



Subject card

Subject name and code	Control and Decision Support Systems, PG_00038282						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 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	Part-time studies	Mode of delivery			at the university		
Year of study	1	Language of instruction			Polish		
Semester of study	2	ECTS credits			2.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Jarosław Tarnawski					
	Teachers						
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	10.0	0.0	10.0	0.0	0.0	20
	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	20	4.0		26.0	50	
Subject objectives	The aim of the course is to learn the selected advanced control systems and decision support systems.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K7_U11] is able to design and realise simple electrical circuits and control systems for a facility or industrial process using computer systems	Implementation of basic and advanced automation algorithms in the control system using computer systems. Practical implementation of the synthesis of a multi-area, adaptive and predictive controller. Ability to select basic and advanced control methods for specific applications. Practical implementation of a decision support system using optimizers from the Matlab package and its integration with the automation system.			[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		
	[K7_W02] has a structured knowledge of the application of information systems to improve the reliability, efficiency, speed and mobility of control and management systems	Practical skills in the use of computer tools and rapid prototyping information systems to design, simulate and analyze the use of advanced control methods and decision support to increase the reliability, efficiency, speed and mobility of control and management systems.			[SW1] Assessment of factual knowledge		

Subject contents	Course content – lecture LECTURE		
	Control methods: Hard and soft switching PID multi-area controllers using fuzzy logic Direct and indirect adaptive control Linear and nonlinear predictive control Methods of reasoning and decision support: AHP method - Analytic Hierarchy Process PCA method - Principal component analysis		
	Course content – laboratory LABORATORY		
	Synthesis of PID controllers with Smith predictor, adaptive and predictive for controlling an object with delay. Construction of a decision support system and integration with the control system.		
Prerequisites and co-requisites	Finished courses: Structures and algorithms of control systems Structures and algorithms for decision support systems		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lectures part	50.0%	60.0%
	Lab part	50.0%	40.0%
Recommended reading	Basic literature	Susmita Bandyopadhyay, Decision Support System: Tools and Techniques, CRC Press, 2024	
		Systems Engineering - Designing Decision Support Systems, PS Publishing, 2024	
		Camacho, Bordons, Model predictive control. Springer Verlag. 2004	
		Karl J Åström, Björn Wittenmark, Adaptive Control: Second Edition, Dover Publications, 2008	
		Piotr Tatjewski, Advanced Control of Industrial Processes: Structures and Algorithms, Springer, 2010	
	Supplementary literature	Karl J Åström, Björn Wittenmark, Computer-Controlled Systems: Theory and Design, Dover Publications, 2011	
	eResources addresses		
Example issues/ example questions/ tasks being completed	Construction is multi-regional controller Construction of predictive control system Construction of adaptive control system Decision-making using AHP method Diagnosis of an industrial process using PCA method		
Practical activities within the subject	Not applicable		

Document generated electronically. Does not require a seal or signature.