



Subject card

Subject name and code	Fundamentals of Control, PG_00056914						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2021		Academic year of realisation of subject		2022/2023		
Education level	first-cycle studies		Subject group				
Mode of study	Full-time studies		Mode of delivery		at the university		
Year of study	2		Language of instruction		Polish		
Semester of study	4		ECTS credits		4.0		
Learning profile	general academic profile		Assessment form		assessment		
Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor		dr hab. inż. Arkadiusz Lewicki				
	Teachers		dr inż. Daniel Wachowiak dr hab. inż. Marek Adamowicz dr hab. inż. Arkadiusz Lewicki				
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	30.0	0.0	0.0	0.0	60
	E-learning hours included: 0.0						
	Address on the e-learning platform: https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11155						
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	60		5.0		35.0	100
Subject objectives	The student learns structure and function of automatic control systems. Learns the methods of automatic control system describing and methods of linear system analysis of automatic control. Learn how to determine the dynamic characteristics of linear systems and to determine the dynamic properties of system on the basis of its characteristic. Scores based on the ability to identify the characteristics of the dynamic properties of systems and analysis of automatic control systems. He learns the ways and transform block diagrams, is gaining the ability to study the stability						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
	K6_W08		Ability to analyze linear automation systems. Ability to determine static and dynamic characteristics. Ability to stability testing. Knowledge of structures of basic types of controllers, selection of gains and synthesis of a closed control system. Knowledge of basic automation blocks.		[SW3] Assessment of knowledge contained in written work and projects		
	K6_U07		Student can design a closed control system, select regulators and analyze the stability and dynamic properties of the 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	The control system and its components, positive and negative feedback. Laplace transformation, transfer function. Block diagrams. Response in time domain: measurement and calculation for a given transmittance. Frequency response: measurement and calculation for a given transmittance. Automation components: proportional, inertial, derivative, oscillating, delay. The characteristics of typical controllers: P, I, PI, PD, PID. Dynamic of control system. The stability of linear control systems, stability criteria. Sets of controller parameters. Examples of typical control systems.						
Prerequisites and co-requisites							

Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Studies prepared by students	60.0%	50.0%
	Midterm colloquium	60.0%	50.0%
Recommended reading	Basic literature	M. Żelazny <i>Podstawy automatyki</i> , PWN, Warszawa , 1976	
		M. Ferenc <i>Podstawy automatyki</i> , Skrypt pol. Śl,. nr 1003, Gliwice, 1981,	
		A.Urbaniak - <i>Podstawy automatyki</i> , Wyd. Politechniki Poznańskiej, Poznań, 2001,	
		R.H. Bishop - <i>Modern control systems</i> , Dorf R.C., Addison-Wesley Publ. Co., 1995,	
		J.Kowal, - <i>Podstawy automatyki</i> , Wydawnictwa Naukowo-Dydaktyczne AGH, 2006,	
		T.Kaczorek, A. Dzieliński, W. Dąbrowski, R. Łopatka - <i>Podstawy teorii sterowania</i> , WNT,Warszawa, 2005	
	Supplementary literature	A. Markowski, J. Kostro, A. Lewandowski - <i>Automatyka w pytaniach i odpowiedziach</i> ., <i>Wydawnictwa Naukowo-Techniczne</i> , Warszawa, 1985	
		K. Rumatowski <i>Podstawy Automatyki</i> , Wydawnictwo Politechniki Poznańskiej, 2004	
		W. Greblicki <i>Podstawy Automatyki</i> , Oficyna Wydawnicza Politechniki Wrocławskiej, 2006	
		D. Horla <i>Podstawy Automatyki</i> , ćwiczenia labolatoryjne, Poznań 2003	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Determine the stability of the system,		
	Determine the transmittance of the system,		
	Convert the block diagram of the control system,		
	Sketch and analyze the Bode / Nyquist characteristics. for the layout.		
	Select the settings of regulators for which the system will be stable		
	Determine the stability margin		
Work placement	Not applicable		