GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	Automatics and Control Engineering, PG_00042164		
Field of study	Power Engineering, Power Engineering, Power Engineering, Power Engineering, Power Engineering		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2022/2023
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
Semester of study	6	ECTS credits	2.0
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	0.0	0.0	0.0	30

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	30	3.0	17.0	50

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_W06	Student defines, distinguishes and classifies basic automation objects. The student presents the methods of modeling, simulation, control and diagnostics for technical objects together with the principles of selecting their components. He knows the principles of operation of energy systems and the methods of using renewable energy sources.	[SW3] Assessment of knowledge contained in written work and projects
K6_U04	The student develops control projects for technical objects in the field of energy together with algorithms implemented in PLC. He can design electrical installations and select, operate, control and diagnose electrical devices.	[SU2] Assessment of ability to analyse information [SU3] Assessment of ability to use knowledge gained from the subject

<table>
<tr><td>Subject contents</td><td>LECTURE
Control objects, division and classification of automation systems and systems. The scope of automation of industrial systems. Regulations and requirements for the control of automation systems. Structures of control systems for objects and technical processes. Integrated control systems. Examples of industrial control systems. Types of industrial measuring, executive and control devices, their selection and characteristics. Methods of identification, modeling and simulation of objects and automation systems. Criteria of the control quality of technical systems. Power system automation. Renewable energy sources. Automated power plants. Generating set automatics, automatic generator synchronization, active and reactive power distribution.

EXCERCISE
Development of the design of the control and monitoring system of the selected automated technical system, based on programmable controllers and a visualization system. The project includes: analysis of the operation of the selected system, development of technical assumptions, determination of the set of input and output signals and functions performed in the visualization system and in the programmable controller, modeling in conjunction with the visualization system, control algorithms, checking the system as well as the development of technical documentation.</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>Exercise</td><td>60.0%</td><td>40.0%</td></tr>
<tr><td>Lecture</td><td>60.0%</td><td>60.0%</td></tr>
</table></td></tr>
<tr><td>Recommended reading</td><td><table>
<tr><td>Basic literature</td><td>LISTA LEKTUR

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. Jstrzębska G.: Energia ze źródeł odnawialnych i jej wykorzystanie. WKŁ 2017
7. Lubośny Z.: Elektroenergetyczna automatyka zabezpieczeniowa farm wiatrowych. PWN 2020.
8. Piegat A.: Modelowanie i sterowanie rozmyte. Warszawa: EXIT 1999.
9. 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.
2. Raven F.H.: Automatic Control Engineering. McGraw-Hill 1988.
3. Dokumentacja techniczna: Programowalny sterownik S7-1200 Podręcznik systemu. Wydanie 04/2009.</td></tr>
<tr><td>eResources addresses</td><td>Adresy na platformie eNauczanie:</td></tr>
</table></td></tr>
<tr><td>Example issues/ example questions/ tasks being completed</td><td>Analyze 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>Work placement</td><td>Not applicable</td></tr>
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