



## Subject card

Subject name and code	Integrated Transceiver Devices, PG_00064030						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	February 2025		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Microelectronic Systems -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Grzegorz Blakiewicz				
	Teachers		dr hab. inż. Grzegorz Blakiewicz				
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		17.0	50
Subject objectives	Gain knowledge of design of main functional blocks of integrated receivers and transmitters for wireless communication. Practice designing and verifying the parameters of functional blocks using a computer simulator.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems		The student has gained knowledge of properties of selected functional blocks of transceivers and receivers, which allows him to select appropriate solution for the assumed requirements.		[SK2] Assessment of progress of work		
	[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by: - appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation, - application of appropriate methods and tools		The student can design and carry out verification simulations of basic functional blocks of transmitters and receivers.		[SU1] Assessment of task fulfilment		
	[K7_W03] knows and understands, to an increased extent, the construction and operating principles of components and systems related to the field of study, including theories, methods and complex relationships between them and selected specific issues - appropriate for the curriculum		The student has gained knowledge of type and design of basic functional blocks of transmitters and receivers.		[SW1] Assessment of factual knowledge		

Subject contents	1. Characteristics of wireless communication systems		
	2. Receiver architectures in integrated wireless communication systems		
	3. Transmitter architectures in integrated wireless communication systems		
	4. Parameters and characteristics of functional blocks in the signal path		
	5. Specifics of design of integrated circuits operating at high frequencies		
	6. Integrated high-frequency low-noise amplifiers		
	7. Frequency conversion circuits		
	8. Integrated mixers of high-frequency signals		
	9. Phase loops		
	10. High-frequency voltage-controlled oscillators		
	11. Phase detectors and programmable frequency dividers		
	12. Intermediate frequency and baseband filters		
	13. Realizations of integrated intermediate frequency filters		
	14. Realizations of integrated baseband filters		
	15. Analog-to-digital and digital-to-analog converters used in communications equipment		
Prerequisites and co-requisites	Basic knowledge of the principle of operation and design of basic analog functional blocks such as, amplifiers, filters, multipliers.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	End-of-semester colloquium	50.0%	70.0%
	Laboratory exercises	50.0%	30.0%
Recommended reading	Basic literature	A. Abidi, P. Gray, R. Meyer, "Integrated Circuits for Wireless Communications" New York 1999	
	Supplementary literature	R. Ludwig, P. Bretchko, RF circuit design, teory and applications, Prentice Hall, New Jersey, 2000	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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