



Subject card

Subject name and code	Control Theory, PG_00038190						
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	1	ECTS credits			5.0		
Learning profile	general academic profile	Assessment form			exam		
Conducting unit	Department of Control Systems Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr hab. inż. Robert Piotrowski					
	Teachers	dr hab. inż. Kazimierz Duzinkiewicz mgr inż. Krzysztof Laddach mgr inż. Mateusz Czyżniewski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	10.0	10.0	0.0	0.0	50
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	50	5.0		70.0		125
Subject objectives	The aim of the course is to present the current achievements of the control theory for the different categories of control systems, e.g.: continuous - discrete, linear - nonlinear, deterministic - stochastic. It will be present the results of modern control theory and the most important results of control theory.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K7_U07	1. The student selects the control algorithm to the control task. 2. The student examines the control systems by simulation tests.			[SU4] Assessment of ability to use methods and tools		
	K7_W06	1. The student knows the classical and modern control methods. 2. The student designs and analyzes the effect of the selected control systems.			[SW3] Assessment of knowledge contained in written work and projects		
Subject contents	Recapitulation of the subjects: Control Engineering Foundations, Dynamic Systems, Continuous Processes Control. Control systems and and its basic features. Stability analyses od linear systems. Stability criteria Lyapunov's methods of stability analysis of control systems - linear and nonlinear systems State space control design - poles placement methods State feedback control systems with observers Optimal control - Linear Quadratic Control (LQC), Dynamic Programming Noisy systems - robust control methods.						
Prerequisites and co-requisites	Not required						
Assessment methods and criteria	Subject passing criteria	Passing threshold			Percentage of the final grade		
	Laboratory	0.0%			30.0%		
	Exam	0.0%			70.0%		

Recommended reading	Basic literature	<p>1. Byrski, W. Obserwacja i sterowanie w systemach dynamicznych. Uczelniane Wydawnictwa Naukowo Dydaktyczne AGH, 2007.</p> <p>2. Bubnicki, A.: Teoria i algorytmy sterowania. PWN, 2005.</p> <p>3. Leigh J.R. Control theory. Wiley, 2004.</p> <p>4. Nise N.S. Control System Engineering. 3th edition. John Wiley & Sons, 2000.</p>
	Supplementary literature	<p>1. Ogata K. Modern Control Engineering. 4th edition. Prentice Hall, 2002.</p> <p>2. Hendricks, E., Jannerup, O., Sorensen, P.H. (2008). Linear Systems Control, Deterministic and Stochastic Methods. Springer – Verlag.</p>
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed	<p>1. Check the observability and controllability of the system represented by A, B and C, using the Kalman test.</p> <p>2. Provide an overview of the linear, non-stationary continuous system using state space model and name its individual components.</p>	
Work placement	Not applicable	