



Subject card

Subject name and code	Renewable energy seminar II, PG_00037312						
Field of study	Technical Physics						
Date of commencement of studies	October 2020	Academic year of realisation of subject			2022/2023		
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	Zakład Fotofizyki Molekularnej -> Instytut Fizyki i Informatyki Stosowanej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Grygiel					
	Teachers	dr inż. Piotr Grygiel					
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	Strengthening and systematizing the knowledge acquired during the lectures and learning its presentation by delivering a lecture on a given topic.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_K05	[K6_K05] He can present the effects of his work, convey information in a generally comprehensible way, communicate, perform self-evaluation and constructive assessment of the effects of other people's work in the course of seminars. [SK4] Assessment of communication skills, including language correctness			[SK4] Assessment of communication skills, including language correctness		
	K6_U08	Has the ability to prepare papers and written studies and oral presentations, in Polish and English, on issues related to renewable energy.			[SU5] Assessment of ability to present the results of task [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	K6_U01	Can learn independently, obtain information related to renewable energy, from literature, databases and other properly selected sources.			[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	K6_U07	He can present the basic facts of physics and renewable energy in a popular way.			[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject [SU1] Assessment of task fulfilment		

Subject contents	<ol style="list-style-type: none"> 1. A farm of solar liquid collectors as a source of renewable energy. 2. Design of liquid collector systems. 3. Solar steam generating systems. 4. Cogeneration systems of fuel cells and analysis of the operation of the selected system. 5. Ways of obtaining geothermal energy and its use. 6. The use of biomass for the production of thermal energy. 7. Thermal energy storage systems. 8. Operation of a wind farm and its cooperation with the energy system. 9. Wind farms, their operational problems, impact on the energy system, its stability and energy quality. 10. Economic aspects of wind farm operation. 11. Design of wind generator systems. 12. The impact of wind farms on the environment. 13. Functions of hydropower plants in the power system. 14. Operating problems of a hydropower plant: cooperation of generators with the power grid, distributed production and energy accumulation. 15. The impact of hydropower plants on the environment. 16. Off-grid photovoltaic systems. " 17. On-grid" photovoltaic systems. 18. Designing photovoltaic installations. 19. Solar radiation concentrating systems. 20. PV/T hybrid systems. 		
Prerequisites and co-requisites	Basic lecture in physics in the field of mechanics, thermodynamics, electricity and magnetism, lecture on renewable energy sources as well as water-, wind energy and fuel cells.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment of the oral presentation.	50.0%	100.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. J. F. Manwell, J. G Mc Gowan, A. L. Rogers, Wind Energy Explained. Theory, Design and Application. John Wiley & Sons, Ltd, 2009 2. A. Luque , S. Hegedus , Handbook of photovoltaic science and engineering, Wiley 2003. 3. S.A. Kalogirou, Solar Energy Engineering Processes and Systems, Elsevier Inc., 2014. 4. A.J. Dicks, A.L.Rand, Fuel Cell Systems Explained, 2018 John Wiley & Sons Ltd. 	
	Supplementary literature	<ol style="list-style-type: none"> 1. T. Burton, N. Jenkins, D. Sharpe, E. Bossanyi, Wind Energy Handbook, Willey & Sons Ltd., 2011 2. J. Nelson , The physics of solar cells , ICP, 2003. 3. K.M. Illyas, Fundamentals of Power Plant Engineering: Performance and Operation, LAP Lamberg Academic Publishing, 2018. 	
	eResources addresses	Uzupełniająca Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	As in the list of proposed topics.		
Work placement	Not applicable		