



## Subject card

Subject name and code	Interferences in the operation of automation and control systems, PG_00059861						
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			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	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	10.0		45.0		100
Subject objectives	Transfer of knowledge about the causes of interference of devices in control systems.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W07] has basic knowledge related to control and automation systems	applies knowledge related to disturbances in control and automation systems			[SW1] Assessment of factual knowledge		
	[K6_U04] has the ability to self-educate, among other things, in order to improve professional qualifications	acquires knowledge through self-education			[SU2] Assessment of ability to analyse information		
	[K6_K05] can think and act in an entrepreneurial way	applies the principles of entrepreneurship			[SK3] Assessment of ability to organize work		
	[K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks	applies knowledge related to interference in computer systems			[SW1] Assessment of factual knowledge		
[K6_W11] knows the hazards arising from devices, installations, systems and technical systems, basic principles of occupational health and safety, taking into account the role of control and security systems in controlling automation and robotics facilities	assesses threats from devices and installations			[SW1] Assessment of factual knowledge			
Subject contents	1. LECTURE Sources and propagation of conducted and radiated electromagnetic disturbances. Electromagnetic emission and immunity of electrical devices. Typical causes of interference in control and automation systems.  LABORATORY Measurements of conducted and radiated electromagnetic interference levels. Testing the immunity of devices to electromagnetic interference.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory reports	50.0%	50.0%
	Active participation in the lecture	50.0%	50.0%
Recommended reading	Basic literature	Charoy, Alain i in. Kompatybilność elektromagnetyczna: Zakłócenia w urządzeniach elektronicznych. Tom 1, 2, 3 i 4. Warszawa: Wydawnictwa Naukowo-Techniczne, 1999.  L. Hasse, J. Kołodziejski, Z. Karkowski, A. Konczakowska, L. Spiralski: Zakłócenia w aparaturze elektronicznej. Warszawa: "Radioelektronik ", 1995.	
	Supplementary literature	Kempski, Adam Józef, Elektromagnetyczne zaburzenia przewodzone w układach napędów przekształtnikowych. Zielona Góra: Oficyna Wydawnicza Uniwersytetu Zielonogórskiego, 2005. Łuszcz, Jarosław. High Frequency Conducted Emission in AC Motor Drives Fed By Frequency Converters: Sources and Propagation Paths. John Wiley and Sons, Inc., Hoboken, N.J: 2018.	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Checking the immunity of selected electronic devices to electromagnetic disturbances.		
Work placement	Not applicable		

Document generated electronically. Does not require a seal or signature.