



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 2023		Academic year of realisation of subject		2023/2024		
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	Department of Control Systems Engineering -> Faculty of Electrical and Control Engineering						
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		The student should be able to use computer methods and systems of rapid prototyping to design, simulate and analyze the use of advanced control and decision support methods.		[SW1] Assessment of factual knowledge		
	K7_U11		The student should understand the purpose of replacing the basic methods and automation tools with the more advanced ones. The student should be able to choose an advanced control method for various applications. The student should be able to synthesize a multiregional PID, adaptive and predictive controller. The student should understand the location of the decision support system in automation applications. The student should be able to build a decision support system and be able to integrate it 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		

Subject contents	Control methods: Multi-area PID controllers hard and soft switched using fuzzy logic Adaptive control, direct and indirect Predictive control The methods reasoning and decision support: AHP - Analytic Hierarchy Process PCA - Principal component analysis											
Prerequisites and co-requisites	Finished courses: Structures and algorithms of control systems Structures and algorithms for decision support systems											
Assessment methods and criteria	<table><tr><td>Subject passing criteria</td><td>Passing threshold</td><td>Percentage of the final grade</td></tr><tr><td>Lab part</td><td>50.0%</td><td>40.0%</td></tr><tr><td>Lectures part</td><td>50.0%</td><td>60.0%</td></tr></table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lab part	50.0%	40.0%	Lectures part	50.0%	60.0%
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Lab part	50.0%	40.0%										
Lectures part	50.0%	60.0%										
Recommended reading	Basic literature	Niederliński A., Mościński J., Ogonowski Z., Regulacja adaptacyjna, PWN, Warszawa 1995. Tatjewski P., Sterowanie zaawansowane obiektów przemysłowych, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2002. Maciejowski J.M., Predictive Control with Constraints, Prentice Hall, 2002. Camacho, Bordons, Model predictive control. Springer Verlag. 2004 Korbicz, Kościelny, Kowalczuk, Cholewa, Diagnostyka procesów, WNT 2002 Grega, Metody i algorytmy sterowania cyfrowego w układach scentralizowanych i rozproszonych, AGH, 2004										
	Supplementary literature	Camacho, Bordons, Model predictive control. Springer Verlag. 2004 Grega, Metody i algorytmy sterowania cyfrowego w układach scentralizowanych i rozproszonych, AGH, 2004										
	eResources addresses											
	Example issues/ example questions/ tasks being completed	Construction is multi 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											