



Subject card

Subject name and code	Computer-based Control Systems, PG_00053910						
Field of study	Informatics						
Date of commencement of studies	October 2022		Academic year of realisation of subject		2024/2025		
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						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Marek Tatała				
	Teachers		mgr inż. Marek Grzegorek				
			dr inż. Marek Tatała				
			dr inż. Sebastian Dziedziewicz				
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 discrete 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	Adresy na platformie eNauczanie: Komputerowe Systemy Sterowania 2024/25 - Moodle ID: 42116 https://enauczanie.pg.edu.pl/moodle/course/view.php?id=42116	
Example issues/ example questions/ tasks being completed			
Work placement	Not applicable		

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