



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 2025		Academic year of realisation of subject		2025/2026		
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 -> Wydziały Politechniki Gdańskiej						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Jarosław Tarnawski				
	Teachers						
Lesson types and methods of instruction	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						
	Adresy na platformie eNauczanie:						
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_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		
	[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.		[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		

Subject contents	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 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
	Lab part	50.0%	40.0%
	Lectures part	50.0%	60.0%
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		
Work placement	Not applicable		

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