GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Computer-based Control Systems, PG_00053910		
Field of study	Informatics		
Date of commencement of studies	October 2024	Academic year of realisation of subject	2026/2027
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	5	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 inż. Marek Tatara	
	Teachers	dr inż. Marek Tatara	

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	4.0	26.0	75

Subject objectives

The aim of the course is to master the knowledge of methods of mathematical modeling of dynamic processes serving as objects submitted for control.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_U07] can apply methods of process and function support, specific to the field of study	Student is able to use methods supporting processes and functions, specific to automation	[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
[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	The student understands the structure and principles of operation of components and control systems, theories, methods and relationships between them as well as selected specific issues regarding signal processing systems and automation	[SW1] Assessment of factual knowledge

Subject contents

1. Basics of digital signal processing and control. 2. Characteristics of discrete signals and systems; methods of analysis. 3. Basic properties of discrete-time systems and methods of description. 4. Z transformation, deterministic signals, multi-dimensional transformations. 5. Modified Z transformation, inverse Z transformation. Applications. 6. Theory of linear discrete systems: Controllability, observability. 7. Similarity transformations, properties of similar systems. 8. Basic structures of linear discrete-time systems 9. Analysis and synthesis of digital control systems: making system dis-crete and analog (discretization and analogization); continuous and discrete modeling 10. Analog to digital processing (ADC conversion)and analogization); continuous and discrete modeling 11. Deterministic and probabilistic approaches to tuning ADC 12. Digital to analog processing (DAC conversion): Rules of conversion (decoding and signal generation)

Prerequisites and co-requisites

No requirements

<table>
<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>Practical exercise</td><td>50.0%</td><td>40.0%</td></tr>
<tr><td>Written exam</td><td>50.0%</td><td>60.0%</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</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">Z. Kowalczuk: Dyskretne modele w projektowaniu układów sterowania, Zesz. Nauk. PG, vol. 78, no. 493, 1992</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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