



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 2026	Academic year of realisation of subject			2027/2028		
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 - understands the working principle 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. Quartz and 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	<table border="1" data-bbox="451 864 1487 929"> <thead> <tr> <th data-bbox="451 864 798 896">Subject passing criteria</th> <th data-bbox="798 864 1141 896">Passing threshold</th> <th data-bbox="1141 864 1487 896">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 896 798 929">exam</td> <td data-bbox="798 896 1141 929">60.0%</td> <td data-bbox="1141 896 1487 929">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	exam	60.0%	100.0%
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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 activities within the subject	Not applicable								

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