



Subject card

Subject name and code	Automatics Equipment, PG_00038096						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2022	Academic year of realisation of subject				2023/2024	
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				4.0	
Learning profile	general academic profile	Assessment form				exam	
Conducting unit	Department of Mechatronics and High Voltage Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Grzegorz Redlarski					
	Teachers	dr inż. lek. Piotr Tojza prof. dr hab. inż. Grzegorz Redlarski dr inż. Mariusz Dąbkowski					
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	30.0	0.0	15.0	0.0	0.0	45
	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	45		4.0		51.0	100
Subject objectives	Gaining the basic knowledge, skills and competencies related to the performance and operation of automation devices						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W07] has basic knowledge related to control and automation systems	The student knows the principles of analysis and design, as well as the selection and configuration of industrial automation devices			[SW1] Assessment of factual knowledge		
	[K6_U07] can build and analyze models of systems and systems in the field related to control systems and automation	The student is able to create mathematical models and design of automation devices tailored to specific needs			[SU1] Assessment of task fulfilment		
	[K6_K04] can react in abnormal and emergency situations, threats to health and life when using automation and robotics components and systems	The student has the knowledge and skills of safe operation of automation devices, as well as the knowledge of how to react in disturbances and emergencies			[SK2] Assessment of progress of work [SK5] Assessment of ability to solve problems that arise in practice		

Subject contents	Introduction, definitions, groups. Requirements for automatics devices. Description methods, static and dynamics characteristics of automatics devices. Systematics of automatics devices. General characteristics of the automatics devices. Types of power for automatics devices. Elements of performing time functions (relays and controllers). Switching elements: electromagnetic relays, reed relay, bimetal elements. Regulators: types and comparing devices constructions, directly and indirectly regulators. The main characteristics and types of regulators. Electrical regulators of the continuous operation. Multipositions regulators with and without correction. Pulse and stepper regulators. Operating characteristics of the regulators. Actuators: general characteristics, types and selection of actuators. Methods for evaluation of dynamic properties (examples). Electric actuators: construction, principle of operation, materials, static and dynamic characteristics, selected aspects of design. DC Servo motors: types, construction, static and dynamic characteristics, control. AC servo motors: types, construction, static and dynamic characteristics, control. Stepping motors: types, construction, static and dynamic characteristics, control. Pneumatic automatics devices: general characteristics, the preparation of air supply and support equipment, methods of describing the dynamic properties (examples), the elements of power and displacement. The basic measuring mechanical elements of automatics devices. Pneumatic cascade. Pneumatic regulators. Pneumatic power amplifiers, setpoints, pneumatic actuators, valves. Hydraulic automatics devices: advantages and disadvantages, types of working medium, power stations, distributor devices, actuators. Formulating technical requirements, certificate, acceptance tests. Sample analysis of automatics device.											
Prerequisites and co-requisites	Basics of electrical engineering and metrology.											
Assessment methods and criteria	<table border="1" data-bbox="451 573 1487 678"> <thead> <tr> <th data-bbox="451 573 798 611">Subject passing criteria</th> <th data-bbox="805 573 1141 611">Passing threshold</th> <th data-bbox="1149 573 1487 611">Percentage of the final grade</th> </tr> </thead> <tbody> <tr> <td data-bbox="451 618 798 645">Lectures</td> <td data-bbox="805 618 1141 645">60.0%</td> <td data-bbox="1149 618 1487 645">60.0%</td> </tr> <tr> <td data-bbox="451 651 798 678">Laboratory</td> <td data-bbox="805 651 1141 678">60.0%</td> <td data-bbox="1149 651 1487 678">40.0%</td> </tr> </tbody> </table>			Subject passing criteria	Passing threshold	Percentage of the final grade	Lectures	60.0%	60.0%	Laboratory	60.0%	40.0%
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Lectures	60.0%	60.0%										
Laboratory	60.0%	40.0%										
Recommended reading	Basic literature	<ol style="list-style-type: none"> 1. Skrypt do laboratorium pod red. A. Grono: Mechatronika. Gdańsk 2008. Wydawnictwo Politechniki Gdańskiej. 2. Parr, Andrew E.: Hydraulics and Pneumatics: a technicians and engineers guide. Oxford: Butterworth-Heinemann, 2000. 										
	Supplementary literature	1. Kostro J.: <i>Elementy, urządzenia i układy automatyki</i> , WSiP, Warszawa 1998.										
	eResources addresses	Adresy na platformie eNauczenie: URZĄDZENIA AUTOMATYKI [2023/24] - Moodle ID: 36031 https://enauczenie.pg.edu.pl/moodle/course/view.php?id=36031										
Example issues/ example questions/ tasks being completed	<ol style="list-style-type: none"> 1. Structures and types of automation devices. 2. The automation devices in electric power systems. 3. Hydraulic and pneumatic devices and systems. 4. Communications between automation devices and systems. 5. Design methodology of selected automation systems. 											
Work placement	Not applicable											

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