



Subject card

Subject name and code	Automatic and control engineering, PG_00044602						
Field of study	Transport						
Date of commencement of studies	October 2024	Academic year of realisation of subject			2025/2026		
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	Full-time studies	Mode of delivery			at the university		
Year of study	2	Language of instruction			Polish		
Semester of study	4	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Electrified Transportation -> Faculty of Electrical and Control Engineering -> Faculties of Gdańsk University of Technology						
Name and surname of lecturer (lecturers)	Subject supervisor		dr inż. Sławomir Judek				
	Teachers		dr inż. Sławomir Judek				
Lesson types	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	15.0	0.0	0.0	0.0	45
	E-learning hours included: 0.0						
	eNauczanie source addresses: Moodle ID: 4227 Automatyka i sterowanie [Transport][2025/26] https://enauczanie.pg.edu.pl/2025/course/view.php?id=4227						
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	45	5.0		25.0		75
Subject objectives	Understanding of automatic control systems and control devices. The acquisition of the ability to solve simple problems of automation and control.						
Learning outcomes	Course outcome		Subject outcome		Method of verification		
Subject contents	Course content – lecture LECTURE Basic concepts of automation. Mathematical modeling of linear one-dimensional description of dynamic systems. Examples of control systems. The Laplace transform. Models of dynamic systems: electrical, mechanical, electromechanical and liquid-level. Continuous and discrete of control systems. Block diagrams. Linear feedback control systems functions, elements and structure, mathematical description, transfer functions, frequency domain characteristics, stability. Mathematical conditions of stability control system - stability criterion. PID controllers, tuning rules. Steady-state errors, dynamic errors, feedback control systems synthesis. Analysis and design of control systems with Matlab. Example problems and solutions. Controllability and observability. Introduction to nonlinear feedback control systems. Digital control algorithms. Equipments and components automation systems. Programmable control systems, computer aided control. supervisory Control And Data Acquisition SCADA. Intelligent Transport Systems. TUTORIALS Models of dynamic systems: electrical, mechanical, electromechanical, liquid-level systems. Mathematical models of continuous linear dynamic systems: time models (differential equations, state variables), models of frequency (transfer function, spectral transmittance), the basic dynamic units (inertialess, integrating, differential, inertial first and second row). The stability of dynamical systems: basic concepts, the study of stability, stability criteria. Programmable logic controllers PLC.						
Prerequisites and co-requisites	Basic knowledge of higher mathematics and physics.						
Assessment methods and criteria	Subject passing criteria		Passing threshold		Percentage of the final grade		
	Midterm colloquium		60.0%		70.0%		
	Practical exercise		60.0%		30.0%		
Recommended reading	Basic literature		Kowal J.: Podstawy automatyki -tom 1. Kraków: AGH, Uczelniane Wydawnictwa Naukowo-dydaktyczne, 2006. Kowal J.: Podstawy automatyki - tom 2. Kraków: AGH, Uczelniane Wydawnictwa Naukowo-dydaktyczne, 2007. Kaczorek T., Dzieliński A., Dąbrowski W., Łopatka R.: Podstawy teorii sterowania. Warszawa: WNT, 2005.				

	Supplementary literature	Domachowski Z.: Automatyka i Robotyka. Podstawy. Gdańsk: Wydawnictwo PG, 2003.
	eResources addresses	
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. What is transmittance? List its most important properties. 2. Specify the principle of selection of the PID controller. Draw a block diagram of the control system. 3. Draw and describe of the block diagram of programmable controller PLC. 	
Practical activities within the subject	Not applicable	

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