GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Metrology I, PG_00056913		
Field of study	Electrical Engineering		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2025/2026
Education level	first-cycle studies	Subject group	
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Wołoszyk	
	Teachers		

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	15.0	55.0	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	Student selects appropriate measurement tools for testing of various electrical 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_U02	Student is able to work individually and in a group, knows how to estimate the time needed to carry out the task, and is able to implement the work schedule.	[SU1] Assessment of task fulfilment
K6_K01	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. 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. The basics of magnetic measurement. Principles of operational tests in electrical engineering.

Prerequisites and co-requisites

Basic knowledge of electrical engineering and electrical circuit analysis.

<table>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Exam</td><td>60.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">1. Chwaleba A., Poniński M., Siedlecki A.: Metrologia elektryczna. WNT, 2014.

2. Turmański S.: Technika pomiarowa. WNT, 2016.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Stabrowski M.: Miernictwo elektryczne. Cyfrowa technika pomiarowa. Oficyna Wydawnicza Politechniki Warszawskiej, 1999. 2. Piotrowski J.: Podstawy miernictwa. WNT, 2002.</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">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.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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