



Subject card

Subject name and code	Electrical Measurements of Non-Electrical Values, PG_00038351						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2025	Academic year of realisation of subject			2025/2026		
Education level	second-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	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
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	10.0	0.0	10.0	10.0	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	5.0	40.0	75		
Subject objectives	Acquiring knowledge on the theory of aquisition and processing measurement signals as well as methods and measuring instruments used for nonelectrical measurements.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_K03] can interact and work in a group assuming various roles and identify priorities for the achievement of a specific task	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.			[SK5] Assessment of ability to solve problems that arise in practice [SK1] Assessment of group work skills		
	[K7_U05] is able to select equipment and carry out electrical measurements, design measuring systems for the determination of nonelectrical quantities, and analyse the results obtained	Student matches appropriate tools for specific measurement tasks. Student designs measurement systems for determining non-electrical quantities. Student analyzes the received measurement results.			[SU1] Assessment of task fulfilment		
	[K7_W02] has an in-depth and structured knowledge of electrical measurements electrical measurements, the methods and equipment used for electrical measurements of non-electrical quantities, he/she knows the principles of testing operation tests of electrical equipment, has a structured knowledge of electricity quality issues	Student recognizes methods and equipment used in measurement of non-electrical quantities. Student matches appropriate tools for specific measurement tasks. Student applies the rules to eliminate the impact of external factors on the measurement accuracy. Student calibrates sensors and measurement circuits. Student analyzes the received measurement results.			[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>LECTURE Classification of sensors and converters used in non-electrical quantities measurement. Static and dynamic properties of measurement sensors and converters. Sensors out-signal standards and rules of matching the signals with measurement systems. Elimination of external noises that disturb work of measurement sensors. Electrical measurement of temperature. Geometrical quantities measurement (dimension, displacement, level...). Movement parameters measurement (linear and rotational speed, vibration...). Electrical measurement of forces and stresses. Measurement of pressure, flow and volume. Electrical measurement of physical and chemical parameters of materials (conductivity, pH, viscosity, turbidity...).</p> <p>PROJECT During the project the student should develop a fragment of a measurement system for some industrial installation containing the measurement of at least four non-electrical quantities. The project should include a detailed selection of sensors including the development of ways of communicating these sensors with primary system and should contain an overall concept of a measurement system.</p> <p>LABORATORY Principles of development and documentation of measurement results. Elimination of the influence of external factors on the sensor - auto-calibration and linearization of characteristics. Water level measurements. Inclinomeric measurements. Temperature measurements.</p>														
Prerequisites and co-requisites	Basic metrology knowledge.														
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="454 669 794 698">Subject passing criteria</th> <th data-bbox="799 669 1139 698">Passing threshold</th> <th data-bbox="1144 669 1482 698">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="454 705 794 734">Laboratory exercises</td> <td data-bbox="799 705 1139 734">60.0%</td> <td data-bbox="1144 705 1482 734">30.0%</td> </tr> <tr> <td data-bbox="454 741 794 770">Written test</td> <td data-bbox="799 741 1139 770">60.0%</td> <td data-bbox="1144 741 1482 770">30.0%</td> </tr> <tr> <td data-bbox="454 777 794 806">Project</td> <td data-bbox="799 777 1139 806">60.0%</td> <td data-bbox="1144 777 1482 806">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Laboratory exercises	60.0%	30.0%	Written test	60.0%	30.0%	Project	60.0%	40.0%
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Laboratory exercises	60.0%	30.0%													
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Project	60.0%	40.0%													
Recommended reading	<p>Basic literature</p> <p>Supplementary literature</p> <p>eResources addresses</p>	<p>1. Praca zbiorowa pod red. J. Piotrowskiego: Pomiary czujniki i metody pomiarowe wybranych wielkości. Warszawa, WNT, 2009.</p> <p>2. Zakrzewski J.: Przetworniki i czujniki pomiarowe. Wyd. Politechniki Śląskiej, Gliwice 2004.</p> <p>3. Nawrocki W.: Sensory i systemy pomiarowe. Wyd. Politechniki Poznańskiej, 2006.</p> <p>1. Milek M.: Pomiary wielkości nielektrycznych metodami elektrycznymi. Wyd. Politechniki Zielonogórskiej, 1998.</p> <p>Adresy na platformie eNauczanie:</p>													
Example issues/ example questions/ tasks being completed	<p>1. Project of measurement system used to control the chosen parameters of the Jet Grouting drilling rig.</p> <p>2. Project of measurement system used to monitor environmental conditions of breeding fish pond.</p>														
Work placement	Not applicable														

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