GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Intelligent sensor systems, PG_00053369
Field of study	Biomedical Engineering, Biomedical Engineering, Biomedical Engineering

Date of commencement of studies	February 2025	**Academic year of realisation of subject**	2025/2026
Education level	second-cycle studies	**Subject group**	Optional subject group Specialty subject group 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	1	**Language of instruction**	Polish
Semester of study	2	**ECTS credits**	2.0
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	dr inż. Grzegorz Jasiński
	Teachers	dr inż. Grzegorz Jasiński

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	0.0	0.0	30
	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	30	3.0	17.0	50

Subject objectives	The aim of the course is to familiarize students with the structure and basic properties of intelligent sensors and intelligent sensor systems.

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study	Knowledge of the features and properties of smart sensors	[SW1] Assessment of factual knowledge
	[K7_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study, making assessment and critical analysis of the prepared software as well as a synthesis and creative interpretation of information presented with it	Znajomość wyboru, wykorzystania i zastosowania	[SU4] Assessment of ability to use methods and tools [SU2] Assessment of ability to analyse information
	[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by: - appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation, - application of appropriate methods and tools	Knowledge about the use of intelligent sensors to build measurement systems	[SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information
	[K7_W10] knows and understands, to an increased extent, the basic processes occurring in the life cycle of equipment, objects and technical systems, as well as methods of supporting processes and functions, specific to the field of study	Knowledge about the structure, operation and properties of intelligent sensors	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge

Subject contents	Introduction to the subject of intelligent sensors. Smart sensor design. ADC converters. Smart sensor interfaces and data formats. Intelligent sensor systems: sensors and sensor networks. Introduction to wireless sensor networks, problems and challenges. Examples of intelligent sensors. Intelligent sensor networks: signal processing. Sensors, electronics and noise reduction techniques. Reliable and energy-saving network protocols. Smart sensor standards.

Prerequisites and co-requisites	

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Test	50.0%	70.0%
	Lab	50.0%	30.0%

Recommended reading	Basic literature	T. Sidor, Elektroniczne przetworniki pomiarowe, UWN-D, Kraków 2006
		I.Kurytnik, M. Karpiński, Bezprzewodowa transmisja informacji, Wydawnictwo PAK, 2008
		W. Nawrocki, Rozproszone systemy pomiarowe, WKŁ Warszawa 2006
	Supplementary literature	J. Fraden, Handbook of modern sensors, Springer 2010
		Gerard C. M. Meijer, Smart Sensor Systems, Wiley 2014
	eResources addresses	Adresy na platformie eNauczanie:

Example issues/ example questions/ tasks being completed	Give the characteristics of quasi-digital sensors
Work placement	Not applicable

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