

## GDAŃSK UNIVERSITY

## 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 2022		Academic year of realisation of subject			2022/2023		
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	dr inż. Jarosław Tarnawski						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Projec	t	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 classes includ	n didactic ed in study	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		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.			[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		
	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		

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 decisis						
	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	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	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 Constaints, Prentice Hall, 2002. Camacho, Bordons, Model predictive control. Springer Verlag. 2004					
		Korbicz, Kościelny, Kowalczuk, Cholewa, Diagnostyka procesów, WNT 2002					
	Grega, Metody i algorytmy sterowania cytrowego 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 Adresy na platformie eNauczanie:						
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	Not applicable					