



Subject card

Subject name and code	Renewable energy seminar II, PG_00037312						
Field of study	Technical Physics						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2023/2024		
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 hab. inż. Waldemar Stampor					
	Teachers	dr hab. inż. Waldemar Stampor					
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_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		
	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_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		

Subject contents	<ol style="list-style-type: none"> <li>1. Energy generation methods. Directions of renewable energy development</li> <li>2. Hydropower.</li> <li>3. Wind energy. Wind farm design.</li> <li>4. Photovoltaics - inorganic cells.</li> <li>5. Photovoltaics - organic cells.</li> <li>6. Photovoltaics - dye-sensitized solar cells.</li> <li>7. Photovoltaics - perovskite cells.</li> <li>8. Solar radiation angles and tracking systems.</li> <li>9. Photovoltaics - multijunctions and radiation concentrators.</li> <li>10. Practical aspects of photovoltaics.</li> <li>11. Photovoltaic installations - modules, off-grid and on-grid systems . Elements of a PV installation.</li> <li>12. Overview of the largest PV installations in Poland.</li> <li>13. Prospects for the development of photovoltaics.</li> <li>14. PV/T hybrid systems.</li> <li>15. Solar collectors.</li> <li>16. Biofuels - biomass and biogas.</li> <li>17. Geothermal energy.</li> <li>18. Heat pumps.</li> <li>19. Renewable energy sources in building sector.</li> <li>20. The concept of a self-sufficient building powered by renewable energy sources.</li> <li>21. Energy storage - cells, batteries and accumulators.</li> <li>22. Hydrogen energy - fuel cells.</li> <li>23. New energy sources for transportation.</li> <li>24. Environmental pollution related to renewable energy sources.</li> </ol>								
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	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Assessment of the oral presentation.</td> <td>50.0%</td> <td>100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Assessment of the oral presentation.	50.0%	100.0%
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Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. S. C. Capareda, Introduction to Renewable Energy Conversions- CRC Press 2019.</li> <li>2. M.A.Hanif, F.Nadeem, R.Tariq, U.Rashid, Renewable and Alternative Energy Resources, Academic Press 2021.</li> <li>3. D.Ginley, D.Kahen, Fundamentals of materials for energy, Cambridge University Press 2011.</li> </ol>							
	Supplementary literature	<ol style="list-style-type: none"> <li>1. T.K.Ghosh, M.A.Prelas Energy resources and systems, vol.2: Renewable Resources, Springer 2011.</li> <li>2. J-C,Sabonnadiere, _Renewable Energies, Wiley 2009.</li> <li>3. J.Twidell, T.Weir, Renewable Energy Resources, Taylor &amp; Francis 2005.</li> </ol>							
	eResources addresses	Adresy na platformie eNauczanie: Seminarium energetyki odnawialnej II 2024 - Moodle ID: 37395 <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=37395">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=37395</a>							
Example issues/ example questions/ tasks being completed	As in the list of proposed topics.								
Work placement	Not applicable								