



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 2021		Academic year of realisation of subject		2023/2024		
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	Discussion of the causes of device interference in control systems.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[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		The student knows the threats arising from devices and installations		[SW1] Assessment of factual knowledge		
	[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		The student has knowledge related to interference in computer systems		[SW1] Assessment of factual knowledge		
	[K6_W07] has basic knowledge related to control and automation systems		The student has knowledge related to disturbances in control and automation systems		[SW1] Assessment of factual knowledge		
	[K6_K05] can think and act in an entrepreneurial way		The student knows the principles of entrepreneurship		[SK3] Assessment of ability to organize work		
	[K6_U04] has the ability to self-educate, among other things, in order to improve professional qualifications		The student is able to self-educate		[SU2] Assessment of ability to analyse information		
Subject contents	<ol style="list-style-type: none">1. Explanation of the causes of interference with the operation of electronic devices.2. Sources, types and propagation paths of electromagnetic disturbances.3. Typical examples of mutual interference of electronic devices.4. Methods to reduce disturbances in selected control systems.5. Elements of designing electronic circuits with increased immunity to interference.6. Engineering testing of equipment immunity to interference.7. Laboratory demonstrations of interference elimination examples.						

Prerequisites and co-requisites			
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Active participation in the lecture	50.0%	50.0%
	Laboratory reports	50.0%	50.0%
Recommended reading	Basic literature	. Spiralski L., Kołodziejski J., Konczakowska A., Hasse L. Zakłócenia w aparaturze elektronicznej. Radioelektronik Sp. z o.o. Warszawa 1995. 2. Charoy A. Zakłócenia w urządzeniach elektronicznych. Warszawa: WNT, 2000.	
	Supplementary literature	Howard W. Johnson, Martin Graham: High-speed Signal Propagation: Advanced Black Magic. Prentice Hall Professional, 2003.	
	eResources addresses	Podstawowe https://www.emcstandards.co.uk/emcacademy - A website presenting the range of issues related to the electromagnetic compatibility of electrical devices. Active participation in the lecture 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		