GDAŃSK UNIVERSITY OF TECHNOLOGY

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 2022	Academic year of realisation of subject	2024/2025
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	Department of Metrology and Information Systems -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Dariusz Świsulski	
	Teachers		

Lesson types and methods of instruction

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

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_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
[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

Subject contents

LECTURE Introduction to sensory systems. Classification of sensors. Static and dynamic properties of sensors. Measuremnt 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, magnetoelectric 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.
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
Assessment of laboratory exercises and home written reports	60.0%	30.0%
Lecture - midterm colloquium and oral exam	60.0%	70.0%

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	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	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.	
Work placement	Not applicable	