GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Metrology I, PG_00038336		
Field of study	Hydrogen Technologies and Electromobility		
Date of commencement of studies	October 2023	Academic year of realisation of subject	2023/2024
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	Department of Metrology and Information Systems -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Wołoszyk	
	Teachers	dr inż. Marek Wołoszyk dr inż. Michał Ziółko	

Lesson types and methods of instruction							
	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	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	10.0	60.0	100

Subject objectives

Acquiring fundamental knowledge on the theory of measurement as well as methods and measurement systems used in electrical engineering.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W05] has structured knowledge of measuring electrical and non-electrical quantities, documenting their results and calculating measurement uncertainty	Student selects appropriate measurement tools for testing of various electrical and nonelectrical parameters. Student describes the methods of evaluation of measurement faults and calculates measurement uncertainty.	[SW3] Assessment of knowledge contained in written work and projects
[K6_K01] is aware of the need for continuous education and self-improvement in the field of the profession of an electrician 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

LECTURE: Meaning and tasks of Metrology. Measurement services. Units in measurement. Elaboration of experiment measurement results. Measurement error theory. 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, standardizing devices, basic transducers and analog filters). Principles of ADC and DAC methods. Digital measurement of voltage, frequency and time. The basics of nonelectrical measurement. Principles of operational tests in electrical engineering.

Prerequisites and co-requisites

Basic knowledge of electrical engineering and electrical circuit analysis.

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Exam	60.0%	100.0%
Recommended reading	Basic literature	1. Chwaleba A., Poniński M., Siedlecki A.: Metrologia elektryczna. WNT, 2014. 2. Turmański S.: Technika pomiarowa. WNT, 2016.	
	Supplementary literature	1. Stabrowski M.: Miernictwo elektryczne. Cyfrowa technika pomiarowa. Oficyna Wydawnicza Politechniki Warszawskiej, 1999. 2. Piotrowski J.: Podstawy miernictwa. WNT, 2002.	
	eResources addresses	Adresy na platformie eNauczanie: METROLOGIA I [TWiE][2023/24] - Moodle ID: 36107 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36107	
Example issues/ example questions/ tasks being completed	1. Discuss the measurement of error band Wheatstone bridge. 2. Provide a system for the measurement of reactive power in a 3-wire electrical network. 3. Discuss the operation of the A / D converter type compensation. 4. Discuss the requirements for proper measurement of earth resistance.		
Work placement	Not applicable		