



Subject card

Subject name and code	Essentials of Automatics, PG_00053183						
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			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	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 hab. inż. Arkadiusz Lewicki dr inż. Daniel Wachowiak					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	20.0	10.0	0.0	0.0	0.0	30
	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	30		3.0		67.0	100
Subject objectives	The subject goal is to show the structure and function of automatic control systems. Student learns the methods of automatic control system describing and methods of linear system analysis of automatic control. He 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.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U07	Student can design a closed control system, select regulators and analyze the stability and dynamic properties of the 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		
	K6_W08	Student can analyze linear automation systems. Is able to determine static and dynamic characteristics. Student knows methods of stability testing. Student can analyse the structures of basic types of controllers, select gains and makes a synthesis of a closed control system.			[SW3] Assessment of knowledge contained in written work and projects		
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
		Midterm colloquium	60.0%
Recommended reading	Basic literature	1. M. Żelazny <i>Podstawy automatyki</i> , PWN, Warszawa , 1976 2. M. Ferenc <i>Podstawy automatyki</i> , Skrypt pol. Śl., nr 1003, Gliwice, 1981, 3. A.Urbaniak - <i>Podstawy automatyki</i> , Wyd. Politechniki Poznańskiej, Poznań, 2001, 4. R.H. Bishop - <i>Modern control systems</i> , Dorf R.C., Addison-Wesley Publ. Co., 1995, 5. J.Kowal, - <i>Podstawy automatyki</i> , Wydawnictwa Naukowo-Dydaktyczne AGH, 2006, 6. T.Kaczorek, A. Dzieliński, W. Dąbrowski, R. Łopatka - <i>Podstawy teorii sterowania</i> , WNT,Warszawa, 2005	
	Supplementary literature	1. A. Markowski, J. Kostro, A. Lewandowski - <i>Automatyka w pytaniach i odpowiedziach</i> ., <i>Wydawnictwa Naukowo-Techniczne</i> , Warszawa, 1985 2. K. Rumatowski <i>Podstawy Automatyki</i> , Wydawnictwo Politechniki Poznańskiej, 2004 3. W. Greblicki <i>Podstawy Automatyki</i> , Oficyna Wydawnicza Politechniki Wrocławskiej, 2006 4. D. Horla <i>Podstawy Automatyki, ćwiczenia laboratoryjne</i> , 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		