

## GDAŃSK UNIVERSITY

## Subject card

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Subject name and code	Sensors and Sensor Networks, PG_00047920							
Field of study	Electronics and Telecommunications							
Date of commencement of studies	October 2021		Academic year of realisation of subject		2022/2023			
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			Polish		
Semester of study	4		ECTS credits			3.0		
Learning profile	general academic profile		Assessment form			assessment		
Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics, Telecommunications and Informatics							
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Piotr Jasiński					
	Teachers		prof. dr hab. inż. Piotr Jasiński					
			dr inż. Paweł Kalinowski					
			mar inż. Kamil Osiński					
			ar inz. Grzegorz Jasiński					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	:t	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0		0.0	45
	E-learning hours included: 0.0							
Learning activity and number of study hours	Learning activity	Participation classes inclu plan	in didactic ded in study	a didactic Participation in ed in study consultation hours		Self-study		SUM
	Number of study hours	45		3.0		27.0		75
Subject objectives	The aim of the course is to familiarize students with the basic types and parameters, sensors and data standards between systems equipped with sensors.							

Learning outcomes	Course outcome	Subject outcome	Method of verification				
	[K6_U08] while identifying and formulating specifications of engineering tasks related to the field of study and solving these tasks, can:n- apply analytical, simulation and experimental methods,n- notice their systemic and non-technical aspects,n- make a preliminary economic assessment of suggested solutions and engineering work n	Knowledge of the selection, use and application of sensors and sensor networks.	[SU3] Assessment of ability to use knowledge gained from the subject				
	understands, to an advanced extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum	and operation of sensors and sensor networks	knowledge				
	[K6_U09] can carry out a critical analysis of the functioning of existing technical solutions and assess these solutions, as well as apply experience related to the maintenance of technical systems, devices and facilities typical for the field of studies, gained in the professional engineering environment	Knowledge about the functioning of sensors and sensor networks	[SU3] Assessment of ability to use knowledge gained from the subject				
	[K6_U07] can apply methods of process and function support, specific to the field of study	Knowledge about the possibility of connecting sensors to microprocessor systems	[SU3] Assessment of ability to use knowledge gained from the subject				
Subject contents	Basic concepts and properties of the sensors. Static parameters. Dynamic parameters. Basic types of electronic sensors on example temperature sensors. Other selected sensor signal output to the specific. Measuring systems for sensors: DC and AC bridges, transducers I / U. Specialized electronics. Technologies of sensors. MEMS. Smart Sensors. IEEE 1451. Analog and digital transmission of sensor signals. Sensor networks. 4-20mA loop. RS232, RS485. Interface ICs - 1-wire, I2C. Extensive measurement network - Ethernet. Wireless Systems: GSM, iRDA, Bluetooth. Sensor networks architecture and protocols - ZigBee. Projects sensor networks.						
Prerequisites and co-requisites							
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Test	50.0%	35.0%				
	Test	50.0%	35.0%				
		50.0%	30.0%				
Recommended reading	Basic literature	J. Piotrowski, Pomiary. Czujniki i metody pomiarowe wybranych wielkości fizycznych i składu chemicznego. WNT Warszawa 2009.					
		T. Sidor, Elektroniczne przetworniki pomiarowe, UWN-D, Kraków 2006					
		I.Kurytnik, M. Karpiński, Bezprzewo Wydawnictwo PAK, 2008	dowa transmisja informacji,				
		W. Nawrocki, Rozproszone systemy pomiarowe, WKŁ Warszawa 2006					
	Supplementary literature	I. Fraden, Handbook of modern sensors, Springer 2010					
	eResources addresses	Adresy na platformie eNauczanie: Sensory i sieci sensorowe 2023 - Moodle ID: 29997 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=29997					
Example issues/ example questions/ tasks being completed	What are the differences and similarities between the metal and the thermistor resistive temperature sensors.						
Work placement	Not applicable						
work placement	not applicable						