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 2021	Academic year of realisation of subject	2024/2025
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
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

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		