



## Subject card

Subject name and code	Natural energy resources, PG_00055885						
Field of study	Naturalne zasoby energetyczne						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Obligatory subject group in the field of study 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	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Energy and Industrial Apparatus -> Faculty of Mechanical Engineering and Ship Technology - > Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Bartosz Dawidowicz				
	Teachers		dr inż. Bartosz Dawidowicz				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 2169 Naturalne zasoby energetyczne <a href="https://enauczanie.pg.edu.pl/2025/course/view.php?id=2169">https://enauczanie.pg.edu.pl/2025/course/view.php?id=2169</a>						
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	30	8.0	37.0	75		
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 in Polish conditions. Discussion of theoretical backgrounds of selected technologies.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W06] knows classic and developmental energy technologies, rules for the selection and operation of heat and energy devices and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, methods of using renewable energy sources	The student's knowledge includes knowledge of classical and renewable energy sources. He knows the physical laws of these processes. They presented the construction and operation of energy conversion devices. Has knowledge of the effects of both classic and renewable energy sources on the natural environment. He knows what are the limitations of the use of renewable energy sources and their profitability.			[SW1] Ocena wiedzy faktograficznej		
	[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	The student performs calculations, correctly interprets the obtained results and performs a project using engineering tools.			[SU3] Ocena umiejętności wykorzystania wiedzy uzyskanej w ramach przedmiotu		
	[K6_W10] knows the basic installations in the field of renewable energy sources and their impact on the environment	The student has theoretical knowledge of energy installations as well as the construction and operation of renewable energy sources. Is aware of the impact of the above-mentioned installation on the environment.			[SW1] Ocena wiedzy faktograficznej		

Subject contents	Energy resources. Ocean and sea 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. Exercises - 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 Laboratory 1. Characteristics of solar collector 2. Characteristics of photovoltaic panel 3. Characteristics of micro-wind generator														
Prerequisites and co-requisites	Thermodynamics, fluid mechanics, heat transfer														
Assessment methods and criteria	<table border="1" data-bbox="451 365 1487 499"> <thead> <tr> <th data-bbox="451 365 794 398">Subject passing criteria</th> <th data-bbox="794 365 1137 398">Passing threshold</th> <th data-bbox="1137 365 1487 398">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 398 794 432">Exercises - test</td> <td data-bbox="794 398 1137 432">56.0%</td> <td data-bbox="1137 398 1487 432">35.0%</td> </tr> <tr> <td data-bbox="451 432 794 465">Lecture - test</td> <td data-bbox="794 432 1137 465">56.0%</td> <td data-bbox="1137 432 1487 465">35.0%</td> </tr> <tr> <td data-bbox="451 465 794 499">Laboratory - report, test</td> <td data-bbox="794 465 1137 499">56.0%</td> <td data-bbox="1137 465 1487 499">30.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Exercises - test	56.0%	35.0%	Lecture - test	56.0%	35.0%	Laboratory - report, test	56.0%	30.0%
Subject passing criteria	Passing threshold	Percentage of the final grade													
Exercises - test	56.0%	35.0%													
Lecture - test	56.0%	35.0%													
Laboratory - report, test	56.0%	30.0%													
Recommended reading	<table border="1" data-bbox="451 510 1487 745"> <tbody> <tr> <td data-bbox="451 510 794 678">Basic literature</td> <td colspan="2" data-bbox="794 510 1487 678">1. Mikielwicz J., Cieśliński J.T.: Niekonwencjonalne urządzenia i systemy konwersji energii. Maszyny Przepływowe pod red. E.S. Burki. Tom 24. IMP PAN, Ossolineum Wrocław 1999. 2. Cieśliński J.T.: Niekonwencjonalne urządzenia i układy energetyczne. Przykłady obliczeń. Wyd. PG 1997. 3. Lewandowski W.M.: Proekologiczne źródła energii odnawialnej. WNT W-wa, 2001. 4. Twidell J.W., A.D Weir: Renewable energy sources. London: Chapman and Hall 1990</td> </tr> <tr> <td data-bbox="451 678 794 712">Supplementary literature</td> <td colspan="2" data-bbox="794 678 1487 712">Journal: Czysta Energia</td> </tr> <tr> <td data-bbox="451 712 794 745">eResources addresses</td> <td colspan="2" data-bbox="794 712 1487 745"></td> </tr> </tbody> </table>			Basic literature	1. Mikielwicz J., Cieśliński J.T.: Niekonwencjonalne urządzenia i systemy konwersji energii. Maszyny Przepływowe pod red. E.S. Burki. Tom 24. IMP PAN, Ossolineum Wrocław 1999. 2. Cieśliński J.T.: Niekonwencjonalne urządzenia i układy energetyczne. Przykłady obliczeń. Wyd. PG 1997. 3. Lewandowski W.M.: Proekologiczne źródła energii odnawialnej. WNT W-wa, 2001. 4. Twidell J.W., A.D Weir: Renewable energy sources. London: Chapman and Hall 1990		Supplementary literature	Journal: Czysta Energia		eResources addresses					
Basic literature	1. Mikielwicz J., Cieśliński J.T.: Niekonwencjonalne urządzenia i systemy konwersji energii. Maszyny Przepływowe pod red. E.S. Burki. Tom 24. IMP PAN, Ossolineum Wrocław 1999. 2. Cieśliński J.T.: Niekonwencjonalne urządzenia i układy energetyczne. Przykłady obliczeń. Wyd. PG 1997. 3. Lewandowski W.M.: Proekologiczne źródła energii odnawialnej. WNT W-wa, 2001. 4. Twidell J.W., A.D Weir: Renewable energy sources. London: Chapman and Hall 1990														
Supplementary literature	Journal: Czysta Energia														
eResources addresses															
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														

Document generated electronically. Does not require a seal or signature.