GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Sensors and Measurement Converters, PG_00067500		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
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	2.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Functional Materials Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Paweł Kalinowski	
	Teachers	dr inż. Paweł Kalinowski	

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	0.0	15
	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	15	4.0	31.0	50

Subject objectives	The aim of the course is to teach students basic metrological problems in the measurement of non-electrical quantities and to familiarize them with the structure and principles of operation of sensors used to measure specific non-electrical quantities

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W02] knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	Student - undarstands the working porinciple of the sensors	[SW1] Assessment of factual knowledge
	[K6_W03] knows and 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	Student - can choose the appropriate converter of physical quantities to achieve the goal.	[SW1] Assessment of factual knowledge

Subject contents	Course content – lecture 1. Basic concepts - measured quantity, measuring sensor and system, accuracy of measurements. 2. Measuring sensors - classification, figures of merit. 3. Determination of dynamic properties of transducers. 4. Resistance sensors in measurement circuits. 5. Measurements of strain - strain gages. 6. Basic limitations of strain gages, measurements of pressure. 7. Inductance sensors and applications. 8. Capacitance sensors and applications. 9. Measurement circuits of impedance sensors. 10. Force and pressure measurements. 11. Flow measurements. 12. Code transducers. 13. Optoelectronic transducers - thermal detectors. 14. Optoelectronic transducers - photon detectors. 15. Position and motion measurements. 16. Seismic measurements. 17. Shock and vibration measurements. 18. Piezoelectric accelerometers. 19. Charge sensors. 20. Charge transducers - limitations and measurement circuits. 21. Temperature reference measurements. 22. Thermoresistors 23. Thermocouples. 24. Semiconductor temperature sensors. 25. Quarz ans special purpose thermometers. 26. Introduction to optical pyrometry. 27. Monochromatic, radiation and multispectral pyrometers. 28. Humidity sensors. 29. Microsystems MEMS, MEOMS. 30. Microsystems - applications.
Prerequisites and co-requisites	No requirements

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	exam	60.0%	100.0%

Recommended reading	Basic literature	J. S. Wilson, Sensor Technology Handbook, Elsevir 2005.
	Supplementary literature	No recommendations
	eResources addresses	

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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