



Subject card

Subject name and code	Digital embedded and programmable systems, PG_00059226						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	February 2026		Academic year of realisation of subject		2026/2027		
Education level	second-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	1		Language of instruction		Polish		
Semester of study	2		ECTS credits		2.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Electric Drives and Energy Conversion -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Arkadiusz Lewicki				
	Teachers		prof. dr hab. inż. Arkadiusz Lewicki				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	0.0	0.0	15.0	0.0	30
	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	30		5.0		15.0	50
Subject objectives	Presentation of programmable logic structures, presentation of programming methods and methods to control of peripheral devices						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_K02] can interact and work in a group assuming various roles and identify priorities for the achievement of a specific task		Pracuje w grupie projektowej		[SK1] Assessment of group work skills		
	[K7_W08] has in-depth knowledge of program development and design of complex systems automation systems using PLC and SCADA, transmission and processing of signals occurring in a variety of physical objects		Uses software for designing logical structures		[SW3] Assessment of knowledge contained in written work and projects		
	[K7_U11] is able to design and realise simple electrical circuits and control systems for a facility or industrial process using computer systems		Designs digital circuits and control systems		[SU3] Assessment of ability to use knowledge gained from the subject		
	[K7_U05] is able to select equipment and take electrical measurements, is able to use ICT information and communication technology to carry out engineering tasks involving devices, systems and automation and robotics systems		Selects measuring equipment and performs measurements of the developed solution		[SU2] Assessment of ability to analyse information		
	[K7_W03] has knowledge of digital signal processing algorithms, knows methods of designing digital circuits with given parameters		Designs digital circuits with specified parameters and properties		[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Course content – lecture The structures of programmable devices: PLD (SPLD, CPLD) and FPGA. Programming methods, methods of logical structure design. Preparing of complex functional blocks. Basics of HDL languages. Cooperation with external digital devices.						
	Course content – project Design of a digital structure for communication of the PLD device with a selected device/digital element						

Prerequisites and co-requisites	Knowledge in the field of digital technology.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Examination of the lecture	60.0%	20.0%
	The projects designed during laboratory exercises	60.0%	80.0%
Recommended reading	Basic literature	1. Robert Betz: Hardware Description Languages. 2. Ducek: Digital Design with CPLD Application and VHDL. 3. Uwe Meyer-Baese: Digital signal processing with Field Programmable Gate Array. 4. K. Parnell, N.Metha: Programmable Logic Design. 5. S.Shjiva: Introduction to logic design. 6. P. Chu: RTL hardware design using VHDL.	
	Supplementary literature	No special recommendations	
	eResources addresses		
Example issues/ example questions/ tasks being completed	1. Describe the structure of the FPGA. 2. Describe the structure of logic macrocell. 3. Design the logical structure to control of selected device.		
Practical activities within the subject	Not applicable		

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