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 2026	Academic year of realisation of subject	2028/2029
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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Marek Tatara	
	Teachers	dr inż. Marek Tatara	

Lesson types

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

Subject contents

Course content – lecture
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

Assessment methods and criteria

Subject passing criteria	Passing threshold	Percentage of the final grade
Practical exercise	50.0%	40.0%
Written exam	50.0%	60.0%

Recommended reading

Basic literature	W.L. Brogan: Modern control theory, Prentice Hall, Englewood Cliffs, 1974
Supplementary literature	Z. Kowalczuk: Dyskretne modele w projektowaniu układów sterowania, Zesz. Nauk. PG, vol. 78, no. 493, 1992
eResources addresses	

Example issues/ example questions/ tasks being completed	
Practical activites within the subject	Not applicable

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