

## GDAŃSK UNIVERSITY

## Subject card

Subject name and code	Measurements and Measurement Systems, PG_00042054							
Field of study	Power Engineering							
Date of commencement of studies	October 2025		Academic year of realisation of subject			2026/2027		
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	2		Language of instruction			English		
Semester of study	4		ECTS credits			5.0		
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							ering ->
Name and surname	Subject supervisor							
of lecturer (lecturers)	Teachers							
Lesson types and methods	Lesson type	Lecture		Laboratory	Projec	t	Seminar	SUM
or instruction	hours	30.0	0.0	30.0	0.0		0.0	60
	E-learning hours inclu	uded: 0.0	•			-		
Learning activity and number of study hours	Learning activity	Participation i classes includ plan	n didactic led in study	Participation in consultation hours		Self-study		SUM
	Number of study hours	60		10.0		55.0		125
Subject objectives	Familiarize students	with issues rela	ted to metrolo	gy and measur	ement s	ystems		•
Learning outcomes	Course outcome Subject outcome Method of verification							
	[K6_W05] has structured knowledge in the field of electrical engineering and electronics, necessary to understand the basics of operation and selection of electrical machines, electricity transmission systems and power electronic devices [K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy							
Subject contents	LECTURE: Basic concepts of measurement. Measurement methods. The theory of measurement errors and uncertainty. Converters. The structure of measuring instruments. Analog and digital measuring instruments. Ways of extending the measuring ranges. Measurement bridges. Measurements of basic electrical quantities (voltage and current, resistance, inductance, capacity, frequency, phase shift, power and energy in single and three-phase circuits). Measurements of non-electrical quantities by electrical methods. Analog-to-digital converters of mechanical quantities. Electrical temperature measurements. Stress measurement. Measurement and diagnostic systems. Measurement software. Interfaces in measurement systems. Measurement data transmission methods: wired and wireless. Vision and infrared measurement systems. Virtual measuring instruments. The use of virtual instruments in the measurement and design of basic measurement systems.							
and co-requisites								

Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade			
and criteria	Homework and presentations - lecture.	60.0%	30.0%			
	28 / 5000 Wyniki tłumaczenia Written test - lecture.	60.0%	20.0%			
	Entry tests nad reports- lab.	60.0%	50.0%			
Recommended reading	Basic literature	1. Alan S Morris Reza Langari: Measurement and Instrumentation. Theory and Application. Elsevier, 2012. ISBN: 978-0-12-381960-4.				
		2. Handbook of Measurements: Benchmarks for Systems Accuracy and Precision. CRC Press, 2015. PrintISBN: 978-1-4822-2522-8.				
		3.Raghavendra, N.V.; Krishnamurthy, L.: Engineering Metrology and Measurements. Published by OxfordUniversity Press, 2013. ISBN 9780198085492.				
	Supplementary literature	1. Parchański J.: Miernictwo elektryczne i elektroniczne, WSiP, Warszawa, Wydanie ósme 2006.				
		2. Chwaleba A., Poniński M., Siedlecki A.: Metrologia elektryczna, WNT, Warszawa 1979, 2003.				
		<ol> <li>Gawędzki W.: Pomiary elektryczne wielkości nieelektrycznych, Wydawnictwo AGH, Kraków, 2010.</li> </ol>				
		4. Czabanowski R.: Sensory i systemy pomiarowe, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław, 2010				
	eResources addresses	Adresy na platformie eNauczanie:				
Example issues/ example questions/ tasks being completed	1. Causes of errors: systematic, random and coarse. Ways to reduce these errors.					
<b>.</b>	2 How to estimate the measurement uncertainty as type A and type B?					
	3. Derive the diagram and the method of balancing the Wheatstone bridge.					
	4. Active and reactive power measurement systems in a three-phase, four-wire system.					
	5. Systems for measuring active and reactive power in a three-phase three-wire system.					
Work placement	Not applicable					

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