



## Subject card

Subject name and code	Ethernet and IP Networks, PG_00053920						
Field of study	Automatic Control, Cybernetics and Robotics						
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			1.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Computer Communications -> Faculty of Electronics, Telecommunications and Informatics						
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	0.0	0.0	0.0	15
	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	15		2.0		8.0	25
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. Acquainted with modern IP networks solutions, migration from IPv4 to IPv6 and IPv6 protocol capabilities.						
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	The student knows the structure and operation principles of Ethernet / IP components and systems, including CE and IPv6			[SW1] Assessment of factual knowledge		
	[K6_U04] can apply knowledge of programming methods and techniques as well as select and apply appropriate programming methods and tools in computer software development or programming devices or controllers using microprocessors or programmable elements or systems specific to the field of study	Student describes the principles of Ethernet network cooperation with other networks Student explains the principles of managing Ethernet and IP networks. Student applies solutions that increase the security of Ethernet and IPv6 networks. The student uses real hardware solutions			[SU4] Assessment of ability to use methods and tools		

Subject contents	History of Ethernet and IP networks. Standardization processes Dominance of Ethernet solutions on the market of local and city networks. Gigabit solutions (10/40/100/400/800 Gbps) Ethernet End-to-end Ethernet concept. Carrier Ethernet (services, scalability, manageability, QoS, reliability). Ethernet solutions compatibility. PoE device power supply problems. Adapting Ethernet to IP protocols. Supporting multicast broadcasts. Industrial / Automotive Ethernet. Principles of cooperation of Ethernet networks with wireless solutions. An overview of the IPv6 concept. Basics of IPv6 addressing - unicast, multicast, anycast addressing. Address allocation and the problem of routing tables. Static and dynamic configuration of IPv6 and DNS. IPv4 / IPv6 network coexistence. Migration methods. Services on IPv6 networks. VoIP. Security in Ethernet and IP networks. Prospects for the development of Ethernet and IP networks. Cooperation of Ethernet and IP networks.		
Prerequisites and co-requisites	Completed course "Computer Networks" lecture + lab.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Practical exercise	50.0%	50.0%
	Midterm colloquium	50.0%	50.0%
Recommended reading	Basic literature	Nowicki K.: Ethernet - sieci, mechanizmy, Infotech 2006  Nowicki K., Światowiak J.: Protokoły IPv6, PG, 2002	
	Supplementary literature	Nowicki K., Uhl T.: Ethernet End-to-End, Shaker Verlag 2008 Nowicki K., Woźniak J.: Przewodowe i bezprzewodowe sieci LAN, OW PW 2002 An IPv6 Deployment Guide, The 6NET Consortium, September 2005 Krawczyk H., Kaczmarek S., Nowicki K.: Aplikacje i usługi a technologie sieciowe, PWN 2018	
	eResources addresses	Adresy na platformie eNauczenie:	
Example issues/ example questions/ tasks being completed	Introduce the concept of the Ethernet end-to-end What is fit to Ethernet IP protocols Present methods of network migration IPv4-> IPv6		
Work placement	Not applicable		