



## Subject card

Subject name and code	Automation and Control Engineering, PG_00055965						
Field of study	Power Engineering, Power Engineering, Power Engineering						
Date of commencement of studies	October 2023	Academic year of realisation of subject			2025/2026		
Education level	first-cycle studies	Subject group			Optional subject group 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 Polish		
Semester of study	6	ECTS credits			4.0		
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						
Lesson types and methods of instruction	Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
	Number of study hours	15.0	15.0	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	6.0		49.0		100
Subject objectives	The aim of the course is to provide theoretical and practical knowledge in the field of construction, design and servicing of automated facilities and technical processes in industrial conditions with the use of computer hardware and engineering software.						
Learning outcomes	Course outcome	Subject outcome			Method of verification		
	[K6_W03] knows the basics of automation and automatic regulation, knows the principles of the selection of electrical devices, drive systems and their control	Student defines, distinguishes and classifies basic automation objects. The student presents the basic methods of modeling, simulation and control of technical objects together with the principles of selecting their elements.			[SW3] Assessment of knowledge contained in written work and projects		
	[K6_U02] is able to apply the learned mathematical methods to the analysis and design of elements, systems and energy systems	The student solves tasks in the field of design, modeling and simulation of systems and automation systems used in the power industry.			[SU1] Assessment of task fulfilment		
Subject contents	<p><b>LECTURE</b> Structures of control systems for objects and technical processes in the power industry. Examples of industrial control systems. Types of industrial measuring, executive and control devices, their selection and basic characteristics. Methods of identification, modeling and simulation of objects and energy automation systems. Power system automation. Automated power plants, automatic generating sets, automatic synchronization of generators, active and reactive power distribution.</p> <p><b>LABORATORY</b> Designing control and monitoring systems for automated energy systems, based on programmable controllers and a visualization system. Analysis of the operation of the selected system, technical assumptions, defining the functions implemented in the programmable controller and visualization systems, control algorithms, technical documentation.</p> <p><b>EXERCISES</b> Mathematical methods for the analysis and design of automation components and systems used in energy systems. Methods of selection of used measuring and executive equipment.</p>						

Prerequisites and co-requisites	Knowledge of the Fundamentals of Automation.		
Assessment methods and criteria	Subject passing criteria	Passing threshold	Percentage of the final grade
	Lecture	60.0%	60.0%
	Laboratory	60.0%	20.0%
	Exercises	60.0%	20.0%
Recommended reading	Basic literature	1. Findeisen W.: Technika regulacji automatycznej. Warszawa: PWN 1976. 2. Kaczorek T.: Teoria układów regulacji automatycznej, Warszawa: WNT 1979. 3. Tatjewski P.: Sterowanie zaawansowane obiektów przemysłowych. Struktury i algorytmy. Warszawa: EXIT 2002. 4. Śmierchalski R.: Automatyzacja systemów energetycznych statku, Wydawnictwo Gryf, Gdańsk 2004. 5. Winkler W., Wiszniewski A.: Automatyka zabezpieczeniowa w systemach elektroenergetycznych. WNT, Warszawa 2004. 6. Piegat A.: Modelowanie i sterowanie rozmyte. Warszawa: EXIT 1999. 7. Ogata K.: Modern Control Engineering. 4th edition. Prentice Hall 2002.	
	Supplementary literature	1. Próchnicki W., Dzida M.: Zbiór zadań z podstaw automatyki. Gdańsk: Wyd. PG 1993. 3. Raven F.H.: Automatic Control Engineering. McGraw-Hill 1988. 4. Dokumentacja techniczna: Programowalny sterownik S7-1200 Podręcznik systemu. Wydanie 04/2009	
	eResources addresses	Adresy na platformie eNauczanie:	
Example issues/ example questions/ tasks being completed	Carry out an analysis of the water level control system in the tank. Design a heating control system in the production hall. Develop alarm algorithms in the turbogenerator control system.		
Work placement	Not applicable		