



Subject card

Subject name and code	Radio Communication Metrology, PG_00048143						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2021	Academic year of realisation of subject			2024/2025		
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			2.0		
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	prof. dr hab. inż. Jacek Stefański					
	Teachers	dr hab. inż. Jarosław Sadowski prof. dr hab. inż. Jacek Stefański					
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	2.0		18.0	50	
Subject objectives	To familiarize students with basic methods of measurement of radio communication devices.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W31] Knows the definitions of measurement error and uncertainty, measurement methods, including digital methods of time, frequency and phase measurements, transducer properties and knows digital signal processing systems.	The student knows the construction and operation of basic measuring equipment and basic measurement methods in radiocommunication systems.			[SW1] Assessment of factual knowledge		
	[K6_U05] can plan and conduct experiments related to the field of study, including computer simulations and measurements; interpret obtained results and draw conclusions	The student knows how to operate and select the appropriate parameters of the equipment used during radiocommunication measurements			[SU4] Assessment of ability to use methods and tools		
Subject contents	1. Basic concepts 2. Measuring methods in radio communication 2. Measuring equipments 3. "TRUE RMS" meter 4. RF signal power meter 5. Signal generators 6. Digital oscilloscopes 7. Signal spectrum analyzers 8. Frequency meters 9. Vector circuit analyzer 10. Logic analyzer 11. Passive elements 12. Measurement station 13. Measurements of base and mobile stations 14. Automation of measurements of radio communication equipments 15. Automation of measurements in network maintenance and management						
Prerequisites and co-requisites	No requirements						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Practical exercise	50.0%			30.0%		
	Midterm colloquium	50.0%			70.0%		

Recommended reading	Basic literature	1. Catalogs, application notes and training materials of companies, e.g. R&S, Maxim, TI, Motorola 2. Steer M., Microwave and RF Design: A Systems Approach, SciTech Publishing, 2010 3. Carvalho NB, Schreurs D., Microwave and Wireless Measurement Techniques, Cambridge University Press, 2013 3. Polish Committee for Standardization, Methods of measurement in radio communication (general) 4. www.etsi.org 5. www.3gpp.org 6. Kreher R., UMTS Performance Measurement a Practical Guide to KPIs for the UTRAN Environment, Wiley & Sons, 2006
	Supplementary literature	No requirements
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	No issues / questions.	
Work placement	Not applicable	