

## Subject card

Subject name and code	Wireless Communication Systems, PG_00048104								
Field of study	Electronics and Telecommunications								
Date of commencement of studies	October 2022		Academic year of realisation of subject			2025/2026			
Education level	first-cycle studies		Subject group			Optional subject group Subject group related to scientific research in the field of study			
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 Microwave and Antenna Engineering -> Faculty of Electronics, Telecommunications and Informatics								
Name and surname	Subject supervisor	Subject supervisor		dr hab. inż. Krzysztof Nyka					
of lecturer (lecturers)	Teachers		dr hab. inż. K	rzysztof Nyka					
Lesson types and methods	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	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 classes includ plan		Participation in consultation hours		Self-study		SUM	
	Number of study hours	30		3.0		42.0		75	
Subject objectives	Celem przedmiotu jest wprowadzenie do technik radiowych stosowanych we współczesnych systemach komunikacji bezprzewodowej pod kątem projektowania i doboru układów w torach wysokiej częstotliwości. Studenci poznają najważniejsze metody modulacji i rozpraszania sygnału i ich wrażliwość na niedoskonałości urządzeń zastosowanych w systemie komunikacyjnym. Przedmiot obejmuje wprowadzenie i praktyczna naukę obsługi zaawansowanego narzędzia symulacyjnego, Keysight ADS Communication Designer umożliwiających zintegrowane projektowanie na poziomie układów, podsystemów i całego systemu komunikacyjnego.								
Learning outcomes	Course outcome		Subject outcome			Method of verification			
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment		selected wireless communication			[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment			
	[K6_W34] Knows the characteristics of telecommunications channels, methods of securing information, modulation systems, methods of access to the channel.		knows the principles of operation and basic parameters of selected wireless communication systems and the requirements concerning RF circuits used in those systems			[SW1] Assessment of factual knowledge			

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Review of multiple access and spectrum spreading  OFDM modulation and spectrum spreading  Radio interface in systems of computer wireless networks (WFI, WiMAX)  Radio interface in 4G systems (LTE)  Basic parameters of digitally modulated signals important for designing RF circuits  Architecture of subsystems in wireless communications  Basic RF circuits in wireless systems  Influence of RF circuits on system quality  Nonlinear effects, noise and interferences in wireless communication systems – link budget  System analysis in modern microwave/RF circuit simulators – Agilient ADS  Behavioral models of circuit blocks in wireless communication systems  ADS simulation tests of selected communication systems  Measurements of devices in wireless communication systems  Measurements of devices in wireless communication systems  Introduction to radar systems and radio identification (RFID)  Prerequisites  Basic signal theory and DSP  and co-requisites  Basic signal theory and DSP  and corrections  Subject passing criteria Passing threshold Percentage of the final grade lecture - activity 0.0% 10.	Subject contents	Review of digital modulation						
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WOLK DIACELLELL INOT applicable	Work placement	Not applicable						

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