



## Subject card

Subject name and code	Solar energy, PG_00055943						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2024/2025	
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				3.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Institute of Energy -> Faculty of Mechanical Engineering and Ship Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Waldemar Targański				
	Teachers						
Lesson types and methods of instruction	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						
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		3.0		42.0	75
Subject objectives	Familiarizing students with the parameters of solar radiation and the possibilities and ways of using solar radiation energy. Familiarizing students with the design and working principle of solar collectors and thermoelectric modules and their assemblies and installations on an individual and industrial scale.						
Learning outcomes	Course outcome		Subject outcome			Method of verification	
	[K6_W11] has knowledge of known technologies and non-technical aspects to solve simple engineering tasks in the field of energy systems and devices		The student has knowledge of the technologies learned and non-technical aspects to solve simple engineering tasks in the field of energy systems and devices.			[SW1] Assessment of factual knowledge	
	[K6_W10] knows the basic installations in the field of renewable energy sources and their impact on the environment		The student knows the basic installations in the field of renewable energy sources and their impact on the environment			[SW1] Assessment of factual knowledge	
	[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 knows: classical and developmental energy technologies, principles of selection and operation of thermal and energy equipment and installations, basic principles of energy systems operation, basic issues regarding the reliability of energy devices and diagnostics, environmental effects of energy technologies used, ways of using renewable energy sources.			[SW1] Assessment of factual knowledge	
Subject contents	Solar radiation energy and its conversion methods. Liquid and air collectors and heating installations with solar collectors. Photovoltaic installations, their types and equipment. Characteristics of the operation of solar collectors and PV installations, taking into account the influence of operating conditions. Designing of solar installations.						
	Energy investigations of the solar collector. Tests of installations with photovoltaic cells.						

Prerequisites and co-requisites	Physics  Thermal technology		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Assessment	56.0%	50.0%
	Laboratory	56.0%	50.0%
Recommended reading	Basic literature	<p>Luque A., Hegedus S.: Handbook of Photovoltaic. Science and Engineering. Second Edition. John Wiley &amp; Sons, Ltd. 2011.</p> <p>Kalogirou S.: Solar Energy Engineering. 2014.</p> <p>Waeli A. et al.: Photovoltaic/Thermal (PV/T) Systems: Principles, Design, and Applications. Springer. 2019.</p>	
	Supplementary literature	Papers in journals	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		