



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	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	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	<p>Control methods:</p> <p>Multi-area PID controllers hard and soft switched using fuzzy logic</p> <p>Adaptive control, direct and indirect</p> <p>Predictive control</p> <p>The methods reasoning and decision support:</p> <p>AHP - Analytic Hierarchy Process</p> <p>PCA - Principal component analysis</p>											
Prerequisites and co-requisites	<p>Finished courses:</p> <p>Structures and algorithms of control systems</p> <p>Structures and algorithms for decision support systems</p>											
Assessment methods and criteria	<table border="1"> <thead> <tr> <th data-bbox="453 799 794 831">Subject passing criteria</th> <th data-bbox="794 799 1142 831">Passing threshold</th> <th data-bbox="1142 799 1489 831">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="453 837 794 869">Lectures part</td> <td data-bbox="794 837 1142 869">50.0%</td> <td data-bbox="1142 837 1489 869">60.0%</td> </tr> <tr> <td data-bbox="453 875 794 904">Lab part</td> <td data-bbox="794 875 1142 904">50.0%</td> <td data-bbox="1142 875 1489 904">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lectures part	50.0%	60.0%	Lab part	50.0%	40.0%
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Lectures part	50.0%	60.0%										
Lab part	50.0%	40.0%										
Recommended reading	<p>Basic literature</p>	<p>Niederliński A., Mościński J., Ogonowski Z., Regulacja adaptacyjna, PWN, Warszawa 1995.</p> <p>Tatjewski P., Sterowanie zaawansowane obiektów przemysłowych, Akademicka Oficyna Wydawnicza EXIT, Warszawa 2002.</p> <p>Maciejowski J.M., Predictive Control with Constraints, Prentice Hall, 2002.</p> <p>Camacho, Bordons, Model predictive control. Springer Verlag. 2004</p> <p>Korbicz, Kościelny, Kowalczyk, Cholewa, Diagnostyka procesów, WNT 2002</p> <p>Grega, Metody i algorytmy sterowania cyfrowego w układach scentralizowanych i rozproszonych, AGH, 2004</p>										
	<p>Supplementary literature</p>	<p>Camacho, Bordons, Model predictive control. Springer Verlag. 2004</p> <p>Grega, Metody i algorytmy sterowania cyfrowego w układach scentralizowanych i rozproszonych, AGH, 2004</p>										
	<p>eResources addresses</p>	<p>Adresy na platformie eNauczanie:</p>										
Example issues/ example questions/ tasks being completed	<p>Construction is multi controller</p> <p>Construction of predictive control system</p> <p>Construction of adaptive control system</p> <p>Decision-making using AHP method</p> <p>Diagnosis of an industrial process using PCA method</p>											
Work placement	<p>Not applicable</p>											