



## Subject card

Subject name and code	, PG_00048148						
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			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Computer Architecture -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Wojciech Siwicki				
	Teachers		dr inż. Wojciech Siwicki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	0.0	0.0	0.0	15.0	0.0	15
	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	15		1.0		9.0	25
Subject objectives	To get the knowledge of methods of verification of digital radio communication system components via computer simulations during design process.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study		Student can model and simulate basic components of digital radio communication system.		[SU1] Assessment of task fulfilment		
	[K6_W35] Knows the concepts of the technique of signal transmission, operation of telecommunications networks and multimedia services and the rules for providing them		Student is able to put into practice the knowledge about construction of digital radio communication devices and links.		[SW1] Assessment of factual knowledge		
Subject contents	<ol style="list-style-type: none"> <li>1. Introduction</li> <li>2. BPSK/QPSK modulator and demodulator</li> <li>3. GMSK modulator and demodulator</li> <li>4. 16QAM modulator and demodulator</li> <li>5. Gaussian channel model</li> <li>6. Rayleigh fading channel model</li> <li>7. Rician fading channel model</li> <li>8. Channel impulse response in urban environment</li> <li>9. Channel transfer function in urban environment</li> <li>10. Intersymbol interferences</li> <li>11. Generation and processing of pseudorandom sequences</li> <li>12. Modulation filter</li> <li>13. Design of transmit-receive path in digital radio communication system</li> <li>14. Analysis of noise characteristics of digital radio communication system</li> <li>15. Summary of the design works</li> </ol>						
Prerequisites and co-requisites	Knowledge of Matlab or SciLab						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
		project	50.0%
Recommended reading	Basic literature	Rappaport T.: Wireless communications principles and practice, 2nd edition, Prentice Hall, 2001 Tranter W., Shanmungan K., Rappaport T., Kosbar K.: Principles of communication systems simulation with wireless applications, Prentice Hall, 2003 Miao G.: Signal processing in digital communications, Artech House, 2007	
	Supplementary literature	Tse D., Viswanath P.: Fundamentals of Wireless Communication, Cambridge University Press, 2005	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		