



Subject card

Subject name and code	Wireless Communication Systems, PG_00048104						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2028/2029		
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 -> Wydział Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Krzysztof Nyka				
	Teachers		dr hab. inż. Krzysztof Nyka				
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		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		applies basic RF circuits in selected wireless communication systems and analyzes their operation in those systems		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		

Subject contents	Review of digital modulation		
	Review of multiple access and spectrum spreading		
	OFDM modulation and spectrum spreading		
	Radio interface in systems of computer wireless networks (WiFi, 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 –Agilent ADS		
	Behavioral models of circuit blocks in wireless communication system		
	ADS simulation tests of selected communication systems		
	Measurements of devices in wireless communication systems		
	Introduction to radar systems and radio identification (RFID)		
Prerequisites and co-requisites	Basic signal theory and DSP		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	laboratory	50.0%	30.0%
	lecture - activity	0.0%	10.0%
	lecture - test	50.0%	60.0%
Recommended reading	Basic literature	1. A. Luzzatto, G. Shirazi, Wireless Transceiver Design, Wiley, 2007 2. K.Wesołowski, Podstawy cyfrowych systemów telekomunikacyjnych, WKŁ, 2006	
	Supplementary literature	none	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Explain the negative effects resulting from strong variations of modulated signal envelope.		
Work placement	Not applicable		

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