



## Subject card

Subject name and code	Radio Communication Antennas and MIMO Techniques, PG_00047501						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2024/2025		
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	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Radiocommunication Systems and Networks -> Faculty of Electronics, Telecommunications and Informatics						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Jarosław Magiera				
	Teachers		dr inż. Jarosław Magiera				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	0.0	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	Familiarization with the construction and operation of the main types of radio antennas						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_W02] Knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study		Knows and understands the structure and operation of various types of radio antennas as well as the structure and operation of MIMO multi-antenna links.		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_W01] Knows and understands, to an increased extent, mathematics to the extent necessary to formulate and solve complex issues related to the field of study.		Knows and understands the mathematical description used in electromagnetic analysis and design of linear antennas		[SW3] Assessment of knowledge contained in written work and projects		
	[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.		Knows and understands physical phenomena occurring in the antenna, associated with the conversion of an electric current into an electromagnetic field and vice versa.		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	1. Antenna conditions in the radio communication link. 2. Rules for selecting antennas in fixed and mobile link. 3. Omni-directional antennas. 4. Sector antennas. 5. Narrow-beam antennas. 6. Antenna technique in land mobile radiocommunication. 7. Construction of planar antennas. 8. Properties of planar antenna solutions. 9. Antenna technique in permanent satellite communications.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Accept	50.0%	100.0%
Recommended reading	Basic literature	Saunders S.R., Aragon-Zavala A.: Antennas and propagation for wireless communication systems. John Wiley&Sons, 2007	
	Supplementary literature	Lack	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Lack		
Work placement	Not applicable		