

表 GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00053424								
Field of study	Automation, Robotics and Control Systems								
Date of commencement of studies	October 2021		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	4		Language of instruction			Polish			
Semester of study	7		ECTS credits			3.0			
Learning profile	general academic profile		Assessment form			assessment			
Conducting unit	Department of Power Electronics and Electrical Machines -> Faculty of Electrical and Control Engineering								
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Jarosław Łuszcz						
	Teachers								
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project Sen		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 i classes incluc plan	n didactic led in study	Participation in consultation hours		Self-study		SUM	
	Number of study 30 hours			5.0		40.0		75	
Subject objectives	Understanding the basic physical phenomena related to the disturbances in the control and automation systems.								
Learning outcomes	Course out	Subj		Method of verification					
Subject contents	Sources and propagation of conducted and radiated disturbances. Electromagnetic emission and immunity of automation systems. Inductive and capacitive parasitic couplings. Characteristics of power and signal circuits in the field of EMC. Interference protection in analog, digital and mixed circuits. Typical causes of disturbances in control and automation systems. Interference reduction methods (filtration, decoupling, shielding). The role of grounding, shielding and equipotentialization in reducing interference. Crosstalk in signal transmission paths. Attenuation of interference in analog signal transmission paths (0-10V, 4-20mA). Attenuation of interference in digital signal transmission paths (RS232, RS485, Ethernet)								
Prerequisites and co-requisites									
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade				
	Lecture reports		50.0%			50.0%			
	Task report		50.0%			50.0%			
Recommended reading	Basic literature		Spiralski L., Kołodziejski J., Konczakowska A., Hasse L. Zakłócenia w aparaturze elektronicznej. Charoy A.: Electromagnetic compatibility. Interference in electronic devices. Volume 1-4. Bogtin E.: Signal and Power Integrity - Simplified.						
	Supplementary literature		Ott H. W. Metody redukcji zakłóceń i szumów w układach elektronicznych. Howard W. Johnson, Martin Graham: High-speed Signal Propagation: Advanced Black Magic.						
	eResources addresses Adresy na platformie eNauczanie:								
Example issues/ example questions/ tasks being completed	Analysis of digital signal transmission interference in serial interfaces. Analysis of the transmission interference of 20 mA analog signals.								
Work placement	Not applicable	Not applicable							