



Subject card

Subject name and code	Digital Control, PG_00047403						
Field of study	Automatic Control, Cybernetics and Robotics						
Date of commencement of studies	February 2027	Academic year of realisation of subject				2027/2028	
Education level	second-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	1	Language of instruction				English	
Semester of study	2	ECTS credits				2.0	
Learning profile	general academic profile	Assessment form				assessment	
Conducting unit	Department of Decision Systems and Robotics -> Faculty of Electronics Telecommunications and Informatics -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		prof. dr hab. inż. Zdzisław Kowalczyk				
	Teachers		prof. dr hab. inż. Zdzisław Kowalczyk				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	0.0	0.0	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		2.0		18.0	50
Subject objectives	The aim of the course is to master the knowledge of methods for modeling of dynamic processes as objects subject to automatic control and the control design methods, as well as complex (Z) transformations.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	[K7_U02] can perform tasks related to the field of study as well as formulate and solve problems applying recent knowledge of physics and other areas of science		The student is able to carry out the task of designing computer control algorithms (in discrete time) based on mathematical tools reflecting knowledge from the physics of real-time objects.		[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [SU2] Assessment of ability to analyse information [SU1] Assessment of task fulfilment		
	[K7_W02] knows and understands, to an increased extent, selected laws of physics and physical phenomena, as well as methods and theories explaining the complex relationships between them, constituting advanced general knowledge in the field of technical sciences related to the field of study		understands in-depth the selected laws and physical phenomena related to control objects and mathematical models describing and explaining them, which constitute advanced general knowledge in the field of technical sciences, related to the field of Automation, Cybernetics and Robotics.		[SW3] Assessment of knowledge contained in written work and projects [SW2] Assessment of knowledge contained in presentation		
	[K7_U03] can design, according to required specifications, and make a complex 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		Student is able to design and make a device or system, using methods, techniques and tools and materials, using standards and norms, using appropriate technologies		[SU1] Assessment of task fulfilment [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		

Subject contents	Course content – lecture Basics of matrix algebra. Vectors, vector spaces and transformations. Linear transformations: linear mappings, base change and others (projections, rotations). Solving systems of equations. Problems of analysis and synthesis of digital control systems: Discretization and analogization; continuous and discrete modeling. Signal processing. Synthesis and analysis of mathematical models of control objects: discrete-time surrogate models. Spatial-state models.		
Prerequisites and co-requisites	Fundamentals of higher mathematics		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Written exam	50.0%	100.0%
Recommended reading	Basic literature	W.L. Brogan: Modern control theory, Prentice Hall, Englewood Cliffs, 1974. K.J. Astrom, B Wittenmark: Computer-controlled systems. Prentice Hall, Upper Saddle River, 1997	
	Supplementary literature	There are no other literature requirements	
	eResources addresses		
Example issues/ example questions/ tasks being completed			
Practical activities within the subject	Not applicable		

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