GDAŃSK UNIVERSITY OF TECHNOLOGY

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 -> Faculties of Gdańsk University of Technology		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Jacek Zawalich	
	Teachers	dr inż. Jacek Zawalich	

Lesson types

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

eNauczanie source addresses:

Moodle ID: 3811 Automatyka i sterowanie [EE][2025/26]
https://enauczanie.pg.edu.pl/2025/course/view.php?id=3811

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

<table>
<tr><td>Subject contents</td><td>Course content – lecture
LECTURE
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.

LABORATORY
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.

EXERCISES
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.</td></tr>
<tr><td>Prerequisites and co-requisites</td><td>Knowledge of the Fundamentals of Automation.</td></tr>
<tr><td>Assessment methods and criteria</td><td>
<table>
<tr><th>Subject passing criteria</th><th>Passing threshold</th><th>Percentage of the final grade</th></tr>
<tr><td>Exercises</td><td>60.0%</td><td>20.0%</td></tr>
<tr><td>Laboratory</td><td>60.0%</td><td>20.0%</td></tr>
<tr><td>Lecture</td><td>60.0%</td><td>60.0%</td></tr>
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<tr><td>Recommended reading</td><td>
<table>
<tr><td>Basic literature</td><td>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. Śmierzchalski 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.</td></tr>
<tr><td>Supplementary literature</td><td>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</td></tr>
<tr><td>eResources addresses</td><td></td></tr>
</table>
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<tr><td>Example issues/ example questions/ tasks being completed</td><td>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.</td></tr>
<tr><td>Practical activites within the subject</td><td>Not applicable</td></tr>
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