



Subject card

Subject name and code	Wireless communication topics, PG_00062754						
Field of study	Technologies for Industry 5.0						
Date of commencement of studies	October 2025		Academic year of realisation of subject		2026/2027		
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	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department Of Microwave And Antenna Engineering -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Piotr Kowalczyk				
	Teachers						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	15.0	0.0	0.0	45
	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	45		5.0		50.0	100
Subject objectives	The aim of the course is to introduce to wireless communication topics, taking into account the basic physical phenomena related to radio waves propagation, the basic components used in wireless systems together with their parameters, which will allow course participants to set up and deploy wireless links.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K6_U03] has the ability to plan, prepare and carry out engineering activities using practical knowledge and understanding of the specificity of materials, devices and tools, processes and technologies, and prepare a substantive report		The student can analyze radio waves and determine the basic parameters of wireless communication links to select appropriate link components.		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K6_W03] demonstrates knowledge on materials used in industrial technologies, their structure and fabrication, knows the principles of conducting research, analyzing it and creating technical documentation		The student will become familiar with basic issues related to the propagation of radio waves and the parameters of waveguides, components, and systems used in wireless communication.		[SW1] Assessment of factual knowledge		

Subject contents	<ol style="list-style-type: none"> 1. Plane wave: basic parameters and effects 2. Propagation media: Impedance and reflection from the interface between two media 3. Plane wave oblique incidence at the Interface between two media 4. Standing wave coefficient and reflection coefficient, multi-layer media 5. Matching of the two media: impedance transformers 6. Coaxial and microstrip transmission lines: basic parameters 7. Scattering matrix and basic types of passive components 8. Antenna types and their basic parameters 9. Wireless systems and basic parameters of wireless communication devices 10. Propagation in real environments of wireless system installations and range equation <p>667 / 5 000</p> <p>Plane Wave: Basic Parameters and Effects Media Impedance and Reflection from the Interface of Two Media Oblique Incidence of a Plane Wave at the Interface of Two and Multilayer Media Standing Wave Coefficient and Reflection Coefficient Matching Two Media: Impedance Transformers Coaxial and Microstrip Transmission Lines: Basic Parameters Scattering Matrix and Basic Passive Components Types of Antennas and Their Basic Parameters Wireless Systems and Basic Parameters of Wireless Communication Devices and Range Equation Propagation in Real Environments of Wireless System Installations</p>		
Prerequisites and co-requisites	Basic knowledge of mathematics, electronics, electricity and magnetism.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Tests	50.0%	50.0%
	Laboratory points	50.0%	50.0%
Recommended reading	Basic literature		<p>P. Kowalczyk, R. Lech, W. Zieniutycz: "Pola i Fale Elektromagnetyczne w Zadaniach", Wydawnictwo Politechniki Gdanskiej, Gdansk 2015; ISBN 978-83-7348-626-3</p> <p>P. Kowalczyk, R. Lech, J. Mazur: "Technika Wysokich Częstotliwości w Zadaniach", Wydawnictwo Politechniki Gdanskiej, Gdansk 2022; ISBN 978-83-7348-859-5</p>
	Supplementary literature		D.Pozar: "Microwave engineering", Willey&Sons, 1998
	eResources addresses		Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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