



Subject card

Subject name and code	Industrial Sensors and Converters, PG_00054543						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2023/2024		
Education level	first-cycle studies		Subject group				
Mode of study	Part-time studies		Mode of delivery		at the university		
Year of study	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		3.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Metrology and Information Systems -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Michał Ziółko				
	Teachers		dr inż. Michał Ziółko				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	20.0	0.0	0.0	30
	E-learning hours included: 0.0						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11889						
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		2.0		43.0	75
Subject objectives	Methods and tools used in the measurement of non-electrical quantities.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W11		He can use electrical devices.		[SW1] Assessment of factual knowledge		
	K6_W10		He can use electrical devices.		[SW1] Assessment of factual knowledge		
	K6_K05		He can use electrical devices.		[SK5] Assessment of ability to solve problems that arise in practice		
	K6_W09		The student knows the basics of processing, use and rational use of electricity.		[SW1] Assessment of factual knowledge		
	K6_U09		He can use electrical devices.		[SU2] Assessment of ability to analyse information		
	K6_U10		Has a basis in preparation for work in an industrial environment.		[SU3] Assessment of ability to use knowledge gained from the subject		
	K6_U05		Has a basis in preparation for work in an industrial environment.		[SU2] Assessment of ability to analyse information		
	K6_K01		Has a basis in preparation for work in an industrial environment.		[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	LECTURE Classification of industrial sensors. Static and dynamic properties of measurement sensors. Gain, conditioning and transmission of the output signal from the sensors. Sensors selection rules taking into account the external conditions and typical constrains of industrial conditions. Construction, working principle and basic usage properties of sensors: temperature, linear and angular displacement, movement parameters, forces and stresses, pressure, etc. LABORATORY Policy development and documentation of measurement results. Study of linear displacement sensors and proximity sensors. Study of properties of absolute and incremental encoders. Study inclinometer. Investigation of optical and laser sensors. Study of properties of temperature sensors.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written test (lecture)	50.0%	60.0%
	Written test at the beginning of laboratory exercise	60.0%	40.0%
Recommended reading	Basic literature	Recommended reading: 1. Zakrzewski J.: Converters and measurement sensors. Silesian University of Technology, Gliwice 2004 2. Nawrocki W.: Sensors and measurement systems. Poznan University of Technology, 2006.	
	Supplementary literature	Thematic internet materials and sample catalog cards of selected converters.	
	eResources addresses	Adresy na platformie eNauczanie: CZUJNIKI I PRZETWORNIKI PRZEMYSŁOWE [ET][I][Niestacjonarne] [2023/24] - Moodle ID: 36113 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=36113	
Example issues/ example questions/ tasks being completed	Transmission methods of measurement signals. Construction of position and displacement sensors. Temperature sensors. Strain gauges.		
Work placement	Not applicable		