GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Digital Control, PG_00047403		
Field of study	Automatic Control, Cybernetics and Robotics		
Date of commencement of studies	February 2026	Academic year of realisation of subject	2026/2027
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Zdzisław Kowalczuk	
	Teachers	prof. dr hab. inż. Zdzisław Kowalczuk	

Lesson types and methods of instruction

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_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	[SU4] Assessment of ability to use methods and tools [SU3] Assessment of ability to use knowledge gained from the subject [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.	[SW2] Assessment of knowledge contained in presentation [SW3] Assessment of knowledge contained in written work and projects
[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.	[SU1] Assessment of task fulfilment [SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools

<table>
<tr><td>Subject contents</td><td colspan="3">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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Fundamentals of higher mathematics</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Written exam</td><td>50.0%</td><td>100.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">There are no other literature requirements</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3"></td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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