



## Subject card

Subject name and code	Network Programming, PG_00038329						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
Education level	second-cycle studies	Subject group			Optional subject group Subject group related to scientific research in the field of study		
Mode of study	Part-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	3	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Piotr Kołodziejek					
	Teachers	dr inż. Piotr Kołodziejek					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	10.0	0.0	0.0	20
	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	20	9.0		46.0	75	
Subject objectives	Acquisition of skills by the students in network data transmission diagnostics and protocols monitoring, network application programming in the client-server architecture in C++, C, Python using selected operating systems and software development environments including multithreaded data transfer, prioritization of network service, network sockets interface, layers, ports, TCP / IP protocols and basics of the cryptographic algorithms.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U12	Student describes the layered model TCP / IP protocol stack, model client-server communication, creation support libraries network applications and defined classes, functions / methods and method their use.			[SU1] Assessment of task fulfilment		
	K7_K02	The student explains the sequences functions called in the application client and server to establish communication with the use of connection protocol with transmission control and no control transmission.			[SK5] Assessment of ability to solve problems that arise in practice		
	K7_W02	Student can work in group taking different roles in it. The student explains phases of the network application project design.			[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Definitions and issues of computer networks, transmission types, network topologies, network protocol stack, TCP / IP, network addressing, ports, network sockets interface, network configuration and diagnostics, client - server architecture communication, event programming, multithreaded data transmission programming, prioritization of network services, basic cryptographic algorithms, client-server application based network programming, web-browser network programming						
Prerequisites and co-requisites	Basic knowledge on computer networks and C/C++ programming.						

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Laboratory tasks and project	100.0%	50.0%
	Lectures colloquium	50.0%	50.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Sosinsky Barrie: Sieci komputerowe - Biblia, Helion, 2011.</li> <li>2. A. Sopala: Pisanie programów internetowych, Mikom, 2000.</li> <li>3. A. Jones, J. Ohlund Programowanie sieciowe Microsoft Windows, RM, 2000.</li> <li>4. Eckel Bruce, Thinking in Java., IV edition</li> <li>5. <a href="http://beej.us/guide/bgnet/">Beej's Guide to Network Programming Using Internet Sockets: http://beej.us/guide/bgnet/</a></li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. E. Harold Java: programowanie sieciowe, READ ME, 2001.</li> </ol>	
	eResources addresses	Adresy na platformie eNauczanie: PROGRAMOWANIE SIECIOWE [Niestacjonarne][2023/24] - Moodle ID: 32276 <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32276">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=32276</a>	
Example issues/ example questions/ tasks being completed	<ul style="list-style-type: none"> <li>• development of network application "echo" in C, C#, Python languages</li> <li>• software design for network transmission between PC application and microcontroller</li> <li>• application of connected and connectionless network sockets,</li> <li>• design of multi-threaded "server" application for handling network communication with dedicated "client" applications and a web browser.</li> <li>• design of a virtual measuring instrument for remote monitoring of selected industrial processes</li> <li>• event-oriented and multithreaded programming of client-server applications,</li> </ul>		
Work placement	Not applicable		