GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Teleinformatic networks, PG_00060226		
Field of study	Technical Physics		
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	5	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Theoretical Physics and Quantum Computing -> Faculty of Applied Physics and Mathematics -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Bartosz Reichel	
	Teachers		

Lesson types

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	30.0	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	5.0	25.0	75

Subject objectives

Acquainted with the basic methods of data transmission, division of ICT equipment. Layer model of the ISO / OSI network.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U03] knows programming languages and can use basic software packages	Can implement selected issues	[SU1] Assessment of task fulfilment
[K6_K01] understands the need to learn and improve professional and personal competencies, inspires and organizes other people's learning process	Can read and understand a data sheet	[SK5] Assessment of ability to solve problems that arise in practice
[K6_U02] analyzes and solves simple scientific and technical problems, based on possessed knowledge, using analytical, numerical, simulation and experimental methods	Can analyze network logs (e.g., Wireshark)	[SU2] Assessment of ability to analyse information

Subject contents	Course content – lecture Lectures: 1. Elements of data transmission Channel, signal, information and modulation: parameters and characteristics. Spectrum, bandwidth, Modulation rate, transmission speed, propagation rate. Synchronous and asynchronous transmission. Receiver synchronization and transmission coding. Error models in transmission channels, elementary error rate. Detection and correction codes. Parity bit and CRC. 2. LAN and WLAN Ethernet (IEEE 802.3): access rule for common medium, device addressing, technologies and parameters, structured cabling, devices (hub, switch). Fast- (IEEE 802.3u) and Gigabit Ethernet (IEEE 802.3 ab / z). Minimal spanning tree (STP). Other solutions: Token Ring and FDDI (IEEE 802.5): 3. Access network Access channels: V.24 (RS232), USB, V.21-V.92 modems, ISDN, ADSL and HDSL modems. Parameters and ranges of application. 4. MAN and WAN network Analog and digital connections: PDH and SDH telecommunications hierarchy. FrameRelay network: principle of operation, layered model, permanent and switched virtual connection, parameters and costs of application. ATM network: operating principle, layered model, logical channel and path, devices. Parameters and scope of application. 5. Protocols and services in ICT networks Protocol definition and protocol classification. Protocols in layered models. Ethernet II ARP ICMP IP TCP and UDP DNS HTTP MQTT 6. Security. Symmetric / asymmetric encryption. Weaknesses and strengths of selected solutions. Attack methods (e.g. Man in the Middle) Course content – laboratory Laboratory 1) Implementation of algorithms: parity bit, modulo sum, CRC 2) The breakdown of the data on to packets, analysis of impact of the size of the header to the size of the package 3) Implementation of minimum spanning tree algorithms 4) Tracking and analysis of the network traffic
Prerequisites and co-requisites	No requirements
Assessment methods and criteria	Subject passing criteria: Project Passing threshold: 50.0% Percentage of the final grade: 100.0%
Recommended reading	Basic literature: D.E. Comer , Sieci komputerowe i intersieci, WNT, Warszawa, 2003 A. Sopala, Pisanie programów internetowych, Mikom, Warszawa, 2000 Supplementary literature: No requirements eResources addresses:
Example issues/ example questions/ tasks being completed	List the layers of the TCP/ISO model. Provide the physical basis for electromagnetic signal propagation (list possible modulations). Provide/describe the algorithm(s) for minimal spanning networks.
Practical activites within the subject	Not applicable

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