objectives	To consolidate and systematize the knowledge acquired during lectures and learn how to present it by delivering a lecture on a given topic.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_U01		Is able to independently obtain the source information on a selected topic of the lecture.		[SU1] Assessment of task fulfilment		
	K6_U08		Has the ability to prepare oral presentations on a selected topic.		[SU1] Assessment of task fulfilment		
	K6_K05		Can communicate a selected issue in a communicative way and assess the lectures of other people.		[SK4] Assessment of communication skills, including language correctness		
	K6_U07		He can present the basic facts of physics related to renewable energy in a popular way.		[SU1] Assessment of task fulfilment		

Subject contents

Presentation topics:

1. Energy generation methods. Directions of renewable energy development
2. Hydropower.
3. Wind energy. Wind farm design.
4. Photovoltaics - inorganic cells.
5. Photovoltaics - organic cells.
6. Photovoltaics - dye-sensitized solar cells.
7. Photovoltaics - perovskite cells.
8. Solar radiation angles and tracking systems.
9. Photovoltaics - multijunctions and radiation concentrators.
10. Practical aspects of photovoltaics.
11. Photovoltaic installations - modules, off-grid and on-grid systems . Elements of a PV installation.
12. Overview of the largest PV installations in Poland.
13. Prospects for the development of photovoltaics.
14. PV/T hybrid systems.
15. Solar collectors.
16. Biofuels - biomass and biogas.
17. Geothermal energy.
18. Heat pumps.
19. Renewable energy sources in building sector.
20. The concept of a self-sufficient building powered by renewable energy sources.
21. Energy storage - cells, batteries and accumulators.
22. Hydrogen energy - fuel cells.
23. New energy sources for transportation.
24. Environmental pollution related to renewable energy sources.

Prerequisites and co-requisites	Knowledge of mechanics, electricity and magnetism, quantum physics, and thermodynamics, within the scope of the basic academic course.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment of the oral presentation: the content and the manner of its presentation.	50.0%	100.0%
Recommended reading	Basic literature	1. S. C. Capareda, Introduction to Renewable Energy Conversions- CRC Press 2019. 2. M.A.Hanif, F. Nadeem, R. Tariq, U. Rashid, Renewable and Alternative Energy Resources, Academic Press 2021. 3. D. Ginley, D. Kahan, Fundamentals of materials for energy, Cambridge University Press 2011.	
	Supplementary literature	1. T.K. Ghosh, M.A. Prelas, Energy resources and systems, vol.2: Renewable Resources, Springer 2011. 2. J-C. Sabonnadiere, Renewable Energies, Wiley 2009. 3. J. Twidell, T. Weir, Renewable Energy Resources, Taylor & Francis 2005.	
	eResources addresses	Podstawowe https://enauczenie.pg.edu.pl/moodle/course/view.php?id=40311 - Addresses on the eLearning platform: Renewable Energy Seminar I 2024 Uzupełniające Adresy na platformie eNauczanie: Seminarium energetyki odnawialnej I - 2024 - Moodle ID: 40311 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=40311	
Example issues/ example questions/ tasks being completed	See list of topics.		
Work placement	Not applicable		

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