



Subject card

Subject name and code	Sensors in Robots, PG_00038127						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2023	Academic year of realisation of subject				2025/2026	
Education level	first-cycle studies	Subject group					
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				4.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Partment of Metrology and Information Systems -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Dariusz Świsulski					
	Teachers	dr hab. inż. Dariusz Świsulski					
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 3707 SENSORYKA ROBOTÓW [ARiSS][AISS][2025/26] https://enauczanie.pg.edu.pl/2025/course/view.php?id=3707						
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	45	7.0	48.0	100		
Subject objectives	The aim of the course is to introduce students to the subject of robot sensors.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W10] has basic knowledge related to mechatronics and robotics systems	The student describes the structure and principle of operation of sensors used in robotics.			[SW1] Assessment of factual knowledge		
	[K6_U08] can design and build systems and devices in the field related to mechatronics and robotics systems	The student is able to plan and carry out experiments and measurements in the field of robot sensors.			[SU4] Assessment of ability to use methods and tools		
Subject contents	Course content – lecture LECTURE Introduction to sensory systems. Classification of sensors. Static and dynamic properties of sensors. Measurement of position and movement (measuring potentiometers, selsyns, inductosyns, inductance sensors, incremental position encoders, linear encoders, absolute position encoders, magnetostrictive linear position transducers). Velocity sensors (DC and AC rate generator, digital methods). Touch sensors (touch switches, strength and strain transducers, resistive strain gauge transducers, magnetolectric transducers, "artificial skin"). Proximity sensors (ultrasonic sensors, photoelectric sensors, inductive sensors, magnetic sensors, capacitive sensors). Vision systems (checking for presence, detecting location, check labeling, verify position, barcode readers). Sensors of Mindstorms NXT robot.						
	Course content – laboratory LABORATORY Inductive sensors. Capacitive sensors. Optoelectronic sensors. Ultrasonic sensors. Magnetic sensors and touch switches. Angular position sensors. Vision sensors.						
Prerequisites and co-requisites	Basic metrology knowledge.						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Lecture - midterm colloquium and oral exam	60.0%			70.0%		
	Assessment of laboratory exercises and home written reports	60.0%			30.0%		

Recommended reading	Basic literature	Świsulski D., Rafiński L.: Sensoryka robotów. Laboratorium. Wydawnictwo Politechniki Gdańskiej, Gdańsk 2007 Honczarenko J.: Roboty przemysłowe. Budowa i zastosowanie. WNT Warszawa 2004
	Supplementary literature	Zakrzewski J.: Czujniki i przetworniki pomiarowe. Wydawnictwo Politechniki Śląskiej. Gliwice 2004 Mukhopadhyay S.C., Huang R.Y.M.: Sensors. Springer 2008
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Static and dynamic properties of sensors. 2. Structure and working principle of distance sensors. 3. Structure and working principle of photoelectric sensors. 4. Structure and working principle of encoders. 5. Structure and working principle of proximity sensors. 	
Practical activities within the subject	Not applicable	

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