GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Fiberoptic Technology in Telecommunications, PG_00048128		
Field of study	Electronics and Telecommunications		
Date of commencement of studies	October 2024	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	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_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
[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_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

<table>
<tr><td>Subject contents</td><td>Lecture
• 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

Laboratory
• 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</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Basic knowledge of optical phenomenons, propagation of electromagnetic waves, modulation techniques and telecommunication systems parameters.

Participation in laboratory classes is obligatory.</td></tr>
<tr><td>Assessment methods and criteria</td><td><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Lecture - final test</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td>Recommended reading</td><td><table><tr><td>Basic literature</td><td>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</td></tr><tr><td>Supplementary literature</td><td>A. Smoliński: Optoelektronika światłowodowa, WKŁ, 1985

G.P. Agrawal: Fiber-Optic Communications Systems, John Wiley And Sons, 2002

J. Siuzdak: Wstęp do telekomunikacji światłowodowej, WKŁ, 1997</td></tr><tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr></table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td></td></tr>
<tr><td>Work placement</td><td>Not applicable</td></tr>
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