GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Protocols of Data Exchange in Systems, PG_00068234
Field of study	Biomedical Engineering

Date of commencement of studies	October 2025	Academic year of realisation of subject	2027/2028
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	3.0
Learning profile	general academic profile	Assessment form	assessment

Conducting unit	Department of Biomedical Engineering -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology

Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Grzegorz Jasiński
	Teachers	dr inż. Grzegorz Jasiński

Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	15.0	15.0	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	The aim of the course is to familiarize students with typical and commonly used data exchange protocols and how to use them in practice. Protocols used in medicine, industry, measurement laboratory and computer networks will be presented. The subject includes, among other things, issues related to the development of communication software using selected interfaces and communication protocols.

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	Student explains the meaning of basic concepts related to the use of communication protocols. Student explains the basic differences between individual protocols. Student indicates and explains the basic conditions for the design and use of data exchange protocols. The student selects data exchange protocols depending on the application . The student tests the operation of selected data exchange protocols. Student builds and configures selected data acquisition and exchange systems. Student creates software that uses popular protocols.	[SW2] Assessment of knowledge contained in presentation [SW1] Assessment of factual knowledge
	[K6_U07] can apply methods of process and function support, specific to the field of study	Student explains the importance of basic concepts related to data acquisition. Selected student has test data acquisition systems. Student builds and configures the selected acquisition systems and data exchange. Student creates software data acquisition systems.	[SU4] Assessment of ability to use methods and tools [SK5] Assessment of ability to solve problems that arise in practice [SU2] Assessment of ability to analyse information

Subject contents	Course content – lecture Lecture content: Importance and place of communication standards in automatic data acquisition systems. Basic concepts related to communication interfaces. Methods of securing data transmission. Personal computer serial interfaces (RS232 and RS485). Software implementation of serial communication in selected programming environments (C++, C#, Python) and in selected operating systems. Basic principles, diagnostics and common errors. Internet protocols and the use of sockets in data transfer. Basic Internet protocols and software implementation of selected programming environments (C++, C#, Python) and in selected operating systems. HTTP, SMTP and FTP protocols. Measurement instrument protocol (SCPI). Modbus protocol. LabView programming environment. Lab content: SCPI protocol and communication using it. Modbus protocol and communication using it. Serial interface. TCP/IP protocols. LabView programming environment. Project content: Development of software that communicates with selected measuring instruments,
Prerequisites and co-requisites	No requirements

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Labs	50.0%	20.0%
	Project	50.0%	30.0%
	Quiz	50.0%	50.0%

Recommended reading	Basic literature	1. A. G. Blank TCP/IP podstawy Wydawnictwo MIKOM PWN 2005 2. E. Rusty Harold: JAVA Programowanie sieciowe, Wydawnictwo RM, Warszawa 3. G. Coulouris, J. Dollimore, T. Kindberg, Systemy rozproszone - podstawy i projektowanie, WNT Warszawa 1998. 4. H. Osterloh TCP/IP szkoła programowania Wydawnictwo HELION 2006 5. K S. Siyan, T. Parker TCP/IP Księga eksperta Wydanie II Helion 2002 6. Materiały do przedmiotu opracowane w formie edukacji na odległość 7. S. Orłowski C#. Tworzenie aplikacji sieciowych. 101 gotowych projektów Helion 2006 8. Skrypt z materiałami do przedmiotu 9. W. Mielczarek Urządzenia pomiarowe i systemy kompatybilne ze standardem SCPI Helion 2009
	Supplementary literature	Materiały do przedmiotu opracowane w formie edukacji na odległość, dostęp: http://uno.biomed.gda.pl
	eResources addresses	

Example issues/ example questions/ tasks being completed	Write an application that uses the Modbus protocol to communicate with a temperature controller.
Practical activites within the subject	Not applicable

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