



## Subject card

Subject name and code	CONTROL ENGINEERING, PG_00053204						
Field of study	Automation, Robotics and Control Systems						
Date of commencement of studies	October 2021	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	3	Language of instruction			Polish		
Semester of study	6	ECTS credits			3.0		
Learning profile	general academic profile	Assessment form			assessment		
Conducting unit	Department of Control Engineering -> Faculty of Electrical and Control Engineering						
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jacek Zawalich					
	Teachers	dr inż. Jacek Zawalich					
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	3.0		27.0		75
Subject objectives	The aim of the course is to provide theoretical and practical knowledge in the field of construction, design and maintenance of automated posts and processes in an industrial environment with the use of professional hardware and software engineering.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	K6_U07	The student solves tasks in the field of design, modeling and simulation of objects, processes, systems and control systems. The student freely uses simulation programs in the field of object modeling and control systems. The student develops programs to be implemented in PLCs or industrial computers.			[SU3] Assessment of ability to use knowledge gained from the subject [SU4] Assessment of ability to use methods and tools		
	K6_W07	Student identifies and classifies typical technical objects. The student presents the basic methods of modeling and simulation of objects, processes and control systems. The student knows the methods of designing simple control systems of various physical quantities in industrial conditions.			[SW3] Assessment of knowledge contained in written work and projects		

Subject contents	<p>LECTURE</p> <p>Classification of control and regulation. Examples of industrial control systems. Control object models, the sensing elements and implementing their properties, static and dynamic characteristics. Methods for identifying industrial, systems, components and controls. Structure of an industrial control systems. Types of industrial control devices. The choice of control devices, measuring and implementing technical designs. Criteria for assessing control complex control and regulation systems. Examples of applicable solutions to complex control systems and control systems in the industry. Designing automation systems.</p> <p>LABORATORY</p> <p>Identify and develop models of selected objects, the choice of regulator, measuring devices and actuators, designing of automatic control systems using PLC.</p>		
Prerequisites and co-requisites	Knowledge of Fundamentals Automation		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Reports of laboratory exercises	100.0%	40.0%
	Colloquium	50.0%	60.0%
Recommended reading	Basic literature	<ol style="list-style-type: none"> <li>1. Findeisen W.: Technika regulacji automatycznej. Warszawa: PWN 1976.</li> <li>2. Kaczorek T.: Teoria układów regulacji automatycznej, Warszawa: WNT 1977.</li> <li>3. Tatjewski P.: Sterowanie zaawansowane obiektów przemysłowych. Struktury i algorytmy. Warszawa: EXIT 2002.</li> <li>4. Mitkowski W.: Stabilizacja systemów dynamicznych. Kraków: AGH 1996.</li> <li>5. Piegat A.: Modelowanie i sterowanie rozmyte. Warszawa: EXIT 1999.</li> <li>6. Nowakowski J.: Podstawy automatyki. Tom I. Gdańsk: Wyd. PG 1992.</li> <li>7. Ogata K.: Modern Control Engineering. 4th edition. Prentice Hall 2002.</li> </ol>	
	Supplementary literature	<ol style="list-style-type: none"> <li>1. Próchnicki W., Dzida M.: Zbiór zadań z podstaw automatyki. Gdańsk: Wyd. PG 1993.</li> <li>2. Urbaniak A.: Automatykacja w inżynierii sanitarnej. Poznań: Wyd. Pol. Poznańskiej 1985.</li> <li>3. Raven F.H.: Automatic Control Engineering. McGraw-Hill 1988.</li> </ol>	
	eResources addresses	<p>Adresy na platformie eNauczanie:</p> <p>TECHNIKA STEROWANIA [2023/24] - Moodle ID: 36016  <a href="https://enauzanie.pg.edu.pl/moodle/course/view.php?id=36016">https://enauzanie.pg.edu.pl/moodle/course/view.php?id=36016</a></p>	
Example issues/ example questions/ tasks being completed	<p>Prepare model of the temperature control of the water tank.</p> <p>Perform the analysis stability control system in the reservoir water level with a delay.</p> <p>Design a heating control system in the warehouse for storage of vegetables and fruits.</p> <p>Prepare a lift control algorithm in a four-storey building.</p>		
Work placement	Not applicable		