GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Automatics Equipment, PG_00038096		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2025	Academic year of realisation of subject	2026/2027
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 -> Wydziały Politechniki Gdańskiej		
Name and surname of lecturer (lecturers)	Subject supervisor	prof. dr hab. inż. Grzegorz Redlarski	
	Teachers		

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_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	[SK5] Assessment of ability to solve problems that arise in practice [SK2] Assessment of progress of work
[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_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

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.

<table>
<tr><td>Prerequisites and co-requisites</td><td colspan="3">Basics of electrical engineering and metrology.</td></tr>
<tr><td>Assessment methods and criteria</td><td colspan="3"><table><tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr><tr><td>Laboratory</td><td>60.0%</td><td>40.0%</td></tr><tr><td>Lectures</td><td>60.0%</td><td>60.0%</td></tr></table></td></tr>
<tr><td rowspan="3">Recommended reading</td><td>Basic literature</td><td colspan="2">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.</td></tr>
<tr><td>Supplementary literature</td><td colspan="2">1. Kostro J.: Elementy, urządzenia i układy automatyki, WSiP, Warszawa 1998.</td></tr>
<tr><td>eResources addresses</td><td colspan="2">Adresy na platformie eNauczanie:</td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td colspan="3">1. Structures and types of automatiion 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.</td></tr>
<tr><td>Work placement</td><td colspan="3">Not applicable</td></tr>
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