



## Subject card

Subject name and code	Laboratory of photovoltaics, PG_00039479						
Field of study	Technical Physics						
Date of commencement of studies	February 2024	Academic year of realisation of subject			2024/2025		
Education level	second-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	3	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Physics of Electronic Phenomena -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Grygiel					
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	30.0	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	4.0		16.0	50	
Subject objectives	Planning and conducting research on commercial "off grid" photovoltaic solar installation in accordance with the rules of engineering art and applicable standards. Preparing an appropriate report.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_W05] Knows the theoretical basis of the functioning of physical scientific equipment.	Knows the theoretical basis for operation of the apparatus for measurements of a photovoltaic system in accordance with applicable regulations.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K7_W06] Has enhanced knowledge of the experimental methods and techniques applied in physics.	Has knowledge of experimental methods and techniques for specialized testing of photovoltaic systems.			[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K7_U03] Has enhanced laboratory work experience.	Possesses laboratory skills in order to carry out tests of a photovoltaic system in accordance with applicable regulations.			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment		
	[K7_U06] Can apply obtained knowledge of physics to exact sciences, natural and technical sciences.	Can apply the acquired knowledge in the field of physics to analyze the results of a photovoltaic system measurements.			[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
Subject contents	1. Creating a description of the work of the tested system. 2. Determining the standards and other regulations in force when testing solar installations. 3. Preparing the list of required tests and planning the measurement process in accordance with applicable standards and regulations. 4. Conducting measurements. 5. Analysis of results, drawing conclusions and formulating possible recommendations, including operational ones. 6. Preparing a written report.						
Prerequisites and co-requisites	Knowledge of the principles of functioning of the "off grid" type solar installation. The ability to carry out, analyze and present the results of measurements of electrical and some non-electrical quantities.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Evaluation of a written report on the course of research and its results.	50.0%			100.0%		

Recommended reading	Basic literature	1. Bogdan Szymański, Instalacje fotowoltaiczne, 6th Edition, GlobEnergia 2017.  2. Applicable standards and regulations for the measurement of solar installations.
	Supplementary literature	1. Handbook of photovoltaic science and engineering, ed. by Antonio Luque and Steven Hegedus, 2011 John Wiley & Sons, Ltd
	eResources addresses	Adresy na platformie eNauczenie:
Example issues/ example questions/ tasks being completed	1. Creating a description of the work of the tested system. 2. Determining the standards and other regulations in force when testing solar installations. 3. Preparing the list of required tests and planning the measurement process in accordance with applicable standards and regulations. 4. Conducting measurements. 5. Analysis of results, drawing conclusions and formulating possible recommendations, including operational ones. 6. Preparing a written report.	
Work placement	Not applicable	