



Subject card

Subject name and code	Fiberoptic Technology in Telecommunications, PG_00048128						
Field of study	Electronics and Telecommunications						
Date of commencement of studies	October 2023	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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			exam		
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. Łukasz Kulas					
	Teachers	dr hab. inż. Łukasz Kulas					
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	3.0		42.0		75
Subject objectives	Introduction to design of fiber optic systems with the focus on its most important elements (optical fiber, transmitter, receiver, optical amplifiers, etc.) and testing methods.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W34] Knows the characteristics of telecommunications channels, methods of securing information, modulation systems, methods of access to the channel.	During the lecture student gains knowledge about parameters of optical fibers, optical transmitters and receivers, connectors important to create a complete fiber-optic system.			[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	Practical skills in analysis, calculation of parameters and basic design of fiber-optic 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	Theoretical knowledge about concepts, composition, operation, measurements of the most important components of fiberoptic links.			[SW1] Assessment of factual knowledge		

Subject contents	<p>Lecture</p> <ul style="list-style-type: none"> • Introduction to fiberoptic systems • Optical fibers – methods of analysis • Classification of optical fibers • Attenuation in fiberoptic systems • Methods of connecting optical fibers • Multimodal dispersion in optical fibers • Chromatic dispersion in optical fibers • Useful bandwidth in optical fibers • Optical receivers and transmitters • Amplifiers in fiberoptic systems • Couplers in fiberoptic systems • Components of fiberoptic links • Measurements of fiberoptic link's performance • Designing of fiberoptic links • Designing of fiberoptic systems <p>Laboratory</p> <ul style="list-style-type: none"> • Introduction to fiberoptic systems - classification of optical fibers, preparation and methods of connecting optical fibers • Optical receivers and transmitters • Chromatic and multimodal dispersion in optical fibers • Useful bandwidth in optical fibers - measurement of attenuation in optical fibers • Reflectometer measurement of fiberoptic systems 								
Prerequisites and co-requisites	<p>Basic knowledge of optical phenomenons, propagation of electromagnetic waves, modulation techniques and telecommunication systems parameters.</p> <p>Participation in laboratory classes is obligatory.</p>								
Assessment methods and criteria	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Subject passing criteria</th> <th style="width: 30%;">Passing threshold</th> <th style="width: 30%;">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td>Lecture - final test</td> <td>50.0%</td> <td>100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lecture - final test	50.0%	100.0%
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Recommended reading	Basic literature	<p>A. Ghatak, K. Thyagarajan: Introduction to fiber optics, Oxford University Press, 1998 M. Ilyas: The Handbook Of Optical Communication Networks, CRC Press, 2003 M. Marciniak: Łączność światłowodowa, WKŁ, 1998</p>							
	Supplementary literature	<p>A. Smoliński: Optoelektronika światłowodowa, WKŁ, 1985</p> <p>G.P. Agrawal: Fiber-Optic Communications Systems, John Wiley And Sons, 2002</p> <p>J. Siuzdak: Wstęp do telekomunikacji światłowodowej, WKŁ, 1997</p>							
	eResources addresses	Adresy na platformie eNauczanie:							
Example issues/ example questions/ tasks being completed									
Work placement	Not applicable								