

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	Subject supervisor		dr hab. inż. Łukasz Kulas						
of lecturer (lecturers)	Teachers		dr hab. inż. Łukasz Kulas						
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Project S		Seminar	SUM	
of instruction	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	
	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] / fulfilme	Assessment of ent	task	
	[K6_W11] has a basic knowledge about the life cycle of mechatronic systems and objects					[SW1] knowle	Assessment of dge	factual	
	[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] knowle	Assessment of	factual	

Data wydruku: 24.04.2024 02:22 Strona 1 z 2

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						
	LABORATORY:						
	Deployment and analysis of simple low frequency wireless data transmission system Deployment and analysis of simple high frequency wireless data transmission system Configuration and installation methods methods of advanced wireless data transmission system Deployment and analysis of advanced wireless data transmission system Case study - performance verification of an unmanned unit wireless system, reliability and resista cyberattacks assessment in close to operational conditions						
Prerequisites and co-requisites	Basic electronics knowledge.						
Assessment methods	Subject passing criteria	Passing threshold	Percentage of the final grade				
and criteria	Cabjest passing stiteria	50.0%	50.0%				
		50.0%	50.0%				
Recommended reading	Basic literature	Simon R. Saunders, "Antennas and Propagation for Wireless Communication Systems", Wiley, 2007 David Tse, "Fundamentals of Wireless Communication", Cambridge University Press 2005 K. Daniel Wong, "Fundamentals of Wireless Communication"					
	Supplementary literature	Engineering Technologies", Wiley, 2012 Andrea Goldsmith, "Wireless Communications", Cambridge University Press 2005 Charles J. Brooks, "Cybersecurity Essentials", Wiley, 2018 Walid Saad, "Wireless Communications and Networking for Unmanned Aerial Vehicles", Cambridge University Press, 2020					
	eResources addresses						
Example issues/ example questions/ tasks being completed							
Work placement	Not applicable						

Data wydruku: 24.04.2024 02:22 Strona 2 z 2