GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	High Frequency Technique, PG_00047918		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2021	Academic year of realisation of subject	2022/2023
Education level	first-cycle studies	Subject group	Obligatory subject group in the field of study 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	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Microwave and Antenna Engineering -> Faculty of Electronics, Telecommunications and Informatics		
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Rafał Lech	
	Teachers	Maciej Jasiński mgr inż. Sebastian Dziedziewicz dr hab. inż. Rafał Lech dr hab. inż. Piotr Kowalczyk dr inż. Małgorzata Warecka	

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	3.0	27.0	75

Subject objectives	Overview of the basic problems of microwave engineering . This includes properties and parameters of the guides – waveguides, integrated lines. Equivalent circuits of the transmission lines. Smith chart. Microwave multiport circuits and definition of their scattering matrix

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K6_W03] Knows and understands, to an advanced 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	Student is able to analyze voltage and reflected waves as well as reflection conditions in transmission lines	[SW1] Assessment of factual knowledge
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Student is able to calculate and measure the wave parameters of transmission lines and waveguides	[SU2] Assessment of ability to analyse information
	[K6_U06] can analyse the operation of components, circuits and systems related to the field of study, measure their parameters and examine technical specifications	student is able to define the principle of operation of basic waveguide and strip lines junctions	[SU1] Assessment of task fulfilment
	[K6_W02] Knows and understands, to an advanced extent, selected laws of physics and physical phenomena as well as methods and theories explaining the complex relationships between them, constituting the basic general knowledge in the field of technical sciences related to the field of study	Student can explain the problems of em wave propagation. in waveguides and define their equivalent circuits	[SW1] Assessment of factual knowledge
Subject contents	1. Main definitions ,properties and application of microwave 2. Wave parameters , eigenfunctions and eigenwaves, definition of the voltage and current waves of TEM,TE,TM, equivalent circuits, charac-teristic impedance 3. Equivalent uniform transmission two conductor line , line equations, reflection and impedance transformation, Smith chart 4. Rectangular and cyrcular waveguides- fundamental mode wave parame-ters , dispersion diagram, construction 5. TEM and quasi TEM lines- wave parameters, equivalent circuits 6. Modeling and construction ; coaxial line, stripline , microstrip and slot lines, coplanar guide, planar and layered coupled lines 7. Electric and magnetic field excitation of the guides, slots in waveguides-aplication, connection of the waveguides, discontinuities 8. Microwave multiport junction, scattering matrix , definition of the S-matrix elements, symmetry properties, reduction of the ports of S-matrix,		
Prerequisites and co-requisites	Knowledge of the Electrodynamika		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Midterm colloquium	60.0%	60.0%
	Practical exercise	40.0%	40.0%
Recommended reading	Basic literature	1.M. Suski "Technika Mikrofalowa" WNT 1979 2. J. Mazur" Technika BWCZ " lecture notes, mwave .eti.pg.gda.pl 3.D.Pozar"Microwave engineering" j.Willey&Sons, 1998	
	Supplementary literature	No requirements	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Aplications of the Smith chart		
Work placement	Not applicable		