



## Subject card

Subject name and code	Metrology, PG_00068803						
Field of study	Hydrogen Technologies and Electromobility						
Date of commencement of studies	October 2025	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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			4.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Partment of Metrology and Information Systems -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marek Wołoszyk				
	Teachers		dr inż. Marek Wołoszyk dr inż. Michał Ziółko				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	E-learning hours included: 0.0						
eNauczanie source addresses: Moodle ID: 3843 METROLOGIA [TWiE][2025/26] <a href="https://enauczanie.pg.edu.pl/2025/course/view.php?id=3843">https://enauczanie.pg.edu.pl/2025/course/view.php?id=3843</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	45	8.0		47.0	100	
Subject objectives	Introduce students with the methods and tools for measuring electrical and nonelectrical quantities						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_U02] can work individually and in a team, can communicate using various techniques in a professional environment, as well as document and analyze the results of their work, can estimate the time needed to perform the entrusted task	The student takes measurements individually or as part of a team. The student prepares and documents the results using various techniques. The student controls the completion of the task within the prescribed time.			[SU1] Assessment of task fulfilment		
	[K6_K01] is aware of the need for continuous education and self-improvement and knows the possibilities of further education	Student correctly selects standard measuring instruments. Student is able to use current literature sources in order to supplement and to develop his or her knowledge.			[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	<p>Course content – lecture  <b>LECTURE</b> Meaning and tasks of Metrology. Measurement services. Units in measurement. Elaboration of experiment measurement results. Measurement error theory. Systematic, random and insensibility inaccuracy. Inaccuracy classes. Measurement uncertainty definition. Analog electric meters. DC and AC measurement bridges. RLC measurements. Compensation methods. Power measurements of 1 and 3-phase devices in electric power engineering. Reactive power measurements. Electrical energy measurements. Digital and analog measurement of electronic systems. Principles of measurement of electronic systems (amplifier, standarizing devices, basic transducers and analog filters). Principles of ADC and DAC methods. Digital measurement of voltage, frequency and time. Analog and digital oscilloscope. <u>Principles of operational tests in electrical engineering.</u></p> <p>Course content – laboratory  <b>LABORATORY</b> Analysis of measurement data. Calibration. Measurement of RLC parameters. Oscilloscope measurement. Power measurement of three phase circuits. Measurement of sinusoidal and distorted waveforms. Computer processing of measurement signals.</p>		
Prerequisites and co-requisites	Basic knowledge of electrical engineering and electrical circuit analysis. Knowledge of the Metrology I course.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	67.0%
	Laboratory exercise	60.0%	33.0%
Recommended reading	Basic literature	1. Praca zbiorowa (red. Swędrawski L.): METROLOGIA. Skrypt do laboratorium. Wydawnictwo Politechniki Gdańskiej, 2009.	
	Supplementary literature	1. Chwaleba A., Poniński M., Siedlecki A.: Metrologia elektryczna. WNT, 2010. 2. Tumański S.: Technika pomiarowa. WNT, 2016. 3. Lisowski M.: Podstawy metrologii. Oficyna Wydawnicza Politechniki Wrocławskiej, 2011.	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Explain the concepts of median and modal values.  2. Measurement error of insensitivity in a Wheatstone bridge.  3. The methods and sensors used for the teperature measurements.		
Practical activites within the subject	Not applicable		

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