



Subject card

Subject name and code	Teleinformatic networks, PG_00060226						
Field of study	Technical Physics						
Date of commencement of studies	October 2026	Academic year of realisation of subject				2028/2029	
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_U02] is able to analyse and solve complex and non-standard scientific and technical problems using appropriate analytical, computational, numerical, simulation or experimental methods.	Can analyze network logs (can use applications such as Wireshark)			[SU2] Assessment of ability to analyse information		
	[K6_U03] possesses programming skills in a selected language and the ability to use selected software packages.	Can implement selected issues, knows how to use documentation and new tools such as machine learning support.			[SU1] Assessment of task fulfilment		
	[K6_K01] demonstrates readiness for continuous learning and updating knowledge in physics and related fields, critically evaluating it and recognising its importance in solving practical and theoretical problems.	In network analysis, guided by ethical principles and the safety of yourself and surroundings. For new fetures, the user can read and understand datasheet notes, expanding their knowledge in the selected field.			[SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	<p>Course content – lecture</p> <p>Lectures:</p> <p>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.</p> <p>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):</p> <p>3. Access network Access channels: V.24 (RS232), USB, V.21-V.92 modems, ISDN, ADSL and HDSL modems. Parameters and ranges of application.</p> <p>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.</p> <p>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</p> <p>6. Security. Symmetric / asymmetric encryption. Weaknesses and strengths of selected solutions. Attack methods (e.g. Man in the Middle)</p> <hr/> <p>Course content – laboratory Laboratory</p> <p>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</p>											
Prerequisites and co-requisites	No requirements											
Assessment methods and criteria	<table border="1" data-bbox="448 1413 1490 1478"> <thead> <tr> <th data-bbox="448 1413 794 1444">Subject passing criteria</th> <th data-bbox="794 1413 1141 1444">Passing threshold</th> <th data-bbox="1141 1413 1490 1444">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="448 1444 794 1478">Project</td> <td data-bbox="794 1444 1141 1478">50.0%</td> <td data-bbox="1141 1444 1490 1478">100.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Project	50.0%	100.0%			
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Recommended reading	<table border="1" data-bbox="448 1485 1490 1608"> <tbody> <tr> <td data-bbox="448 1485 794 1541">Basic literature</td> <td colspan="2" data-bbox="794 1485 1490 1541">D.E. Comer , Sieci komputerowe i intersieci, WNT, Warszawa, 2003 A. Sopala, Pisanie programów internetowych, Mikom, Warszawa, 2000</td> </tr> <tr> <td data-bbox="448 1541 794 1574">Supplementary literature</td> <td colspan="2" data-bbox="794 1541 1490 1574">No requirements</td> </tr> <tr> <td data-bbox="448 1574 794 1608">eResources addresses</td> <td colspan="2" data-bbox="794 1574 1490 1608"></td> </tr> </tbody> </table>			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		
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Example issues/ example questions/ tasks being completed	<p>List the layers of the TCP/ISO model.</p> <p>Provide the physical basis for electromagnetic signal propagation (list possible modulations).</p> <p>Provide/describe the algorithm(s) for minimal spanning networks.</p>											
Practical activities within the subject	Not applicable											

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