



Subject card

Subject name and code	Integrated Circuits Design for Wireless Communication, PG_00048583						
Field of study	Electronics and Telecommunications, Biomedical Engineering, Biomedical Engineering, Biomedical Engineering						
Date of commencement of studies	February 2023		Academic year of realisation of subject		2023/2024		
Education level	second-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	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		4.0		16.0	50
Subject objectives	Transfer of knowledge of the design and optimization of the main functional blocks in integrated receivers and transmitters for wireless communications. Practicing the design and verification of parameters of functional blocks using computer simulators.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U01] can apply mathematical knowledge to formulate and solve complex and non-typical problems related to the field of study by:n-appropriate selection of source information and its critical analysis, synthesis, creative interpretation and presentation,n-application of appropriate methods and toolsn		Ability to design and simulate the most important functional blocks in transceivers.		[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools		
	[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.		Knowledge of transceivers architectures. Knowledge of the principles of operation and methods of design the most important funkcjonal blocks in transceivers		[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge		
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems		He can choose the solution best suited to the project specification.		[SK2] Assessment of progress of work		

Subject contents	1. General characteristics of wireless communication systems		
	2. Survey of receiver architectures in wireless communication systems		
	3. Survey of transmitter architectures in wireless communication systems		
	4. Basic parameters and characteristics of functional blocks in signal path		
	5. Remarks on high frequency integrated circuits design		
	6. Implementation of integrated low noise high frequency amplifiers		
	7. Frequency conversion circuits		
	8. Implementation of integrated high frequency mixers		
	9. High frequency phase locked loops		
	10. Implementation of integrated high frequency voltage controlled oscillators		
	11. Integrated phase detectors and programmable frequency dividers		
	12. Intermediate frequency and baseband filters		
	13. Implementation of integrated intermediate frequency filters		
	14. Implementation of integrated baseband filters		
	15. Analogue-digital and digital-analogue converters		
	16. Interface and controlling circuits		
	17. Final test		
Prerequisites and co-requisites	No requirements		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	50.0%	70.0%
	Practical exercise	50.0%	30.0%
Recommended reading	Basic literature	A. Abidi, P. Gray, R. Meyer, "Integrated Circuits for Wireless Communications" New York 1999	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie: Projektowanie układów scalonych dla systemów komunikacji bezprzewodowej - 23/24 - Moodle ID: 30636 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=30636	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		