



Subject card

Subject name and code	Nanosensors, PG_00020901						
Field of study	Nanotechnology						
Date of commencement of studies	February 2023	Academic year of realisation of subject			2023/2024		
Education level	second-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	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Instytut Nanotechnologii i Inżynierii Materiałowej -> Faculty of Applied Physics and Mathematics						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Leszek Wicikowski					
	Teachers	dr inż. Leszek Wicikowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	15.0	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	insight into the latest research and developments in the field of development and construction of micro and nanosensors						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U07	The student is able to use knowledge about nanosensors to determine how to monitor processes. He can choose the type of sensor adequate to the phenomenon being monitored			[SU3] Assessment of ability to use knowledge gained from the subject		
	K7_W04	The student knows the methods of manufacturing nanosensors. He can indicate materials suitable for their production, He understands physical phenomena occurring in nanosensors			[SW1] Assessment of factual knowledge		
	K7_W03	The student knows the latest research and developments in production of nanosensors. He is familiar with scientific literature on nanosensors			[SW2] Assessment of knowledge contained in presentation		
	K7_W02	The student is able to classify types of nanosensors. He can determine the scope of their use. He knows the advantages and disadvantages of the appropriate sensors			[SW1] Assessment of factual knowledge		
Subject contents	Introduction to Nanosensors. Definition and Classification of Nanosensors Materials for Nanosensors Mechanical Nanosensors Thermal Nanosensors Optical Nanosensors Magnetic Nanosensors Nanobiosensors. Future Trends of Nanosensors						
Prerequisites and co-requisites							
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	seminar		50.0%		50.0%		
	final test		50.0%		50.0%		

Recommended reading	Basic literature	NANOSENSORS PHYSICAL, CHEMICAL, AND BIOLOGICAL Vinod Kumar Khanna, CRC Press, Taylor & Francis Group 2012
	Supplementary literature	scientific literature
	eResources addresses	Adresy na platformie eNauczenie: Nanoczujniki - Moodle ID: 34669 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=34669
Example issues/ example questions/ tasks being completed	Distinguish between sensors and transducers giving examples. Justify the statement, All transducers contain a sensor and mostly, although not always, sensors will also be transducers. List and describe the important parameters and characteristics of a sensor.	
Work placement	Not applicable	