



## Subject card

Subject name and code	Fundamentals of Control, PG_00056914						
Field of study	Electrical Engineering						
Date of commencement of studies	October 2022	Academic year of realisation of subject			2023/2024		
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 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: <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11155">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=11155</a>						
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_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 fulfillment		
	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		
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%	50.0%
	Studies prepared by students	60.0%	50.0%
Recommended reading	Basic literature	<p>M. Żelazny <i>Podstawy automatyki</i>, PWN, Warszawa ,1976</p> <p>M. Ferenc <i>Podstawy automatyki</i>, Skrypt pol. Śl., nr 1003, Gliwice, 1981,</p> <p>A.Urbaniak - <i>Podstawy automatyki</i>, Wyd. Politechniki Poznańskiej, Poznań, 2001,</p> <p>R.H. Bishop - <i>Modern control systems</i>, Dorf R.C., Addison-Wesley Publ. Co., 1995,</p> <p>J.Kowal, - <i>Podstawy automatyki</i>, Wydawnictwa Naukowo-Dydaktyczne AGH, 2006,</p> <p>T.Kaczorek, A. Dzieliński, W. Dąbrowski, R. Łopatka - <i>Podstawy teorii sterowania</i>, WNT, Warszawa, 2005</p>	
	Supplementary literature	<p>A. Markowski, J. Kostro, A. Lewandowski - <i>Automatyka w pytaniach i odpowiedziach</i>., <i>Wydawnictwa Naukowo-Techniczne</i>, Warszawa, 1985</p> <p>K. Rumatowski <i>Podstawy Automatyki</i>, Wydawnictwo Politechniki Poznańskiej, 2004</p> <p>W. Greblicki <i>Podstawy Automatyki</i>, Oficyna Wydawnicza Politechniki Wrocławskiej, 2006</p> <p>D. Horla <i>Podstawy Automatyki, ćwiczenia labolatoryjne</i>, Poznań 2003</p>	
	eResources addresses	<p>Adresy na platformie eNauczanie:            PODSTAWY AUTOMATYKI [ET][2023/24] - Moodle ID: 28436  <a href="https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28436">https://enauczanie.pg.edu.pl/moodle/course/view.php?id=28436</a></p>	
Example issues/ example questions/ tasks being completed	<p>Determine the stability of the system,</p> <p>Determine the transmittance of the system,</p> <p>Convert the block diagram of the control system,</p> <p>Sketch and analyze the Bode / Nyquist characteristics. for the layout.</p> <p>Select the settings of regulators for which the system will be stable</p> <p>Determine the stability margin</p>		
Work placement	Not applicable		