GDAŃSK UNIVERSITY OF TECHNOLOGY

Subject card

Subject name and code	, PG_00061800		
Field of study	Automation, Robotics and Control Systems		
Date of commencement of studies	October 2020	Academic year of realisation of subject	2023/2024
Education level	first-cycle studies	Subject group	
Mode of study	Full-time studies	Mode of delivery	at the university
Year of study	4	Language of instruction	Polish Polish
Semester of study	7	ECTS credits	3.0
Learning profile	general academic profile	Assessment form	assessment
Conducting unit	Department of Controlled Electric Drives -> Faculty of Electrical and Control Engineering		
Name and surname of lecturer (lecturers)	Subject supervisor	dr inż. Mirosław Włas	
	Teachers		

Lesson types and methods of instruction

Lesson type	Lecture	Tutorial	Laboratory	Project	Seminar	SUM
Number of study hours	15.0	0.0	15.0	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	5.0	40.0	75

Subject objectives

The main content is the design, integration and visualization of industrial process control systems, constructed on the basis of CSCADA class visualization software. Types of industrial facilities with PLCs and converters. Types and methods of control of industrial automation systems. Principles of selection of conductors and apparatuses and protections for power electronic equipment. Selection of control and control apparatus. Machine safety. Methods of creating designs and drawing electrical diagrams. Hardware requirements for automatic control and regulation systems.

Learning outcomes

Course outcome	Subject outcome	Method of verification
[K6_W06] knows the structure of computers and microprocessors and the tasks of operating systems, has basic knowledge of the basics of computer software, drivers, microprocessor technology, design of simple algorithms and the operation of information networks	The student lists and characterizes the basic types of electronic and power electronic devices used in industry, explains the control methods of industrial automation systems, and designs the power supply of instrumentation and control systems.	[SW3] Assessment of knowledge contained in written work and projects [SW1] Assessment of factual knowledge
[K6_U01] can obtain information from literature, databases and other sources; integrate the information obtained, interpret it and draw conclusions, formulate and justify opinions	The student is able to analyze technical and operating documents of industrial automation equipment.	[SU4] Assessment of ability to use methods and tools [SU1] Assessment of task fulfilment
[K6_U03] can prepare and present a presentation on the problems and results of an engineering task	The student designs a sample AKPIA system at the level of control and visualization of control of industrial facilities with drive systems.	[SU5] Assessment of ability to present the results of task [SU3] Assessment of ability to use knowledge gained from the subject

Subject contents	LECTURE The main content is the design, integration and visualization of industrial process control systems, constructed on the basis of CAD/CAD class design software and SCADA class visualization software. Types of industrial objects with PLCs and converters. Types and methods of control of industrial automation systems. Principles of selection of conductors and apparatuses and protection for power electronic equipment. Selection of control and control apparatus. Power supply and redundancy of industrial automation systems, PLCs and LCD touch panels. Machine safety - safety categories and stop categories. Methods of creating designs and drawing electrical diagrams. Hardware requirements for automatic control and regulation systems. LABORATORY EXERCISES During the course of the exercise, which is set for the whole semester, students will get acquainted with a wide range of tasks carried out by modern industrial automation systems, starting from the automation of the production process with the use of PLCs, frequency converters with induction motors, servo drives with PMSM motors, through the visualization and control of the process from the level of SCADA class control and supervision stations. The laboratory is equipped with PCs, software: iFIX 4.5, InTouch 10, Citec 6.1, Borland C, as well as drive systems, industrial automation systems and taskers that are models of real industrial objects.
Prerequisites and co-requisites	
Assessment methods and criteria	

Subject passing criteria	Passing threshold	Percentage of the final grade
Report	60.0%	100.0%

Recommended reading	Basic literature	1. Niestępski S., Parol M. i In.: Instalacje Elektryczne Budowa, Projektowanie i Eksploatacja Oficyna Wydawnicza Politechniki Warszawskiej, Warszawa 2001 2. Wiatr J.: Poradnik Projektanta Elektryka Dom Wydawniczy Medium Warszawa 2006. 3. Jakuszewski R.: Programowanie systemów SCADA. WPK J. Skalmierskiego, Gliwice 2002
	Supplementary literature	J. Szymański Co warto wiedzieć o napięciowych przemiennikach częstotliwości Rzeszów 2001
	eResources addresses	Adresy na platformie eNauczanie:
Example issues/ example questions/ tasks being completed		1. Design and construction of a conveyor belt drive model (Mitsubishi st. 9). 2. Stepper motor control using EtherCAT (Beckhoff st. 2). 3. Drive of a goods-person elevator with an induction motor.(st. 7 FCM 300 inverter, PLC - Moeller XC-200). 4. Pumping station model.(st. 3, ABB inverter, Siemens S1200 controller). 5. Control of a 3-axis milling plotter.(st. 1. servo drives and stepper motors and PLC from B&R).
Work placement	Not applicable	