



Subject card

Subject name and code	Renewable Energy Sources, PG_00053656						
Field of study	Mechanical Engineering						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2026/2027		
Education level	first-cycle studies	Subject group					
Mode of study	Full-time studies	Mode of delivery			at the university		
Year of study	3	Language of instruction			English		
Semester of study	5	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Janusz Cieśliński					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	15.0	0.0	0.0	45
	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	45		0.0		0.0	45
Subject objectives	Presentation of the modern achievements and tendencies in the area of renewable energy resources utilization. Classification of renewable energy resources. Possibilities of renewable energy resources utilization. Discussion of theoretical backgrounds of selected technologies.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U01	The student is able to independently find information about the current state of knowledge in the field of renewable energy sources.			[SU1] Assessment of task fulfilment		
	K6_W09	Student knows basic characteristics of renewable resources.			[SW1] Assessment of factual knowledge		
	K6_U06	The student knows the value of CO2 emissions for each technology. Can determine the efficiency of appliances.			[SU1] Assessment of task fulfilment		
	[K6_W12] possesses basic knowledge necessary to understand the ex-technical conditions of engineering activity, possesses basic knowledge on management, including quality management and running commercial enterprise, within the range of protection of intellectual property and patent law; knows general principles of creating and developing forms of individual entrepreneurship and basic HSE rules applicable to machine industry	The student has basic knowledge necessary to understand non-technical conditions of using various energy sources, including renewable and unconventional sources.			[SW1] Assessment of factual knowledge		

Subject contents	<p>Course content – lecture Lecture: energy resources, ocean and see resources, tidal energy, wave energy, osmotic energy, ocean thermal energy conversion, wind energy, Betz criterion, aerogenerators, hydro-power, water turbines, hydropower stations - types and characteristics, geothermal energy, dry rock and aquifer resources, geothermal power stations and heat-generating plants, solar energy, solar collectors, solar ponds, solar "power tower", solar "thermal tower", photovoltaics.</p> <p>Tutorial: estimation of the power of tidal, wave and osmotic power plant as well as OTEC cycle, wind power, rotor diameter of aerogenerator, calculation of the power of hydropower plant, efficiency of geothermal power plant, surface area and efficiency of solar collector.</p> <p>Laboratory: 1. Characteristics of solar collector 2. Characteristics of photovoltaic panel 3. Characteristics of micro-wind generator 4. Operation of hydropower plant.</p>											
Prerequisites and co-requisites												
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="456 577 794 607">Subject passing criteria</th> <th data-bbox="799 577 1137 607">Passing threshold</th> <th data-bbox="1142 577 1469 607">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="456 613 794 642">Test</td> <td data-bbox="799 613 1137 642">56.0%</td> <td data-bbox="1142 613 1469 642">90.0%</td> </tr> <tr> <td data-bbox="456 649 794 678">Laboratory reports</td> <td data-bbox="799 649 1137 678">100.0%</td> <td data-bbox="1142 649 1469 678">10.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Test	56.0%	90.0%	Laboratory reports	100.0%	10.0%
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Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> <li>1. Physical properties of renewable sources</li> <li>2. OTEC system</li> <li>3. Classification of hydro power plants and their advantages</li> <li>4. Types of geothermal sources and scheme of the binary power plant</li> <li>5. Features of wind/electricity generating systems</li> <li>6. Solar constant</li> </ol>											
Practical activities within the subject	Not applicable											

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