



Subject card

Subject name and code	, PG_00056130						
Field of study	Mechatronics						
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		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Microwave and Antenna Engineering -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Łukasz Kulas				
	Teachers		dr hab. inż. Łukasz Kulas				
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		0.0		0.0	30
Subject objectives	The aim of this course is introduction to the most important topics in wireless data transfer, including radio signals propagation effects in different environments and information about the most popular wireless systems used in unmanned applications together with their functional blocks, parameters and configurations important for high-quality data transfer. Additionally, practical installation and maintenance aspects of wireless systems will be covered during the course.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_W08] knows and understands design and production processes of elements and simple mechatronic devices				[SW1] Assessment of factual knowledge		
	[K6_U06] is able to identify and formulate specification of simple, practical engineering tasks, distinctive for mechatronics				[SU1] Assessment of task fulfilment		
	[K6_U05] is able to use properly choosen tools to compare design solutions of elements and mechatronics systems according to given application and economic crtierions (e.g. power demand, speed, costs)				[SU1] Assessment of task fulfilment		
	[K6_W11] has a basic knowledge about the life cycle of mechatronic systems and objects				[SW1] Assessment of factual knowledge		
	[K6_W10] has a basic knowledge about development trends in terms of engineering and technical sciences and scientific disciplines: Mechanical Engineering, Automation, Electronics and Electrical Engineering, adequate for Mechatronics curse				[SW1] Assessment of factual knowledge		

Subject contents	LECTURE: 1. Introduction to wireless data transmission 2. Introduction to high frequency radio signals propagation 3. Radio signals propagation - propagation effects 4. Radio signals propagation - different operational environments 5. The most popular wireless systems used in unmanned applications - introduction and examples 6. The most popular wireless systems used in unmanned applications - key parameters and application areas 7. Wireless data transmission system functional blocks 8. Antennas - basic electrical and radio parameters 9. Antennas - basic concepts and configurations 10. Wireless data transmission system - design principles 11. Wireless data transmission system - installation and configuration 12. Wireless data transmission system - verification and testing methods 13. Cybersecurity in wireless data transmission systems 14. New development trends - wireless systems of the future 15. Case study - summary of course topics 		
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