GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Physical and Chemical Sensors, PG_00039762						
Field of study	Materials Engineering, Materials Engineering, Materials Engineering						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
Education level	first-cycle studies		Subject group		Optional subject group. 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	3		Language of instruction		Polish		
Semester of study	6		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Institute of Nanotechnology and Materials Engineering -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Leszek Wicikowski				
	Teachers						

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	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	2.0	18.0	50

Subject objectives	The aim of the course is to acquaint students with basic types of physical and chemical sensors. Particular emphasis will be placed on gas sensors, sensors for water pollution monitoring as well as temperature, humidity, pressure and strain sensors. Within the course the students prepare a seminar on the latest news of the paper describing the research. Moreover, in groups of two, a student project of the monitoring system for the selected object or process will be prepared.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	K6_U08	The student can prepare a summary of the content from previously developed sources. He can design a seminar outline and reports on the ongoing project work	[SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment
	K6_W06	The student can use the necessary tools in the prepared project. He can use software helpful in engineering practice. It uses the manufacturers' data on the sensors it wants to use	[SW3] Assessment of knowledge contained in written work and projects
	K6_W04	The student knows the principles of operation of physicochemical sensors. He can describe the physical phenomena that are the basis of their operation.	[SW1] Assessment of factual knowledge
	K6_U09	The student can prepare an oral presentation in a seminar and a report on project work based on the available literature. Using this knowledge, he can find and use sensors in specific technical solutions	[SU5] Assessment of ability to present the results of task [SU1] Assessment of task fulfilment
	K6_K01	The student can use appropriate databases and complete his knowledge based on the available literature. Can critically analyze the information obtained and select information that best helps to solve the problems posed before him	[SK5] Assessment of ability to solve problems that arise in practice

Subject contents	Static and dynamic properties of sensors. Gas sensors: amperometric, potentiometric, catalytic, semiconductor. Sensors for monitoring water: conductometric, pH, ISE, potentiometric, amperometric. Temperature sensors, humidity and pressure. Strain gauges.		
Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Project	50.0%	25.0%
	Test	50.0%	50.0%
	Seminar	50.0%	25.0%
Recommended reading	Basic literature	Tadeusz Pisarkiewicz, MIKROSENSORY GAZÓW, Wydawnictwo AGH 2007 A. Cygański, Podstawy metod elektroanalitycznych, WNT 2004	
	Supplementary literature	Articles from journal Sensors and Actuators	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	An example of the project - Monitoring the quality of milk		
Work placement	Not applicable		

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