



Subject card

Subject name and code	Renewable energy sources, PG_00037308						
Field of study	Technical Physics						
Date of commencement of studies	October 2022	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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Zakład Ekoinżynierii i Silników Spalinowych -> Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bartosz Dawidowicz				
	Teachers		dr inż. Bartosz Dawidowicz				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	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	The aim of the course is to present concepts and problems related to energy resources, energy conversion methods, especially renewable energy sources (RES). Comparison of conventional energy generation methods with renewable energy methods. Presentation of the physical properties and classification of renewable energy sources. Providing theoretical foundations of physical phenomena used to convert energy from renewable energy sources and the construction and operation of devices. Presentation of technical, energy, environmental and economic problems related to renewable energy.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_W02	The student knows and understands the phenomena occurring during energy conversion, is able to describe them and present a technical solution to the problem. Knows the possibilities and limitations of renewable energy.			[SW1] Assessment of factual knowledge		
	K6_U09	The student is able to access specialized sources of literature and distinguish information based on physically and mathematically justified facts from speculation. Is able to analyze and verify data and information in accordance with physical, mathematical and logical principles and draw conclusions independently.			[SU3] Assessment of ability to use knowledge gained from the subject		

Subject contents	1. Introduction: - energy resources: definition, division, raw materials, economic importance, - energy conversion methods (classical, unconventional, renewable), - energy resources quantitative estimates, - reasons for interest in renewable energy, - physical characteristics of renewable energy. 2. Energy of seas and oceans. 3. Hydropower. 4. Wind energy. 5. Geothermal energy. 6. Solar energy (heliotechnics, photovoltaics). 7. Biomass. 8. Fuel cells: principle of operation, types of fuel cells.											
Prerequisites and co-requisites	Basic knowledge of physics, mechanics, electrochemistry, thermodynamics.											
Assessment methods and criteria	<table border="1" data-bbox="451 461 1487 528"> <thead> <tr> <th data-bbox="451 461 794 495">Subject passing criteria</th> <th data-bbox="794 461 1137 495">Passing threshold</th> <th data-bbox="1137 461 1487 495">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 495 794 528">Test</td> <td data-bbox="794 495 1137 528">56.0%</td> <td data-bbox="1137 495 1487 528">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Test	56.0%	100.0%			
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Example issues/ example questions/ tasks being completed	1. Physical characteristics of renewable energy 2. Energy resources of seas and oceans 3. Types of hydroelectric power plants 4. Diagram of a geothermal power plant 5. Betz criterion 6. Photovoltaic effect 7. Biomass energy conversion 8. Scheme and principle of operation of a fuel cell											
Work placement	Not applicable											