GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Programmable logic controllers, PG_00067421
Field of study	Automatic Control, Cybernetics and Robotics

Date of commencement of studies	October 2025	**Academic year of realisation of subject**	2026/2027
Education level	first-cycle studies	**Subject group**	Obligatory subject group in the field of study
			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	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 Decision Systems and Robotics -> Faculty of Electronics Telecommunications and Informatics -> Wydziały Politechniki Gdańskiej

Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Tomasz Talaśka
	Teachers	dr hab. inż. Tomasz Talaśka

Lesson types and methods of instruction	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	2.0	28.0	75

Subject objectives	Acquainted with programmable logic controllers, their programming and the using in automation. Basic knowledge of supervising, data acquisition and process visualization systems (SCADA).

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	Knows and understands the structure and operating principle of PLC controllers, HMI panels i SCADA systems	[SW1] Assessment of factual knowledge
	[K6_U03] can design, according to required specifications, and make a simple device, facility, system or carry out a process, specific to the field of study, using suitable methods, techniques, tools and materials, following engineering standards and norms, applying technologies specific to the field of study and experience gained in the professional engineering environment	Is able to program programmable logic controllers used in simple automation systems.	[SU4] Assessment of ability to use methods and tools
	[K6_W21] knows and understands the basic methods of decision making as well as methods and techniques of design and operation of automatic regulation and control systems, computer applications for controlling and monitoring dynamic systems.	Knowledge about the use of programmable logic controllers in simple and complex automation systems.	[SW1] Assessment of factual knowledge

Subject contents	1. Introductory knowledge of programmable logic controllers (PLCs) properties and applications 2. General architecture, operating system, and work cycle of a PLC. 3. Programming languages for logic controllers. 4. Programming languages: LD, FBD, ST, IL, and SFC. 5. Basic principles of program writing and operation. 6. Data and variable types. 7. Contacts, relays, and connections. 8. Counters and timers. 9. Mathematical functions and relations. 10. Data operations. 11. Control functions. 12. Programming examples. 13. Selected controller hardware elements. 14. Discrete input and output modules. 15. Analog input and output modules. 16. Controller networks. 17. Communication protocols. 18. Communication modules. 19. Supervisory control and process visualization (SCADA) systems. 20. Communication with PLCs. 21. HMI panels and their programming methods. 21,Current and historical trends.
Prerequisites and co-requisites	

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
evaluation of laboratory	50.0%	60.0%
test	50.0%	40.0%

Recommended reading	Basic literature	1. T.Legierski, J.Kasprzyk, J.Wyrwał, J.Hajda, "Programowanie sterowników PLC", Wyd. Pracowni Komputerowej J.Skalmierskiego 2. A.Maczyński, "Sterowniki programowalne PLC. Budowa systemu i podstawy programowania. Astor
	Supplementary literature	No requirements
	eResources addresses	

Example issues/ example questions/ tasks being completed	
Work placement	Not applicable

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