GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Ethernet Networks, PG_00063905						
Field of study	Informatics						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2025/2026		
Education level	second-cycle studies		Subject group		Optional subject group Specialty 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	1		Language of instruction		Polish		
Semester of study	1		ECTS credits		6.0		
Learning profile	general academic profile		Assessment form		exam		
Conducting unit	Department Of Computer Communications -> Faculty Of Electronics Telecommunications And Informatics -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Krzysztof Nowicki				
	Teachers		dr inż. Krzysztof Nowicki				

Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	15.0	60
	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	60	12.0	78.0	150

Subject objectives	Acquainted with the concept of Ethernet from end to end. Feasibility of the concept now and in the coming years. Acquainted with the problems of scalability, reliability, quality, manageability and offer services in Ethernet networks. New applications of Ethernet solutions (PoE, Automotive, IoT)

Learning outcomes	Course outcome	Subject outcome	Method of verification
	[K7_K02] is ready to provide critical evaluation of received content and to acknowledge the importance of knowledge in solving cognitive and practical problems	Student is able to assess the importance of developing Ethernet and IP solutions in solving cognitive and practical problems	[SK5] Assessment of ability to solve problems that arise in practice
	[K7_W11] knows and understands, to an increased extent, the general principles of creation and development of forms of individual entrepreneurship and the economic, legal and other conditions of various types of activities related to the awarded qualification, including the principles of protection of industrial property and copyright law	The student knows the technical and social aspects of the operation of complex information systems in the information society. The student is able to describe the IEEE 802 standardization processes, classify Ethernet network solutions, explain the concept of Ethernet from end to end	[SW1] Assessment of factual knowledge
	[K7_U12] is able, to an increased extent, to analyze the operation of components and systems related to the field of study, as well as to measure their parameters and study their technical characteristics, and to plan and carry out experiments related to the field of study, including computer simulations, interpret the obtained results and draw conclusions	The student is able to solve engineering and research problems in the design, evaluation and maintenance of Ethernet network systems and applications using experimental methods and management techniques.	[SU1] Assessment of task fulfilment [SU4] Assessment of ability to use methods and tools
	[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	The student knows the structure and operation of network components and systems, including the IEEE 802 2. 2. standardization process, classifies various Ethernet solutions, understands Ethernet concepts from end to end, knows the theory of switching and complex relationships between them, and selected specific issues: Layer solutions physical - PMD, PMI and intermediary layers, Compatibility of Ethernet solutions, Connecting Ethernet PoE networks, EFM, VLAN, link acquisition effect, link aggregation methods, Supporting multicast transmissions, CE	[SW1] Assessment of factual knowledge

Subject contents	History of Ethernet and IP networks. Standardization processes (IEEE, MEF, IETF, ITU-T). Domination of Ethernet solutions on the market of local and urban networks. Fast / Giga / 10 Gigabit Ethernet 40/100/400 Gb / Ethernet. Ethernet concept from end to end. Ethernet Carrier concept (Management, Scalability, Reliability, QoS, Security, Services), Physical layer solutions - PMD, PMI and intermediate layers. Structured cabling, Compatibility of Ethernet solutions. Ethernet PoE network connection - EFM devices power supply problems - First mile Ethernet RPR Multimedia networks in Ethernet networks - the effect of link acquisition, the Big Bang analysis. Adaptation of Ethernet to IP protocols. Flow control. Switching in the second, third and fourth layer - comparison, advantages and disadvantages. New ways to determine VLAN membership. Link aggregation methods. Supporting multicast transmissions. Industrial Ethernet. The principles of cooperation between Ethernet networks and wireless solutions. Development perspectives for Ethernet and IP networks

Prerequisites and co-requisites	Lecture and laboratory "Computer Networks"

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	project	50.0%	25.0%
	lecture	50.0%	25.0%
	laboratory	50.0%	25.0%
	seminar	50.0%	25.0%

Recommended reading	Basic literature
	Nowicki K.: Ethernet - sieci, mechanizmy, Infotech 2006
	Nowicki K., Uhl T.: Monitorowanie i bezpieczeństwo sieci komputerowych, WN AM Szczecin, 2016

	Supplementary literature	Nowicki K., Woźniak J.: Przewodowe i bezprzewodowe sieci LAN, OW PW 2002
		Nowicki K., Uhl T.: Ethernet End-to-End, Shaker Verlag 2008
		Krawczyk H., Kaczmarek S., Nowicki K.: Aplikacje i usługi a technologie sieciowe, WN PWN 2018
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	Issues: Standardization processes of computer networks. Domination of Ethernet solutions on the market of local and urban networks. End-to-end Ethernet and CE concept. Multimedia in Ethernet networks. Principles of Ethernet network cooperation with wireless solutions. Problems of scalability, manageability, reliability, security, quality and implementation of services in Ethernet networks. Questions: Comparison of 1/10/40/100 Gb / s Ethernet physical layer solutions. Present compatibility problems of Ethernet solutions. PoE - power supply problems. EFM. Introduce new ways to determine VLAN membership. Multicast support Industrial Ethernet. Tasks carried out: monitoring, eavesdropping, attacks on mechanisms, device recognition, Ethernet network design	
Work placement	Not applicable	

Document generated electronically. Does not require a seal or signature.